



## IMPORTANT INTERVIEW TOPICS

### COBOL

Redefines, Renames & Condition Names

Search & Search All

Perform varying.

Index & Subscript

Static Call & Dynamic Call

String, Unstring & Inspect.

Usage Clauses.

Error Codes.

Amode & Rmode

### CICS

TSQ & TDQ

IBM Supplied Transaction.

Types of transaction initiation.

BMS (MDT, Cursor Positioning, TIOA, Skipper&stopper)

Pseudo Conversation (Types)

Link & Xctl

Browsing & Read Prev

STI & ATI

Start, Delay, Load, DEQ, Rollback, SyncPoint.

## **DB2**

Tables, TableSpace, DataBase, Index, IndexSpace, BufferPool

Type of tablespaces

DML -- Queries, SubQueries, Joins, Corr. SubQuery

DCL - Grant, Revoke

Cursors - Fetch, Open, Close

Bind , Rebind.

DCLGEN, SPUFI, QMF

Locks, Isolation Level, Cursor Stability, Repeatable Read.

Commit, Rollback, Database Recovery.

Utilities: Load, runstats, Copy

SQL Codes.

## **MVS**

JES2, JES3

O/S - MVS, DOS, VSAM

Paging, Swapping.

Frames, Slots

Communication Devices, Control Units.

Processors

System Initialisation.

System DataSet.

## **JCL**

Job Card

Exec, Prgm/ Proc, Restart, Cond, Param

DD ----- Disp, Space, DCB

Sysin, Sysout, Sysprint, Sysdumb, Sysabend

Instream & Catalog Procedure

Utilities - IEBCOPY, SORT, IEBGEN

RESTART & check pont parameter

COND Parameter

Notify, Parm, Dprty, class

GDG -- Limit, Scratch

## **VSAM**

CI, CA, Splits

Freespaces.

Organisation of VSAM

ESDS, KSDS, RRDS, LDS

Define Cluster , AIX, BuildAoix, Verify, REPRO

IDCAMS

# POPULAR INTERVIEW QUESTIONS

## COBOL & COBOL II

**Q1) Name the divisions in a COBOL program ?.**

A1) IDENTIFICATION DIVISION, ENVIRONMENT DIVISION, DATA DIVISION, PROCEDURE DIVISION.

**Q2) What are the different data types available in COBOL?**

A2) Alpha-numeric (X), alphabetic (A) and numeric (9).

**Q3) What does the INITIALIZE verb do? - GS**

A3) Alphabetic, Alphanumeric fields & alphanumeric edited items are set to SPACES. Numeric, Numeric edited items set to ZERO. FILLER , OCCURS DEPENDING ON items left untouched.

**Q4) What is 77 level used for ?**

A4) Elementary level item. Cannot be subdivisions of other items (cannot be qualified), nor can they be subdivided themselves.

**Q5) What is 88 level used for ?**

A5) For condition names.

**Q6) What is level 66 used for ?**

A6) For RENAMES clause.

**Q7) What does the IS NUMERIC clause establish ?**

A7) IS NUMERIC can be used on alphanumeric items, signed numeric & packed decimal items and unsigned numeric & packed decimal items. IS NUMERIC returns TRUE if the item only consists of 0-9. However, if the item being tested is a signed item, then it may contain 0-9, + and - .

**Q8) How do you define a table/array in COBOL?**

A8) ARRAYS.

05 ARRAY1 PIC X(9) OCCURS 10 TIMES.

05 ARRAY2 PIC X(6) OCCURS 20 TIMES INDEXED BY WS-INDEX.

**Q9) Can the OCCURS clause be at the 01 level?**

A9) No.

**Q10) What is the difference between index and subscript? - GS**

A10) Subscript refers to the array occurrence while index is the displacement (in no of bytes) from the beginning of the array. An index can only be modified using PERFORM, SEARCH & SET. Need to have index for a table in order to use SEARCH, SEARCH ALL.

**Q11) What is the difference between SEARCH and SEARCH ALL? - GS**

A11) SEARCH - is a serial search.

SEARCH ALL - is a binary search & the table must be sorted ( ASCENDING/DESCENDING KEY clause to be used & data loaded in this order) before using SEARCH ALL.

**Q12) What should be the sorting order for SEARCH ALL? - GS**

A12) It can be either ASCENDING or DESCENDING. ASCENDING is default. If you want the search to be done on an

array sorted in descending order, then while defining the array, you should give DESCENDING KEY clause. (You must load the table in the specified order).

**Q13) What is binary search?**

A13) Search on a sorted array. Compare the item to be searched with the item at the center. If it matches, fine else repeat the process with the left half or the right half depending on where the item lies.

**Q14) My program has an array defined to have 10 items. Due to a bug, I find that even if the program access the 11th item in this array, the program does not abend. What is wrong with it?**

A14) Must use compiler option SSRANGE if you want array bounds checking. Default is NOSSRANGE.

**Q15) How do you sort in a COBOL program? Give sort file definition, sort statement syntax and meaning. - GS**

A15) Syntax: SORT file-1 ON ASCENDING/DESCENDING KEY key.... USING file-2 GIVING file-3.

USING can be substituted by INPUT PROCEDURE IS para-1 THRU para-2  
GIVING can be substituted by OUTPUT PROCEDURE IS para-1 THRU para-2.

file-1 is the sort (work) file and must be described using SD entry in FILE SECTION.  
file-2 is the input file for the SORT and must be described using an FD entry in FILE SECTION and SELECT clause in FILE CONTROL.  
file-3 is the out file from the SORT and must be described using an FD entry in FILE SECTION and SELECT clause in FILE CONTROL.  
file-1, file-2 & file-3 should not be opened explicitly.

INPUT PROCEDURE is executed before the sort and records must be RELEASEd to the sort work file from the input procedure.

OUTPUT PROCEDURE is executed after all records have been sorted. Records from the sort work file must be RETURNed one at a time to the output procedure.

**Q16) How do you define a sort file in JCL that runs the COBOL program?**

A16) Use the SORTWK01, SORTWK02,..... dd names in the step. Number of sort datasets depends on the volume of data being sorted, but a minimum of 3 is required.

**Q17) What is the difference between performing a SECTION and a PARAGRAPH? - GS**

A17) Performing a SECTION will cause all the paragraphs that are part of the section, to be performed.  
Performing a PARAGRAPH will cause only that paragraph to be performed.

**Q18) What is the use of EVALUATE statement? - GS**

A18) Evaluate is like a case statement and can be used to replace nested Ifs. The difference between EVALUATE and case is that no 'break' is required for EVALUATE i.e. control comes out of the EVALUATE as soon as one match is made.

**Q19) What are the different forms of EVALUATE statement?**

A19)

EVALUATE  
WHEN A=B AND C=D  
imperative stmt

EVALUATE SQLCODE ALSO FILE-STATUS  
WHEN 100 ALSO '00'  
imperative stmt

```

    WHEN (D+X)/Y = 4
        imperative stmt
    WHEN OTHER
        imperative stmt
END-EVALUATE

```

```

    WHEN -305 ALSO '32'
        imperative stmt
    WHEN OTHER
        imperative stmt
END-EVALUATE

```

```

EVALUATE SQLCODE ALSO A=B
    WHEN 100 ALSO TRUE
        imperative stmt
    WHEN -305 ALSO FALSE
        imperative stmt
END-EVALUATE

```

```

EVALUATE SQLCODE ALSO TRUE
    WHEN 100 ALSO A=B
        imperative stmt
    WHEN -305 ALSO (A/C=4)
        imperative stmt
END-EVALUATE

```

**Q20) How do you come out of an EVALUATE statement? - GS**

A20) After the execution of one of the when clauses, the control is automatically passed on to the next sentence after the EVALUATE statement. There is no need of any extra code.

**Q21) In an EVALUATE statement, can I give a complex condition on a when clause?**

A21) Yes.

**Q22) What is a scope terminator? Give examples.**

A22) Scope terminator is used to mark the end of a verb e.g. EVALUATE, END-EVALUATE; IF, END-IF.

**Q23) How do you do in-line PERFORM? - GS**

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A23) PERFORM ... <UNTIL> ...
    <sentences>
END-PERFORM

```

**Q24) When would you use in-line perform?**

A24) When the body of the perform will not be used in other paragraphs. If the body of the perform is a generic type of code (used from various other places in the program), it would be better to put the code in a separate Paragraph and use PERFORM Paragraph name rather than in-line perform.

**Q25) What is the difference between CONTINUE & NEXT SENTENCE ?**

A25) They appear to be similar, that is, the control goes to the next sentence in the paragraph. But, Next Sentence would take the control to the sentence after it finds a full stop (.). Check out by writing the following code example, one if sentence followed by 3 display statements (sorry they appear one line here because of formatting restrictions) If 1 > 0 then next sentence end if display 'line 1' display 'line 2'. display 'line 3'. \*\*\* Note- there is a dot (.) only at the end of the last 2 statements, see the effect by replacing Next Sentence with Continue \*\*\*

**Q26) What does EXIT do ?**

A26) Does nothing ! If used, must be the only sentence within a paragraph.

**Q27) Can I redefine an X(100) field with a field of X(200)?**

A27) Yes. Redefines just causes both fields to start at the same location. For example:

```

01 WS-TOP PIC X(1)

```

01 WS-TOP-RED REDEFINES WS-TOP PIC X(2).  
If you MOVE '12' to WS-TOP-RED,  
DISPLAY WS-TOP will show 1 while  
DISPLAY WS-TOP-RED will show 12.

**A28) Can I redefine an X(200) field with a field of X(100) ?**

Q31) 1 Yes.

**Q31)2 What do you do to resolve SOC-7 error? - GS**

Q31) Basically you need to correct the offending data. Many times the reason for SOC7 is an uninitialized numeric item.

Examine that possibility first. Many installations provide you a dump for run time abend's ( it can be generated also

by calling some subroutines or OS services thru assembly language). These dumps provide the offset of the last

instruction at which the abend occurred. Examine the compilation output XREF listing to get the verb and the line

number of the source code at this offset. Then you can look at the source code to find the bug. To get capture the

runtime dumps, you will have to define some datasets (SYSABOUT etc ) in the JCL. If none of these are helpful, use

judgement and DISPLAY to localize the source of error. Some installation might have batch program debugging

tools. Use them.

**Q32) How is sign stored in Packed Decimal fields and Zoned Decimal fields?**

Q32) Packed Decimal fields: Sign is stored as a hex value in the last nibble (4 bits ) of the storage.

Zoned Decimal fields: As a default, sign is over punched with the numeric value stored in the last bite.

**Q33) How is sign stored in a comp-3 field? - GS**

Q33) It is stored in the last nibble. For example if your number is +100, it stores hex 0C in the last byte, hex 1C if

your number is 101, hex 2C if your number is 102, hex 1D if the number is -101, hex 2D if the number is -102 etc...

**Q34) How is sign stored in a COMP field ? - GS**

Q34) In the most significant bit. Bit is ON if -ve, OFF if +ve.

**Q35) What is the difference between COMP & COMP-3 ?**

Q35) COMP is a binary storage format while COMP-3 is packed decimal format.

**Q36) What is COMP-1? COMP-2?**

Q36) COMP-1 - Single precision floating point. Uses 4 bytes.

COMP-2 - Double precision floating point. Uses 8 bytes.

**Q37) How do you define a variable of COMP-1? COMP-2?**

Q37) No picture clause to be given. Example 01 WS-VAR USAGE COMP-1.

**Q38) How many bytes does a S9(7) COMP-3 field occupy ?**

Q38) Will take 4 bytes. Sign is stored as hex value in the last nibble. General formula is  $\text{INT}((n/2) + 1)$ , where n=7 in this example.

**Q39) How many bytes does a S9(7) SIGN TRAILING SEPARATE field occupy ?**

Q39) Will occupy 8 bytes (one extra byte for sign).

**Q40) How many bytes will a S9(8) COMP field occupy ?**

Q40) 4 bytes.

**Q41) What is the maximum value that can be stored in S9(8) COMP?**

Q41) 99999999

**Q42) What is COMP SYNC?**

Q42) Causes the item to be aligned on natural boundaries. Can be SYNCHRONIZED LEFT or RIGHT.

For binary data

items, the address resolution is faster if they are located at word boundaries in the memory. For example, on main

frame the memory word size is 4 bytes. This means that each word will start from an address divisible by 4. If my

first variable is x(3) and next one is s9(4) comp, then if you do not specify the SYNC clause, S9(4) COMP will start

from byte 3 ( assuming that it starts from 0 ). If you specify SYNC, then the binary data item will start from address 4.

You might see some wastage of memory, but the access to this computational field is faster.

**Q43) What is the maximum size of a 01 level item in COBOL I? in COBOL II?**

Q43) In COBOL II: 16777215

**Q44) How do you reference the following file formats from COBOL programs:**

Q44)

Fixed Block File - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS F,

BLOCK CONTAINS 0 .

Fixed Unblocked - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS F,

do not use BLOCK CONTAINS

Variable Block File - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS V, BLOCK

CONTAINS 0. Do not code the 4 bytes for record length in FD ie JCL rec length will be max rec length in pgm + 4

Variable Unblocked - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS V, do not use

BLOCK CONTAINS. Do not code 4 bytes for record length in FD ie JCL rec length will

be max rec length in pgm + 4.

ESDS VSAM file - Use ORGANISATION IS SEQUENTIAL.

KSDS VSAM file - Use ORGANISATION IS INDEXED, RECORD KEY IS, ALTERNATE RECORD KEY IS RRDS File - Use ORGANISATION IS RELATIVE, RELATIVE KEY IS

Printer File - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS F, BLOCK

CONTAINS 0. (Use RECFM=FBA in JCL DCB).

**Q45) What are different file OPEN modes available in COBOL?**

Q45) Open for INPUT, OUTPUT, I-O, EXTEND.

**Q46) What is the mode in which you will OPEN a file for writing? - GS**

Q46) OUTPUT, EXTEND

**Q47) In the JCL, how do you define the files referred to in a subroutine ?**

Q47) Supply the DD cards just as you would for files referred to in the main program.

**Q48) Can you REWRITE a record in an ESDS file? Can you DELETE a record from it?**

Q48) Can rewrite (record length must be same), but not delete.

**Q49) What is file status 92? - GS**

Q49) Logic error. e.g., a file is opened for input and an attempt is made to write to it.

**Q50) What is file status 39 ?**

Q50) Mismatch in LRECL or BLOCKSIZE or RECFM between your COBOL pgm & the JCL (or the dataset label). You will get file status 39 on an OPEN.

**Q51) What is Static and Dynamic linking ?**

Q51) In static linking, the called subroutine is link-edited into the calling program, while in dynamic linking, the subroutine & the main program will exist as separate load modules. You choose static/dynamic linking by choosing either the DYNAM or NODYNAM link edit option. (Even if you choose NODYNAM, a CALL identifier (as opposed to a CALL literal), will translate to a DYNAMIC call). A statically called subroutine will not be in its initial state the next time it is called unless you explicitly use INITIAL or you do a CANCEL. A dynamically called routine will always be in its initial state.

**Q52) What is AMODE(24), AMODE(31), RMODE(24) and RMODE(ANY)? (applicable to only MVS/ESA Enterprise Server).**

Q52) These are compile/link edit options. Basically AMODE stands for Addressing mode and RMODE for Residency mode.  
AMODE(24) - 24 bit addressing;  
AMODE(31) - 31 bit addressing  
AMODE(ANY) - Either 24 bit or 31 bit addressing depending on RMODE.  
RMODE(24) - Resides in virtual storage below 16 Meg line. Use this for 31 bit programs that call 24 bit programs.

(OS/VS Cobol pgms use 24 bit addresses only).

RMODE(ANY) - Can reside above or below 16 Meg line.

**Q53) What compiler option would you use for dynamic linking?**

Q53) DYNAM.

**Q54) What is SSRANGE, NOSSRANGE ?**

Q54) These are compiler options with respect to subscript out of range checking. NOSSRANGE is the default and if chosen, no run time error will be flagged if your index or subscript goes out of the permissible range.

**Q55) How do you set a return code to the JCL from a COBOL program?**

Q55) Move a value to RETURN-CODE register. RETURN-CODE should not be declared in your program.

**Q56) How can you submit a job from COBOL programs?**

Q56) Write JCL cards to a dataset with //xxxxxxx SYSOUT=(A,INTRDR) where 'A' is output class, and dataset should be opened for output in the program. Define a 80 byte record layout for the file.

**Q57) What are the differences between OS VS COBOL and VS COBOL II?**

Q57) OS/VS Cobol pgms can only run in 24 bit addressing mode, VS Cobol II pgms can run either in 24 bit or 31 bit addressing modes.

- I. Report writer is supported only in OS/VS Cobol.
- II. USAGE IS POINTER is supported only in VS COBOL II.
- III. Reference modification e.g.: WS-VAR(1:2) is supported only in VS COBOL II.
- IV. EVALUATE is supported only in VS COBOL II.
- V. Scope terminators are supported only in VS COBOL II.
- VI. OS/VS Cobol follows ANSI 74 stds while VS COBOL II follows ANSI 85 stds.
- VII. Under CICS Calls between VS COBOL II programs are supported.

**Q58) What are the steps you go through while creating a COBOL program executable?**

Q58) DB2 precompiler (if embedded SQL used), CICS translator (if CICS pgm), Cobol compiler, Link editor. If DB2 program, create plan by binding the DBRMs.

**Q59) Can you call an OS VS COBOL pgm from a VS COBOL II pgm ?**

Q59) In non-CICS environment, it is possible. In CICS, this is not possible.

**Q60) What are the differences between COBOL and COBOL II?**

A60) There are at least five differences:

COBOL II supports structured programming by using in line Performs and explicit scope terminators, It introduces

new features (EVALUATE, SET. TO TRUE, CALL. BY CONTEXT, etc) It permits programs to be loaded and

addressed above the 16-megabyte line It does not support many old features (READY TRACE, REPORT-WRITER,

ISAM, Etc.), and It offers enhanced CICS support.

**Q61) What is an explicit scope terminator?**

A61) A scope terminator brackets its preceding verb, e.g. IF .. END-IF, so that all statements between the verb and its scope terminator are grouped together. Other common COBOL II verbs are READ, PERFORM, EVALUATE, SEARCH and STRING.

**Q62) What is an in line PERFORM? When would you use it? Anything else to say about it?**

A62) The PERFORM and END-PERFORM statements bracket all COBOL II statements between them. The COBOL equivalent is to PERFORM or PERFORM THRU a paragraph. In line PERFORMs work as long as there are no internal GO TOs, not even to an exit. The in line PERFORM for readability should not exceed a page length - often it will reference other PERFORM paragraphs.

**Q63) What is the difference between NEXT SENTENCE and CONTINUE?**

A63) NEXT SENTENCE gives control to the verb following the next period. CONTINUE gives control to the next verb after the explicit scope terminator. (This is not one of COBOL II's finer implementations). It's safest to use CONTINUE rather than NEXT SENTENCE in COBOL II.

**Q64) What COBOL construct is the COBOL II EVALUATE meant to replace?**

A64) EVALUATE can be used in place of the nested IF THEN ELSE statements.

**Q65) What is the significance of 'above the line' and 'below the line'?**

A65) Before IBM introduced MVS/XA architecture in the 1980's a program's virtual storage was limited to 16 megs. Programs compiled with a 24 bit mode can only address 16 Mb of space, as though they were kept under an imaginary storage line. With COBOL II a program compiled with a 31 bit mode can be 'above the 16 Mb line. (This 'below the line', 'above the line' imagery confuses most mainframe programmers, who tend to be a literal minded group.)

**Q66) What was removed from COBOL in the COBOL II implementation?**

A66) Partial list: REMARKS, NOMINAL KEY, PAGE-COUNTER, CURRENT-DAY, TIME-OF-DAY, STATE, FLOW, COUNT, EXAMINE, EXHIBIT, READY TRACE and RESET TRACE.

**Q67) Explain call by context by comparing it to other calls.**

A67) The parameters passed in a call by context are protected from modification by the called program. In a normal call they are able to be modified.

**Q68) What is the linkage section?**

A68) The linkage section is part of a called program that 'links' or maps to data items in the calling program's working storage. It is the part of the called program where these share items are defined.

**Q69) What is the difference between a subscript and an index in a table definition?**

A69) A subscript is a working storage data definition item, typically a PIC (999) where a value must be moved to the subscript and then incremented or decrements by ADD TO and SUBTRACT FROM statements. An index is a register item that exists outside the program's working storage. You SET an index to a value and SET it UP BY value and DOWN BY value.

**Q70) If you were passing a table via linkage, which is preferable - a subscript or an index?**

A70) Wake up - you haven't been paying attention! It's not possible to pass an index via linkage. The index is not part of the calling programs working storage. Those of us who've made this mistake, appreciate the lesson more than others.

**Q71) Explain the difference between an internal and an external sort, the pros and cons, internal sort syntax etc.**

A71) An external sort is not COBOL; it is performed through JCL and PGM=SORT. It is understandable without any code reference. An internal sort can use two different syntax's: 1.) USING, GIVING sorts are comparable to external sorts with no extra file processing; 2) INPUT PROCEDURE, OUTPUT PROCEDURE sorts allow for data manipulation before and/or after the sort.

**Q72) What is the difference between comp and comp-3 usage? Explain other COBOL usage's.**

A72) Comp is a binary usage, while comp-3 indicates packed decimal. The other common usage's are binary and display. Display is the default.

**Q73) When is a scope terminator mandatory?**

A73) Scope terminators are mandatory for in-line PERFORMS and EVALUATE statements. For readability, it's recommended coding practice to always make scope terminators explicit.

**Q74) In a COBOL II PERFORM statement, when is the conditional tested, before or after the perform execution?**

A74) In COBOL II the optional clause WITH TEST BEFORE or WITH TEST AFTER can be added to all perform statements. By default the test is performed before the perform.

**Q75) In an EVALUTE statement is the order of the WHEN clauses significant?**

A75) Absolutely. Evaluation of the WHEN clauses proceeds from top to bottom and their sequence can determine results.

**Q76) What is the default value(s) for an INITIALIZE and what keyword allows for an override of the default.**

A76) INITIALIZE moves spaces to alphabetic fields and zeros to alphanumeric fields. The REPLACING option can be used to override these defaults.

**Q77) What is SET TO TRUE all about, anyway?**

A77) In COBOL II the 88 levels can be set rather than moving their associated values to the related data item. (Web note: This change is not one of COBOL II's better specifications.)

**Q78) What is LENGTH in COBOL II?**

A78) LENGTH acts like a special register to tell the length of a group or elementary item.

**Q79) What is the difference between a binary search and a sequential search? What are the pertinent COBOL commands?**

A79) In a binary search the table element key values must be in ascending or descending sequence. The table is 'halved' to search for equal to, greater than or less than conditions until the element is found. In a sequential search the table is searched from top to bottom, so (ironically) the elements do not have to be in a specific sequence. The binary search is much faster for larger tables, while sequential works well with smaller ones. SEARCH ALL is used for binary searches; SEARCH for sequential.

**Q80) What is the point of the REPLACING option of a copy statement?**

A80) REPLACING allows for the same copy to be used more than once in the same code by changing the replace value.

**Q81) What will happen if you code GO BACK instead of STOP RUN in a stand alone COBOL program i.e. a program which is not calling any other program.**

A81) The program will go in an infinite loop.

**Q82) How can I tell if a module is being called DYNAMICALLY or STATICALLY?**

A82) The ONLY way is to look at the output of the linkage editor (IEWL) or the load module itself. If the module is being called DYNAMICALLY then it will not exist in the main module, if it is being called STATICALLY then it will be seen in the load module. Calling a working storage variable, containing a program name, does not make a DYNAMIC call. This type of calling is known as IMPLICITE calling as the name of the module is implied by the contents of the working storage variable. Calling a program name literal (CALL

**Q83) What is the difference between a DYNAMIC and STATIC call in COBOL.**

A83) To correct an earlier answer: All called modules cannot run standalone if they require program variables passed to them via the LINKAGE section. DYNAMICally called modules are those that are not bound with the calling program at link edit time (IEWL for IBM) and so are loaded from the program library (joblib or steplib) associated with the job. For DYNAMIC calling of a module the DYNAM compiler option must be chosen, else the linkage editor will not generate an executable as it will expect address resolution of all called modules. A STATICally called module is one that is bound with the calling module at link edit, and therefore becomes part of the executable load module.

**Q84) How many divisions are there in JCL-COBOL?**

A84) SIX

**Q85) What is the purpose of Identification Division?**

A85) Documentation.

**Q86) What is the difference between PIC 9.99 and 9v99?**

A86) PIC 9.99 is a FOUR-POSITION field that actually contains a decimal point where as PIC 9v99 is THREE- POSITION numeric field with implied or assumed decimal position.

**Q87) what is Pic 9v99 Indicates?**

A87) PICTURE 9v99 is a three position Numeric field with an implied or assumed decimal point after the first position; the v means an implied decimal point.

**Q88) What guidelines should be followed to write a structured Cobol prg'm?**

A88)

- 1) use 'evaluate' stmt for constructing cases.
- 2) use scope terminators for nesting.
- 3) use in line perform stmt for writing 'do' constructions.
- 4) use test before and test after in the perform stmt for writing do-while constructions.

**Q89) Read the following code. 01 ws-n pic 9(2) value zero. a-para move 5 to ws-n. perform b-para ws-n times. b-para.**

**move 10 to ws-n. how many times will b-para be executed ?**

A89) 5 times only. it will not take the value 10 that is initialized in the loop.

**Q90) What is the difference between SEARCH and SEARCH ALL? What is more efficient?**

A90) SEARCH is a sequential search from the beginning of the table. SEARCH ALL is a binary search, continually dividing the table in two halves until a match is found. SEARCH ALL is more efficient for tables larger than 70 items.

**Q91) What are some examples of command terminators?**

A91) END-IF, END-EVALUATE

**Q92) What care has to be taken to force program to execute above 16 Meg line?**

A92) Make sure that link option is AMODE=31 and RMODE=ANY. Compile option should never have SIZE(MAX). BUFSIZE can be 2K, efficient enough.

**Q93) How do you submit JCL via a Cobol program?**

A93) Use a file //dd1 DD sysout=(\*, intrdr)write your JCL to this file. Pl some on try this out.

**Q94) How to execute a set of JCL statements from a COBOL program**

A94) Using EXEC CICS SPOOL WRITE(var-name) END-EXEC command. var-name is a COBOL host structure containing JCL statements.

**Q95) Give some advantages of REDEFINES clause.**

A95)

1. You can REDEFINE a Variable from one PICTURE class to another PICTURE class by using the same memory location.
2. By REDEFINES we can INITIALISE the variable in WORKING-STORAGE Section itself.
3. We can REDEFINE a Single Variable into so many sub variables. (This facility is very useful in solving Y2000 Problem.)

**Q96) What is the difference between static call & Dynamic call**

A96) In the case of Static call, the called program is a stand-alone program, it is an executable program. During run time we can call it in our called program. As about Dynamic call, the called program is not an executable program it can executed through the called program

**Q97) What do you feel makes a good program?**

A97) A program that follows a top down approach. It is also one that other programmers or users can follow logically and is easy to read and understand.

**Q98) How do you code Cobol to access a parameter that has been defined in JCL? And do you code the PARM parameter on the EXEC line in JCL?**

A98)

- 1) using JCL with sysin. //sysin dd \*here u code the parameters(value) to pass in to cobol program /\* and in program

you use accept variable name(one accept will read one row)/.another way.

- 2) in jcl using parm statement ex: in exec statement parm='john','david' in cobol pgm u have to code linkage section in that for first value you code length variable and variable name say, abc pic x(4).it will take john inside to read next value u have to code another variable in the same way above mentioned.

**Q99) Why do we code S9(4) comp. Inspite of knowing comp-3 will occupy less space.**

A99) Here s9(4)comp is small integer ,so two words equal to 1 byte so totally it will occupy 2 bytes(4 words).here in s9(4) comp-3 as one word is equal to 1/2 byte.4 words equal to 2 bytes and sign will occupy 1/2 byte so totally it will occupy 3 bytes.

**Q100) The maximum number of dimensions that an array can have in COBOL-85 is ----- ?**

A100) SEVEN in COBOL - 85 and THREE in COBOL - 84

**Q101) How do you declare a host variable (in COBOL) for an attribute named Emp-Name of type VARCHAR(25) ?**

A101)

```
01 EMP-GRP.  
    49 E-LEN PIC S9(4) COMP.  
    49 E-NAME PIC X(25).
```

**Q102) What is Comm?**

A102) COMM - HALF WORD BINARY

**Q103) Differentiate COBOL and COBOL-II. (Most of our programs are written in COBOLII, so, it is good to know, how, this is different from COBOL)**

A103) The following features are available with VS COBOL II:

1. MVS/XA and MVS/ESA support The compiler and the object programs it produces can be run in either  
24- or 31-bit addressing mode.
2. VM/XA and VM/ESA support The compiler and the object programs it produces can be run in either  
24- or 31-bit addressing mode.
3. VSE/ESA support The compiler and the object programs it produces can be run under VSE/ESA.

**Q104) What is PERFORM ? What is VARYING ? (More details about these clauses)**

A104) The PERFORM statement is a PROCEDURE DIVISION statement which transfers control to one or more specified procedures and controls as specified the number of times the procedures are executed. After execution of the specified procedures is completed (i.e., for the appropriate number of times or until some specified condition is met), control is transferred to the next executable statement following the PERFORM statement. There are 5 types of PERFORM statements:

- a) Basic PERFORM
- b) PERFORM TIMES
- c) PERFORM UNTIL
- d) PERFORM VARYING
- e) IN-LINE PERFORM

**Q105) How many sections are there in data division?.**

A105) SIX SECTIONS 1.FILE SECTION 2.WORKING-STORAGE SECTION 3. LOCAL-STORAGE SECTION 4.SCREEN SECTION 5.REPORT SECTION 6. LINKAGE SECTION

**Q106) What is Redefines clause?**

A106) Redefines clause is used to allow the same storage allocation to be referenced by different data names .

**Q107) How many bytes does a s9(4)comp-3 field occupy?**

A107) 3Bytes (formula :  $n/2 + 1$ )

**Q108) What is the different between index and subscript?**

A108) Subscript refers to the array of occurrence , where as Index represents an occurrence of a table element. An index can only modified using perform, search & set. Need to have an index for a table in order to use SEARCH and SEARCH All.

**Q109) What is the difference between Structured COBOL Programming and Object Oriented COBOL programming?**

A109) Structured programming is a Logical way of programming, you divide the functionalities into modules and code logically. OOP is a Natural way of programming; you identify the objects first, and then write functions, procedures around the objects. Sorry, this may not be an adequate answer, but they are two different programming paradigms, which is difficult to put in a sentence or two.

**Q110) What divisions, sections and paragraphs are mandatory for a COBOL program?**

A110) IDENTIFICATION DIVISION and PROGRAM-ID paragraph are mandatory for a compilation error free COBOL program.

**Q111) Can JUSTIFIED be used for all the data types?**

A111) No, it can be used only with alphabetic and alphanumeric data types.

**Q112) What happens when we move a comp-3 field to an edited (say z (9). ZZ-)**

A112) the editing characters r to be used with data items with usage clause as display which is the default. When u tries displaying a data item with usage as computational it does not give the desired display format because the data item is stored as packed decimal. So if u want this particular data item to be edited u have to move it into a data item whose usage is display and then have that particular data item edited in the format desired.

**Q113) What will happen if you code GO BACK instead of STOP RUN in a stand-alone COBOL program i.e. a program which is not calling any other program ?**

A113) Both give the same results when a program is not calling any other program. GO BACK will give the control to the system even though it is a single program.

**Q114) what is the difference between external and global variables?**

A114) Global variables are accessible only to the batch program whereas external variables can be referenced from any batch program residing in the same system library.

**Q115) You are writing report program with 4 levels of totals: city, state, region and country. The codes being used can be the same over the different levels, meaning a city code of 01 can be in any number of states, and the same applies to state and region code so how do you do your checking for breaks and how do you do add to each level?**

A115) Always compare on the highest-level first, because if you have a break at a highest level, each level beneath it must also break. Add to the lowest level for each record but add to the higher level only on a break.

**Q116) What is difference between COBOL and VS COBOL II?.**

A116) In using COBOL on PC we have only flat files and the programs can access only limited storage, whereas in VS COBOL II on M/F the programs can access up to 16MB or 2GB depending on the addressing and can use VSAM files to make I/O operations faster.

**Q117) Why occurs can not be used in 01 level ?**

A117) Because, Occurs clause is there to repeat fields with same format, not the records.

**Q118) What is report-item?**

A118) A Report-Item Is A Field To Be Printed That Contains Edit Symbols

**Q119) Difference between next and continue clause**

A119) The difference between the next and continue verb is that in the continue verb it is used for a situation where there is no EOF condition that is the records are to be accessed again and again in an file, whereas in the next verb the indexed file is accessed sequentially, read next record command is used.

**Q120) What is the Importance of GLOBAL clause According to new standards of COBOL**

A120) When any data name, file-name, Record-name, condition name or Index defined in an Including Program can be referenced by a directly or indirectly in an included program, Provided the said name has been declared to be a global name by GLOBAL Format of Global Clause is 01 data-1 pic 9(5) IS GLOBAL.

**Q121) What is the Purpose of POINTER Phrase in STRING command**

A121) The Purpose of POINTER phrase is to specify the leftmost position within receiving field where the first transferred character will be stored

**Q122) How do we get current date from system with century?**

A122) By using Intrinsic function, FUNCTION CURRENT-DATE

**Q123) What is the maximum length of a field you can define using COMP-3?**

A123) 10 Bytes (S9(18) COMP-3).

**Q124) Why do we code s9 (4) comp? In spite of knowing comp-3 will occupy less space?**

A124) Here s9(4)comp is small integer, so two words equal to 1 byte so totally it will occupy 2 bytes(4 words).here in s9(4) comp-3 as one word is equal to 1/2 byte.4 words equal to 2 bytes and sign will occupy 1/2 byte so totally it will occupy 3 bytes.

**Q125) What is the LINKAGE SECTION used for?**

A125) The linkage section is used to pass data from one program to another program or to pass data from a PROC to a program.

**Q126) Describe the difference between subscripting and indexing ?**

A126) Indexing uses binary displacement. Subscripts use the value of the occurrence.

1. What R 2 of the common forms of the EVALUATE STATEMENT ?
2. What does the initialize statement do ?
3. What is the reference modification.
4. Name some of the examples of COBOL 11?
5. What are VS COBOL 11 special features?
6. What are options have been removed in COBOL 11?
7. What is the file organization clause ?
8. What is a subscript ?
9. What is an index for tables?
10. What are the two search techniques ?

11. What is an in-line perform ?
12. What is CALL statement in COBOL?
13. When can the USING phrase be included in the call statement ?
14. In EBCDIC, how would the number 1234 be stored?
15. How would the number +1234 be stored if a PIC clause of PICTUREs9(4) comp-3 were used?
16. What is Alternate Index ? How is it different from regular index ?

IBMMAINFRAMES.COM

## Customer Information Control System(CICS)

IBM's Customer Information Control System (CICS) is an on-line teleprocessing system developed by IBM. By providing a sophisticated control and service database/data communication system, the application developer can concentrate on fulfilling specific business needs rather than on communication and internal system details. CICS allows data to be transmitted from the terminal to the host computer, have the data processed, access files/databases, and then have data to be transmitted from the terminal to the host computer, have the data processed, access files/databases, and then have data transmitted back to the terminal. To accomplish that, CICS uses a telecommunication package such as VTAM or TCAM and various file access methods: VSAM, DL/1, DB2, etc.

The latest release CICS/ESA is Release 3.3.

Some of the new functionality includes:

1. Expanded features for the system programmer
2. Improved above the line storage utilization
3. New options for many CICS commands
4. Improved cross-platform communication facilities

Functionality

CICS provides the following support:

### *Data Communications*

- An interface between the terminal and printers with CICS via a telecommunication access method (TCAM or VTAM).
- Multi Region Operation(MRO), through which more than one CICS region of a system can communicate
- Intersystem Communication (ISC), through which one CICS region of a system can communicate with other CICS regions in other systems

### *Application Programming*

- Interfaces with programming languages such as COBOL and Assembler
- Command level translator
- An Execution Diagnostic Facility (EDF)
- A Command Interpreter

### *Data Handling*

- An interface with database access methods such as DB2, DL/1, and VSAM
- An interface with error checking and reporting facilities

### **Terminology:**

CICS has its own language. Some of the language abbreviations of CICS are:

SIT	System Initialization Table
PCT	Program Control Table
PPT	Program Processing Table
TCT	Terminal Control Table
FCT	File Control Table
TCP	Terminal Control Program
TCTUA	Terminal Control Terminal User Area
DCT	Destination Control Table
TDQ	Transient Data Queue
EIP	Execution Interface Program
FCP	File Control Program
ICP	Interval Control Program
KCT	Task Control Program
PCP	Program Control Program
SCP	Storage Control Program
TCA	Task Control Area
TCTTE	Terminal Control Table Terminal Entry
TSQ	Temporary Storage Queue
TWA	Task Work Area
AID	Attention Identifier
CWA	Common Work Area
MRO	Multi Region Operation
QID	Queue Identifier

**Q1) What are the six different types of argument values in COBOL that can be placed in various options of a CICS command?**

A1)

- Data Value** - EX (Literal 8 or 77 KEYLEN PIC S9(4) COMP VALUE 8.)
- Data Area** - EX (01 RECORD-AREA.  
05 FIELD1 PIC X(5). )
- Pointer-Ref** - EX (05 POINTER-I PIC S9(8) COMP. )
- Name** - EX (05 FILE-NAME PIC X(5) VALUE 'FILEA'. )
- Label** - Cobol paragraph name
- HHMMSS** - EX (77 TIMEVAL PIC S9(7) COMP3. )

**Q2) Kindly specify the PIC clause for the following**

Any BLL Cell, Data type of Length Option field, HHMMSS type of data fields

- A2) Any BLL Cell - **S9(8) COMP**  
 Data type of Length Option field - **S9(4) COMP**  
 HHMMSS type of data fields - **S9(7) COMP3**

**Q3) Specify CICS transaction initiation process. (From the perspective of CICS control programs and control tables.)**

A3) TCP places data in TIOA and corresponding entry into TCT.

KCP acquires the transaction identifier from TIOA and verifies if it is present in PCT.

SCP acquires Storage in Task Control Area (TCA), in which KCP prepares control data for the task.

KCP then loads the application programs mentioned in PCT by looking for it in PPT.

If resident - real storage memory location is not present in the PPT the control is passed to PCP that loads the application programs from the physical storage location address given in PPT. The control is then passed to the application program (LOAD module).

**Q4) List the sequence of steps used to achieve “Modification in Skip Sequential Mode.”**

A4)

- I. READNEXT command
- II. Issue the ENDBR command
- III. Issue the READ command with UDTAE option.
- IV. Manipulate the record (DELETE or REWRITE command)
- V. Issue START command
- VI. Issue two READNEXT commands (One for dummy skip)
- VII. Go to step two.

**Q5) Specify the requirements for Automatic Task Initiation. (Mention the control table, it's entries and the corresponding Procedure division CICS command).**

A5) DFHDCT TYPE=INTRA,  
DESTID=MSGs,  
TRANSID=MSW1,  
TRIGLEV=1000

```
EXEC CICS WRITEQ TD
      QUEUE('MSGs'),
      FROM(DATA-AREA),
      LENGTH(MSG_LEN)
END-EXEC.
```

**Q6) What are the commands used to gain exclusive control over a resource (for Ex a Temporary storage queue.)?**

```
A6) EXEC CICS ENQ          EXEC CICS DEQ
      RESOURCE(QID)        RESOURCE(QID)
END-EXEC                  END-EXEC
```

**Q7) What is the EIB parameter and the CICS command used to implement Pseudo-Conversational technique using single PCT - Single PPT entry?**

A7) EIBCALEN - To check if COMMAREA has been passed in return command.

```
EXEC CICS RETURN
      TRANSID(data-name)
      COMMAREA(data-area)
      LENGTH(data-value)
END-EXEC
```

**Q8) Mention the 5 fields available in the symbolic map for every 'NAMED' field in the DFHMDI macro? Give a brief description of these fields (Not exceeding a line).**

A8) FIELD+L - Return the length of text entered (or for dynamic cursor positioning)  
FIELD+F - Returns X(80) if data entered but erased.  
FIELD+A - Used for attributes reading and setting  
FIELD+I - Used for reading the text entered while receiving the map.  
FIELD+O - Used for sending information on to the MAP.

**Q9) What are the two ways of breaking a CPU bound process to allow other tasks to gain access to CPU.**

```
A9) EXEC CICS DELAY          EXEC CICS DELAY
      INTERVAL(hhmmss)      TIME(hhmmss)
END-EXEC                    END-EXEC
```

POST and WAIT commands also achieve the same result.

**Q10) How do you initiate another transaction? The transaction initiated should be in a position to retrieve**

**information pertaining to which transaction has initiated it and from which terminal. (Code the required CICS commands)**

A10) EXEC CICS START  
INTERVAL(hhmmss)/TIME(hhmmss)  
TRANSID('TRAN')  
TERMID('TRM1')  
**FROM(data-area)**  
**LENGTH(data-value)**  
**RTRANSID(EIBTRNID)**  
**RTERMID(EIBTRMID)**  
END-EXEC

EXEC CICS RETRIEVE  
INTO(data-area)  
LENGTH(data-value)  
RTRANSID(data-name)  
RTERMID(data-name)  
END-EXEC

**Q11) Mention the option (along with argument type) used in a CICS command to retrieve the response code after execution of the command.**

A11) RESP( S9(8) COM.)

**Q12) What's the CICS command used to access current date and time?**

A12) ASKTIME.

**Q13) Into what fields will the date and time values be moved after execution of the above command?**

A13) EIBDATE & EIBTIME.

**Q14) How do you terminate an already issued DELAY command?**

A14) EXEC CICS CANCEL  
REQID(id)  
END-EXEC

**Q15) How do you dynamically set the CURSOR position to a specific field?**

A15) MOVE -1 to FIELD+L field. Mention CURSOR option in the SEND command.

**Q16) Which option of the PCT entry is used to specify the PF key to be pressed for initiating a transaction?**

A16) TASKREQ=PF1

**Q17) Specify the CICS command used to read a VSAM record starting with prefix "F". Code all the relevant options.**

A17) EXEC CICS READ  
DATASET('FILENAME')  
INTO(data-area)  
RIDFLD(data-area)  
KEYLENGTH(1)  
GENERIC  
LENGTH(WK-LEN)  
END-EXEC.

**Q18) Mention the option used in the CICS READ command to gain accessibility directly to the file I/O area. (Assume COBOL-II).**

A18) SET(ADDRESS OF LINKAGE-AREA).

**Q19) Which command is used to release a record on which exclusive control is gained?**

A19) EXEC CICS UNLOCK END-EXEC.

**Q20) How do you establish a starting position in a browse operation?**

A20) EXEC CICS STARTBR----- END-EXEC.

**Q21) What is the option specified in the read operation to gain multiple concurrent operations on the same dataset?**

A21) REQID(value).

**Q22) What is the CICS command that gives the length of TWA area?**

A22) EXEC CICS ASSIGN  
TWALENG(data-value)  
END-EXEC.

**Q23) What are the attribute values of Skipper and Stopper fields?**

A23) ASKIP, PROT.

**Q24) How do you set the MDT option to 'ON' status, even if data is not entered?**

A24) Mention FSET option in DFHMDF or set it dynamically in the program using FIELD+A attribute field.

**Q25) What option is specified in the SEND command to send only the unnamed fields on to the screen?**

A25) MAPONLY \_\_\_\_\_.

**Q26) Which CICS service transaction is used to gain accessibility to CICS control tables? Mention the one that has the highest priority.**

A26) CEDA

**Q27) What is the most common way of building queue-id of a TSQ? (Name the constituents of the Queue ID).**

A27) TERMID+TRANSACTION-ID.

**Q28) Into which table is the terminal id registered?**

A28) TCT.

**Q29) How and where is the TWA size set? .**

A29) TWASIZE=300 in PCT table.

**Q30) Which transient data queue supports ATI?**

A30) INTRA-PARTITION Data queue.

**Q31) Code the related portions of CICS/COBOL-I programs to gain addressability to TWA area assigned to a**

**particular task. Assume that the size of TWA area is 300 bytes. What are the advantages if COBOL-II is used**

**in the place of COBOL? Code the above requirement in COBOL-II.**

A31)

COBOL- II PROGRAM

LINKAGE SECTION.

01 PARMLIST.

02 FILLER PIC S9(8) COMP.

02 TWA-PTR S(98) COMP.

01 TWA-DATA-LAYOUT.

02 DATA-AREA PIC X(300).

PROCEDURE DIVISION.

.....

EXEC CICS ADDRESS

TWA(TWA-PTR)

END-EXEC

SERVISE RELOAD TWA-DATA-LAYOUT.

COBOL- II PROGRAM

LINKAGE SECTION.

01 TWA-DATA-LAYOUT.

05 DATA-AREA PIC X(300).

PROCEDURE DIVISION.

.....

EXEC CICS ADDRESS

TWA(ADDRESS OF TWA-DATA-LAYOUT)

END-EXEC

.....

**Q32) Code a program meeting the following requirements.**

**'EMPS' is a transaction used to return information pertaining to an employee when the 'EMPID' is entered on the screen. The information pertaining to an employee is present in a VSAM/KSDS dataset registered in FCT as "EMPINFOR". The map and the working storage section of the emp-info are given for reference. If the employee id is found the information has to be sent to the screen (Status field) with the message "Emp Id: XXX found.". If the emp-id key is not found then status field should array the message "Key not found." and the 'EMP ID' field should be set to bright. If the Exit option is set to "Y" then the task has to terminated. Use pseudo-conversation technique three (Single PCT and PPT).**

EMPLOYEE INFORMATION FORM

EMP ID : XXX

EMP NAME :

EMP DESIG :           SEX :

DEPARTMENT

SALARY :

STATUS :

EXIT : X

X - Input Field

Mapname - EMPFORM  
Mapsetname - EMPFORM

Label given to various 'named' fields on the DFHMDF macro while defining the map shown above. EMPID, EMPNAME, EMPDESIG, DEPART, SEX, SALARY, STATUS and EXITINP.

Structure of the VSAM/KSDS file.

Working-Storage Section.

01 EMP-IOAREA.

05 EMP-REC.

10 EMP-KEY PIC XXX.  
10 EMP-NAME PIC X(32).  
10 EMP-SEX PIC X.  
10 EMP-DEPT PIC X(10)  
10 EMP-DESIG PIC X(5).  
10 EMP-SAL PIC 9(7).

A32) COBOL-II PROGRAM.

WORKING-STORAGE SECTION.

77 LENGTH-OF-AREA PIC S9(4) COMP.  
77 WS-RCODE PIC S9(8) COMP.

01 STATUS.

02 NORMAL.

05 FILLER PIC X(8) VALUE 'EMP ID: '  
05 EMP-ID PIC X(3).  
05 FILLER PIC X(6) VALUE 'FOUND'.

02 ABNORMAL REDEFINES NORMAL.

05 ABMSG PIC X(17).

01 EMP-IOAREA.

05 EMP-REC.

10 EMP-KEY PIC XXX.  
10 EMP-NAME PIC X(32).  
10 EMP-SEX PIC X.  
10 EMP-DEPT PIC X(10)  
10 EMP-DESIG PIC X(5).  
10 EMP-SAL PIC 9(7).

LINKAGE SECTION.

01 DFHCOMMAREA.

05 INPVAL PIC X(3).

PROCEDURE DIVISION.

.....

IF EIBCALEN=0

EXEC CICS SEND  
MAP('EMPFORM')  
MAPSET('EMPFORM')  
ERASE  
END-EXEC.

```
MOVE 3 TO LENGTH-OF-AREA
EXEC CICS RETURN
      TRANSID('EMPS')
      COMMAREA('SEC')
      LENGTH(DATA-VALUE)
END-EXEC.
```

ELSE IF INPVAL = 'SEC'

```
EXEC CICS RECEIVE
      MAP('EMPFORM')
      MAPSET('EMPFORM')
END-EXEC.
```

```
EXEC CICS READ
      DATASET('EMPINFOR')
      INTO(EMP-IOAREA)
      RIDFLD(EMPIDI)
      LENGTH(LENGTH-OF-AREA)
      RESP(WS-RCODE)
END-EXEC.
```

```
IF WS-RCODE NOT = DFHRESP(NORMAL)
      MOVE 'KEY NOT FOUND' TO ABMSG'
      MOVE DFHMBRY TO EMPIDA
```

ELSE

```
      MOVE EMP-NAME TO EMPNAMEO
      MOVE EMP-SEX TO SEXO
      MOVE EMP-DESIG TO EMPDESIGO
      MOVE EMP-SAL TO SALARY
      MOVE EMP-DEPT TO DEPARTO
      MOVE EMP-KEY TO EMP-ID
      MOVE STATUS TO STATUSO.
```

```
EXEC CICS SEND
      MAP('EMPFORM')
      MAPSET('EMPFORM')
      ERASE
END-EXEC.
```

```
MOVE 3 TO LENGTH-OF-AREA
EXEC CICS RETURN
      TRANSID('EMPS')
      COMMAREA('SEC')
      LENGTH(LENGTH-OF-AREA)
END-EXEC.
```

```
EXEC CICS RETURN
END-EXEC.
```

ELSE IF (EXITINPI NOT = 'Y')

```
EXEC CICS RETURN
END-EXEC.
```

**Q33) What does “Pseudo Conversational” mean?**

A33) The programming technique in which the task will not wait for the end-user replies on the terminal. Terminating the task every time the application needs a response from the user and specifying the next transaction to be started when the end user press any attention key (Enter, PF1 through PF24, PA1,PA2 and Clear) is pseudo-conversational processing.

**Q34) Explain the means of supporting pseudo conversation programming. (E.g. Storing and restoring of states, control flow, error handling)**

A34) When we send a map using SEND MAP command. Immediately we release the program by using EXEC CICS RETURN command. In this command we mention the TRANSACTION ID which is to be executed after receiving the map. In this command we also specify the data that should be stored in COMMUNICATION AREA for later use. When this command is executed the corresponding program is released from the memory. After receiving the response from the terminal the program is again loaded and this time the data which we stored in communication area will be copied into the working storage section. And the map will be received with RECEIVE MAP command. The variable EIBCALEN in EIB holds the length of communication area. In procedure division we checks the value of EIBCALEN if it is zero, we first send the map followed by RETURN command. Otherwise, that is if EIBCALEN is not zero, we know that this transaction is not running first time and we receive the map by using RECEIVE MAP command.

**Q35) What is the function of the CICS translator?**

A35) The CICS translator converts the EXEC CICS commands into call statements for a specific programming language. There are CICS translators for Assembler, COBOL, and PL/1.

**Q36) How can you start a CICS transaction other than by keying the Transaction ID at the terminal?**

A36) By coding an EXEC CICS START in the application program

1. By coding the trans id and a trigger level on the DCT table
2. By coding the trans id in the EXEC CICS RETURN command
3. By associating an attention key with the Program Control Table
4. By embedding the TRANSID in the first four positions of a screen sent to the terminal.
5. By using the Program List Table

**Q37) What is the purpose of the Program List Table?**

A37) The Program List Table records the set of applications programs that will be executed automatically at CICS start-up time.

**Q38) What are the differences between and EXEC CICS XCTL and an EXEC CICS START command?**

A38) The XCTL command transfer control to another application (having the same Transaction ID), while the START command initiates a new transaction ID (therefore a new task number). The XCTL continues task on the same terminal. START can initiate a task on another terminal.

**Q39) What are the differences between an EXEC CICS XCTL and an EXEC CICS LINK command.**

A39) The XCTL command transfer control to an application program at the same logical level (do not expect to control back), while the LINK command passes control to an application program at the next logical level and expects control back.

**Q40) What happens to resources supplied to a transaction when an XCTL command is executed?**

A40) With an XCTL, the working storage and the procedure division of the program issuing the XCTL are released. The I/O areas, the GETMAIN areas, and the chained Linkage Section areas (Commarea from a higher level) remain. All existing locks and queues also remain in effect. With a LINK, however, program storage is also saved, since the transaction expects to return and use it again.

**Q41) What CICS command do you need to obtain the user logon-id?**

A41) You must code EXEC CICS ASSIGN with the OPERID option.

**Q42) What is a resident program?**

A42) A program or map loaded into the CICS nucleus so that it is kept permanently in main storage and not deleted when CICS goes "Short On Storage".

**Q43) What is EIB. How it can be used?**

A43) CICS automatically provides some system-related information to each task in a form of EXEC Interface Block (EIB), which is unique to the CICS command level. We can use all the fields of EIB in our application programs right away.

**Q44) What is some of the information available in the EIB area?**

A44)

- I. The cursor position in the map
- II. Transaction ID
- III. Terminal ID
- IV. Task Number
- V. Length of communication area
- VI. Current date and time
- VII. Attention identifier

**Q45) What information can be obtained from the EIBRCODE?**

A45) The EIBRCODE tells the application program if the last CICS command was executed successfully and, if not, why not.

**Q46) What is the effect of including the TRANSID in the EXEC CICS RETURN command?**

A46) The next time the end user presses an attention key, CICS will start the transaction specified in the TRANSID option.

**Q47) Explain how to handle exceptional conditions in CICS.**

A47) An abnormal situation during execution of a CICS command is called an exceptional condition".

There are various ways to handle these exception conditions:

1. **Handle Condition Command:** It is used to transfer control to the procedure label specified if the exceptional condition specified occurs.
2. **Ignore Condition Command:** It causes no action to be taken if the condition specified occurs in the program. That is control will be returned to the next instruction following the command which encountered the exceptional condition.

3. **No Handle Option:** This option can be specified in any CICS command and it will cause no action to be taken for any exceptional condition occurring during execution of this command.
4. **RESP Option:** This option can be specified in any CICS command. If the RESP option is specified in a command, CICS places a response code at a completion of the command. The application program can check this code, then proceed to the next processing.

**Handle condition:**

Invalid handling of CICS error condition within the program causing the looping. Here is one example, most program have EXEC CICS HANDLE CONDITION ERROR(label) or EXEC CICS HANDLE ABEND LABEL(label) to trap any error condition or abend. This type of coding is usually acceptable if they handle the error / abend correctly in their handling paragraph. However, the program often cause another error or abend within the handling routine. In that case, looping or sos will occur. I strong recommend that the following statement should be included in their ERROR handling paragraph.

EXEC CICS HANDLE CONDITION ERROR END-EXEC. It means that from now on, CICS will handle all the errors and will not go back to error handling routine. For HANDLE ABEND, code EXEC CICS HANDLE ABEND CANCEL instead. Please check the application program reference manual for further explanation of these two commands. Besides, not only these two HANDLE will cause the program, other type of error handle might cause loop too. So code the HANDLE command carefully. It is a good program practice to deactivate the error handling by EXEC CICS HANDLE CONDITION condition END-EXEC. Once you know that the program won't need it anymore.

**Q48) What is the function of the EXEC CICS HANDLE CONDITION command?**

A48) To specify the paragraph or program label to which control is to be passed if the "handle condition" occurs.

**Q49) How many conditions can you include in a single HANDLE CONDITION command?**

A49) No more than 16 in a single handle condition. If you need more, then you must code another HANDLE CONDITION command.

**Q50) What is the EXEC CICS HANDLE ABEND?**

A50) It allows the establishing of an exit so cleanup processing can be done in the event of abnormal task termination.

**Q51) What is the difference between EXEC CICS HANDLE CONDITION and an EXEC CICS IGNORE command?**

A51) A HANDLE CONDITION command creates a "go-to" environment. An IGNORE command does not create a go-to environment; instead, it gives control back to the next sequential instruction following the command causing the condition. They are opposites.

**Q52) What happens when a CICS command contains the NOHANDLE option?**

A52) No action is going to be taken for any exceptional conditional occurring during the execution of this command. The abnormal condition that occurred will be ignored even if an EXEC CICS HANDLE condition exist. It has the same effect as the EXEC CICS IGNORE condition except that it will not cancel the previous HANDLE CONDITION for any other command.

**Q53) When a task suspends all the handle conditions via the PUSH command, how does the task reactivate all the handle conditions?**

A53) By coding an EXEC CICS POP HANDLE command.

**Q54) Explain re-entrancy as applies to CICS.**

A54) Reentrant program is a program which does not modify itself so that it can reenter to itself and continue processing after an interruption by the operating system which, during the interruption, executes other OS tasks including OS tasks of the same program. It is also called a "reenterable" program or "serially reusable" program.

A quasi-reentrant program is a reentrant program under the CICS environment. That is, the quasi-reentrant program is a CICS program which does not modify itself. That way it can reenter to itself and continue processing after an interruption by CICS which, during the interruption, executes other tasks including CICS tasks of the same program. In order to maintain the quasi-reentrancy, a CICS application program must follow the following convention:

**Constants in Working Storage:** The quasi-reentrant program defines only constants in its ordinary data area (e.g. working Storage Section). These constants will never be modified and shared by the tasks.

**Variable in Dynamic Working Storage:** The quasi reentrant program acquires a unique storage area (called Dynamic Working Storage --DWS) dynamically for each task by issuing the CICS macro equivalent GETMAIN. All variables will be placed in this DWS for each task. All counters would have to be initialized after the DWS has been acquired.

**Restriction on Program Alteration:** The program must not alter the program itself. If it alters a CICS macro or command, it must restore the alteration before the subsequent CICS macro or command.

**Q55) What are the CICS commands available for program control?**

A55) The following commands are available for the Program Control services:

1. **LINK:** To pass control to another program at the lower level, expecting to be returned.
2. **XCTL:** To pass control to another program at the same level, not expecting to be returned.
3. **RETURN:** To return to the next higher-level program or CICS.
4. **LOAD:** To load a program.
5. **RELEASE:** To release a program.

**Q56) How is addressability achieved to the data outside programs working-storage.?**

A56) The Base Locator for Linkage (BLL) is an addressing convention used to address storage outside the Working Storage Section of an application program. If BLL is used for the input commands (e.g.: READ, RECEIVE), it will improve the performance, since the program would be accessing directly the input buffer outside of the program. In order to work as intended, the program must construct BLL based on the following convention:

1). The parameter list must be defined by means of a 01 level data definition in the Linkage Section as the first area definition to the Linkage Section, unless a communication area is being passed to the program, in which case DFHCOMMAREA must be defined first. The parameter list consists of a group of the address pointers, each of which is defined as the full word binary field (S9(8) COMP). This is called the BLL cells.

2). The parameter list is followed by a group of 01 level data definitions, which would be the actual data areas. The first address pointer of the parameter list is set up by CICS for addressing the parameter list itself. From the second address pointer onward, there is a

one-to-one correspondence between the address pointers of the parameter list and 01 level data definitions.

3). VS COBOL II provides CICS application programs with a significant improvements in the area of addressability through the special ADDRESS register. Therefore, if an application program is written in VS COBOL II, the program is no longer requires building the BLL cells in the Linkage Section.

**Q57) Explain the various ways data can be passed between CICS programs.**

A57) Data can be passed between CICS programs in three ways- COMMAREA, TRASIENT DATA QUEUE & TEMPORARY STORAGE QUEUE.

Data can be passed to a called program using the COMMAREA option of the LINK or XCTL command in a calling program. The called program may alter the data content of COMMAREA and the changes will be available to the calling program after the RETURN command is issued in the called program. This implies that the called program does not have to specify the COMMAREA option in the RETURN command.

If the COMMAREA is used in the calling program, the area must be defined in the Working Storage Section of the program (calling), whereas, in the called program, the area must be defined as the first area in the Linkage Section, using reserved name DFHCOMMAREA.

**Q58) What is the difference between using the READ command with INTO option and SET option?**

A58) When we use INTO option with the READ command the data content of the record will be moved into the specified field defined in the Working Storage Section of the program. When we use SET option with the READ command, CICS sets the address pointer to the address of the record in the file input/output area within CICS, so that the application program can directly refer to the record without moving the record content into the Working Storage area defined in the program. Therefore, the SET option provides a better performance than the INTO option.

**Q59) Can we define an alternate index on VSAM/RRDS ?**

A59) No

**Q60) What is the difference between the INTO and the SET option in the EXEC CICS RECEIVE MAP command?**

A60) The INTO option moves the information in the TIOA into the reserved specified area, while the SET option simply returns the address of the TIOA to the specified BLL cell or "address-of" a linkage-section.

**Q61) How to establish dynamic cursor position on a map? How to get the cursor position when we receive a map?**

A61) We dynamically position a cursor through an application program using a symbolic name of the symbolic map by placing -1 into the field length field ( i.e., fieldname + L) of the field where you wish to place the cursor. The SEND MAP command to be issued must have the CURSOR option ( without value ). Also, the mapset must be coded with MODE = INOUT in the DFHMSD macro. We get the cursor position when we receive a map by checking EIBCPOSN, which is a halfword ( S9(4) COMP) binary field in EIB, and contains offset position (relatively to zero ) of the cursor on the screen.

**Q62) What is MDT?**

A62) MDT ( Modified Data Tag ) is one bit of the attribute character. If it is off ( 0 ), it indicates that this field has not been modified by the terminal operator. If it is on ( 1 ), it indicates that this field has been modified by the operator. Only when MDT is on, will the

data of the field be sent by the terminal hardware to the host computer ( i.e., to the application program, in end ). An effective use of MDT drastically reduces the amount of data traffic in the communication line, thereby improving performance significantly. Therefore, BMS maps and CICS application programs should be developed based on careful considerations for MDT.

**Q63) What are the three ways available for a program to position the cursor on the screen?**

A63)

- I. Static positioning. Code the insert cursor (IC) in the DFHMDF BMS macro.
- II. Relative positioning. Code the CURSOR option with a value relative to zero(position 1,1 is zero) .
- III. Symbolic positioning. Move high values or -1 to the field length in the symbolic map(and code CURSOR on the SEND command).

**Q64) Name three ways the Modified Data Tag can be set on?**

A64) The Modified Data Tag can be set on:

1. When the user enters data into the field.
2. When the application program moves DFHBMFSE to the attribute character.
3. By defining it in the BMS macro definition.

**Q65) What is a mapset?**

A65) A mapset is a collection of BMS maps link-edited together.

**Q66) What is the function of DFHMDF BMS macro?**

A66) The DFHMDF macro defines fields, literal, and characteristics of a field.

**Q67) Why is a TERM ID recommended in naming a TSQ?**

A67) In order to avoid confusion and to maintain data security, a strict naming convention for QID will be required in the installation. Moreover, for a terminal-dependent task (e.g., pseudo-conversational task), the terminal id should be included in QID in order to ensure the uniqueness of TSQ to the task.

**Q68) Explain the basic difference between Intra partition TDQ and Extra partition TDQ.**

A68)

**INTRA PARTITION TD QUEUES** It is a group of sequential records which are produced by the same and / or different transactions within a CICS region. These Qs are stored in only one physical file ( VSAM ) in a CICS region, which is prepared by the system programmer. Once a record is read from a queue, the record will be logically removed from the queue; that is the record cannot be read again.

**EXTRA PARTITION TD QUEUES** It is a group of sequential records which interfaces between the transactions of the CICS region and the systems outside of CICS region. Each of these TDQs is a separate physical file, and it may be on the disk, tape, printer or plotter.

**Q69) What are the differences between Temporary Storage Queue (TSQ) and Transient Data Queue (TDQ).?**

A69) Temporary Storage Queue names are dynamically defined in the application program, while TDQs must first be defined in the DCT (Destination Control Table). When a TDQ contains certain amount of records (Trigger level), a CICS transaction can be started automatically. This does not happen when using a TSQ. TDQ(extra partition) may be used by batch application; TSQ cannot be accessed in batch. The Transient Data Queue is actually a QSAM file. You may update an existing item in a TSQ. A record in a TDQ cannot be updated. Records in TSQ can be read randomly. The TDQ can be read only sequentially. Records in Temporary Storage can be read more than once, while records stored in Temporary Data Queues cannot. With TDQs it is "one read" only.

**Q70) What is the difference between getting the system time with EIBTIME and ASKTIME command?**

A70) The ASKTIME command is used to request the current date and time. Whereas, the EIBTIME field have the value at the task initiation time.

**Q71) What does the following transactions do?**

A71) **CEDF** : CICS-supplied Execution Diagnostic Facility transaction. It provides interactive program

execution and debugging functions of a CICS programs.

**CEMT** : CICS-supplied Extended Master Terminal transaction. It displays or manipulates CICS

control environment interactively.

**CEBR** : CICS-supplied Temporary Storage Browse transaction. It displays the content of Temporary Storage Queue ( TSQ ).

**CECI** : CICS-supplied Command Interpreter transaction. It verifies the syntax of a CICS command

and executes the command.

**Q72) Explain floating maps with illustration.**

A72) Maps which can position themselves relative to the previous maps on the screen or page are known as

the floating maps. For this you have to use special positional operands to LINE and COLUMN parameters of the BMS macro definition. They are SAME, NEXT. Actually this floating map concept is there only in Full BMS where as it is not available in Min. or Standard BMS macros. RECEIVE MAP is not recommended in the case of floating maps. Hence these maps are normally used to send information such as selected records from a database to screen but not for data entry. A mapset can contain more than one map in it, you may use all these maps to build a screen. In that case there are two ways to send these maps on to the screen

i ) Use separate SEND MAP commands one for each map involved. or

ii) Use ACCUM operand along with SEND MAP command and while sending really on to the

screen use SEND PAGE to display them at one shot. The second one is called cumulative mapping scheme where you also can use floating maps.

Let's take a situation where you have to build a screen like this

HEADER MAP (no. of A gr. employs)

DETAIL MAP (employee list )

TRAILER MAP (Press a key to continue...)

Under such situations whatever the detail map needed that is to be displayed again and again to display all the information one screenful at a time. In this floating map concept helps.

Code the map like this

M1 DFHMDI ..... HEADER=YES,JUSTIFY=FIRST.....

M2 DFHMDI ..... LINE=NEXT.....

M3 DFHMDI .....TRAILER=YES,JUSTIFY=LAST.....

Here M2 is detail map, which is coded as floating map. Procedure:

Every time using cumulative map technique send header (first) and followed by detail map next into a page buffer once the page is full an overflow occurs by using CICS HANDLE OVERFLOW command send first trailer map then header map ( This will do two things a) it sends previous map on to the screen b) starts fresh page buffer ). Repeated this until no more records to be retrieved. Here M2 is the one which holds the record values read from the file.

**Q73) What is the function of the Terminal Control Table(TCT)?**

A73) The TCT defines the characteristics of each terminal with which CICS can communicate.

**Q74) What does it mean when EIBCALEN is equal to zeros?**

A74) When the length of the communication area (EIBCALEN) is equal to zeros, it means that no data was passed to the application.

**Q75) How can the fact that EIBCALEN is equal to zeros be of use to an application programmer?**

A75) When working in a pseudo-conversational mode, EIBCALEN can be checked if it is equal to zero. A programmer can use this condition as a way of determining first time usage(of the program).

**Q76) Which CICS system program is responsible for handling automatic task initialization?**

A76) The Transient Data Program(TDP).

**Q77) In an on-line environment, how can you prevent more than one user from accessing the same Transient Data Queue at the same time?**

A77) By issuing an EXEC CICS ENQ against the resource. When processing is completed, a DEQ should be executed.

**Q78) When an application is invoked via the EXEC CICS START command with the from option, how does the application gain access to the common area?**

A78) An EXEC CICS RETRIEVE command will access the common area.

**Q79) The DFHCOMMAREA is used to pass information from one application to another. What are some other ways that this function can be accomplished?**

A79) You can also pass information in the following ways.

- By using a temporary storage queue
- By using an intrapartition TDQ
- By using the Task Work Area
- By using TCTUA
- Through a file

**Q80) How do you define Task Work Area?**

A80) By defining it on the PCT (the Program Control Table)

**Q81) What information do you get when an EXEC CICS STARTCODE is issued?**

A81) You will be able to determine if the application was started by (1) a transient data trigger level(QD), (2) a START command (S,SD), (3) user (U) or terminal input (TD), or (4) Distributed Program Link(D,DS).

**Q82) Which CICS command must be issued by the application program in order to gain access to the Common Work Area(CWA)?**

A82) EXEC CICS ADDRESS with CWA option.

**Q83) In which CICS table would you specify the length of the TASK WORK AREA (TWA)?**

A83) In the Program Control Table(PCT).

**Q84) What is a deadlock?**

A84) Deadlock (also known as a “deadly embrace”) occurs when a task is waiting for a resource held by another task which, in turn, is waiting for a resources held by the first task.

**Q85) Explain the term Transaction routing?**

A85) Transaction routing is a CICS mode of intercommunication which allows a terminal connected to local CICS to execute another transaction owned by a remote CICS.

**Q86) Explain the term Function Request Shipping?**

A86) Function request shipping is one of the CICS modes of intercommunication which allows an application program in a local CICS to access resources owned by a remote CICS.

**Q87) Explain the term “MRO” (Multi Region Operation)?**

A87) MRO is the mechanism by which different CICS address spaces within the same CPU can communicate and share resources.

**Q88) What are different system tables used in CICS?**

A88) PCT, FCT, TCT, DCT, PPT

**Q89) What is multitasking and multithreading?**

A89) Multitasking is the feature supported by the operating system to execute more than one task simultaneously. Multithreading is the system environment where the tasks are sharing the same programs load module under the multitasking environment. It is a subset of multitasking since it concerns tasks which use the same program.

**Q90) What is the difference between link xctl?**

A90) Link is temporary transfer of control. Xctl is permanent transfer of control

**Q91) Name some of the common tables in CICS and their usage.**

A91) PCT Program Control Table - defines each transaction, containing a list of valid transaction

identifiers (transid) where each transaction is paired with its matching

PPT Program Processing Table - contains a list of valid program names and maps and whether a

current version is in the CICS region or needs to be brought in as a new copy;

FCT File Control Table - contains a list of files known to CICS, the dataset name and status

(closed/open, enabled/disabled);

TCT Terminal Control Table - a list of the terminals known to CICS.

**Q92) Name some common CICS service programs and explain their usage?**

A92) Terminal Control, File Control, Task Control, Storage Control, etc. Each CICS services program controls the usage

and status for its resource (file, terminal, etc) within the CICS region.

**Q93) What is meant by a CICS task?**

A93) A CICS task exists from the time the operator presses the enter key until the application program returns control to

CICS.

**Q94) What is meant by program reentrance?**

A94) A program is considered reentrant if more than one task can execute the code without interfering with the other tasks'

execution.

**Q95) What is the common systems area (CSA)?**

A95) The common systems area is the major CICS control block that contains system information, including pointers to most other CICS control blocks. The CSA points to all members of STATIC storage.

**Q96) What is the COMMAREA (communications area)?**

A96) This is the area of main storage designed to let programs or tasks communicate with one another, used in programs via RETURN, XCTL and LINK commands.

**Q97) What is the EIB (execute interface block)?**

A97) The execute interface block lets the program communicate with the execute interface program, which processes CICS commands. It contains terminal id, time of day and response codes.

**Q98) What is an MDT (Modified Data Tag) - it's meaning and use?**

A98) The modified data tag is the last bit in the attribute byte for each screen field. It indicates whether the corresponding field has been changed.

**Q99) What is a transid and explain the system transid CEMT?**

A99) Transid is a transaction identifier, a four character code used to invoke a CICS task. CEMT is the master terminal transaction that lets you display and change the status of resources - it is the primary CICS service transaction.

**Q100) What is the common work area (CWA)?**

A100) The common work area is a storage area that can be accessed by any task in a CICS system.

**Q101) How do you access storage outside your CICS program?**

A101) In COBOL storage was accessed via BLL cells using the SET option of ADDRESS commands. In COBOL II the special register, ADDRESS OF lets you reference the address of any Linkage Section field.

**Q102) How does COBOL II and CICS release 1.7 provide for exceptional conditions and how does that differ from VS COBOL and earlier CICS releases?**

A102) VS COBOL used the HANDLE CONDITION command to name routines to pass program control when exceptional conditions were encountered. COBOL II and CICS release 1.7 introduced the RESP option on many CICS commands.

**Q103) What is the meaning and use of the EIBAID field?**

A103) EIBAID is a key field in the execute interface block; it indicates which attention key the user pressed to initiate the task.

**Q104) How do you control cursor positioning?**

A104) It's controlled by the CURSOR option of the SEND MAP command using a direct (0 through 1919) or symbolic value.

**Q105) What are attribute bytes and how and why are they modified?**

A105) Attribute bytes define map field characteristics (brightness, protection, etc); they are modified prior to issuing a SEND MAP command, eg. from normal to intense to highlight an error field.

**Q106) How do you invoke other programs? What are the pros and cons of each method?**

A106) There are three ways:

- 1) Use a COBOL II CALL statement to invoke a subprogram. This method is transparent to CICS, which sees only the one load module.
- 2) An EXEC LINK is similar to a call; it invokes a separate CICS program and ends with a RETURN to the invoking program. or
- 3) An EXEC XCTL which transfers control to another CICS program and does not get control back.

**Q107) What is BMS?**

A107) BMS is Basic Map Support; it allows you to code assembler level programs to define screens.

**Q108) What is the difference between FSET and FRSET?**

A108) FSET specifies that the modified data tag should be turned on before the map is sent to the screen. FRSET turns off the attribute byte; it's used to transmit only changed data from the terminal.

**Q109) What is the difference between the enter key, the PF keys and the PA keys?**

A109) The enter and PF keys transmit data from the screen; the PA keys tell CICS that a terminal action took place, but data is not transmitted.

**Q110) Explain the difference among the EXEC LINK, EXEC XCTL and Cobol II static call statements in CICS.**

A110) COBOL II allows for static calls which are more efficient than the LINK instruction which establishes a new run-unit.

**Q111) Are sequential files supported by CICS?**

A111) Yes, but not as part of the File Control Program. They are supported as extra partition transient data files.

**Q112) What option can be coded on the RETURN command to associate a transaction identifier with the next terminal input?**

A112) The TRANSID option.

**Q113) What is an ASRA?**

A113) An ASRA is the CICS interrupt code, the equivalent of an MVS abend code.

**Q114) What is temporary storage?**

A114) Temporary storage is either main or auxiliary storage that allows the program to save data between task invocations.

**Q115) What is transient data?**

A115) Transient data provides CICS programs with a simple method for sequential processing, often used to produce output for 3270 printers.

**Q116) What are the two types of transient data queues?**

A116) They are intrapartition, which can only be accessed from within CICS and extrapartition, which are typically used to collect data online, but process it in a batch environment.

**Q117) Where are transient data sets defined to CICS?**

A117) They are defined in the destination control table (DCT).

**Q118) Once a transient data queue is read, can it be reread?**

A118) No, silly! That's why IBM calls it transient.

**Q119) Name some commands used for CICS file browsing.**

A119) STARTBR, READNEXT, READPREV, ENDBR and RESETBR.

**Q120) What other file control processing commands are used for file updating?**

A120) WRITE, REWRITE, DELETE and UNLOCK.

**Q121) What is Journal Recovery and Dynamic Transaction Backout?**

A121) Journal Recovery is recovery of changes made to a file during online processing. If a file has I/O problems it is restored from a backup taken before online processing began and the journalled changes are applied. Dynamic transaction backout is the removal of partial changes made by a failed transaction.

**Q122) What tables must be updated when adding a new transaction and program?**

A122) At a bare minimum the Program Control Table ( PCT) and Program Processing Table (PPT) must be updated.

**Q123) What is the meaning of the SYNCPOINT command?**

A123) SYNCPOINT without the ROLLBACK option makes all updates to protected resources permanent, with the ROLLBACK option it reverses all updates.

**Q124) What do the terms locality of reference and working set mean?**

A124) They refer to CICS efficiency techniques. Locality of reference requires that the application program should consistently reference instructions and data within a relatively small number of pages. The working set is the number of program pages needed by a task.

**Q125) What do the keywords MAPONLY and DATAONLY mean?**

A125) MAPONLY is a SEND MAP operand that sends only fields with initial values to the screen. DATAONLY is the SEND MAP operand that specifies only data from the map area should be displayed.

**Q126) What is the MASSINSERT option?**

A126) MASSINSERT is a WRITE option that modifies normal VSAM split processing, leaving free space after the inserted record, so subsequent records can be inserted without splits. It is ended by an UNLOCK command.

**Q127) What is a cursor in CICS sql processing?**

A127) A cursor is a pointer that identifies one row in a sql results table as the current row.

**Q128) What are the DB2 steps required to migrate a CICS DB2 program from source code to load module?**

A128) A DB2 precompiler processes some SQL statements and converts others. It creates a data base request module (DBRM) for the binding step. The bind process uses the DBRM to create an application plan, which specifies the techniques DB2 will use to process the embedded SQL statements. The link/edit step includes an interface to the CICS/DB2 attachment facility.

**Q129) Name some translator and compile options and explain their meaning?**

A129) For translator SOURCE option prints the program listing, DEBUG enables EDF and COBOL2 alerts the system to use the COBOL II compiler. For the compiler XREF prints a sorted data cross reference and FDUMP prints a formatted dump if the program abends.

**Q130) What is the significance of RDO?**

A130) RDO is Resource Definition Online. Since release 1.6 RDO allows resources (terminals, programs, transactions and files) to be defined interactively while CICS is running.

**Q131) What is CECI?**

A131) CECI is the command level interpreter transid that interactively executes CICS commands. It is a rudimentary CICS command debugger which does not require coding an entire program.

**Q132) What is CEDF?**

A132) CEDF is the execute diagnostic facility that can be used for debugging CICS programs.

**Q133) What is CEBR?**

A133) CEBR lets you browse the contents of a specific temporary storage queue.

**Q134) Name and explain some common CICS abend codes?**

A134) Any AEL\_ indicates an execute interface program problem - the abending program encountered an exceptional condition that was not anticipated by the coding. APCT - the program could not be found or is disabled. ASRA - most common CICS abend, indicating a program check, identified by a one-byte code in the Program Status Word in the dump. AKCP - the task was cancelled; it was suspended for a period longer than the transaction's defined deadlock timeout period. AKCT - The task was cancelled because it was waiting too long for terminal input.

**Q135) What is a logical message in CICS?**

A135) A logical message is a single unit of output created by SEND TEXT or SEND MAP commands. BMS collects the separate output from each command and treats them as one entity. This technique may be used to build CICS reports.

**Q136) What are the CICS commands associated with temporary storage queue processing?**

A136) WRITEQ TS, READQ TS, and DELETEQ, whose meanings should be self-explanatory.

**Q137) What are the CICS commands associated with transient data queue processing?**

A137) WRITEQ TD, READQ TD, DELETEQ TD, ENQ and DEQ.

**Q138) What is the meaning of the ENQ and DEQ commands?**

A138) Neither command is exclusively a transient data command. The ENQ command reserves any user defined resource for the specific task. For enqueued transient data no other task will be able to write records to it for as long as it is enqueued. DEQ removes the lock.

**Q139) How do you delete Item 3 in a five-item TSQ?**

A139) You can't--at least not directly. Options, none of them good, include:

- I. adding a logical-delete flag to the contents of each item;
- II. moving item 4 to 3 and 5 to 4 and initializing item 5, all thru rewrites; this is a variant on I;
- III. creating a new 'copy' TSQ that excludes the unwanted item, killing the old TSQ (deleteq ts), writing the new TSQ with the original name from the new TSQ, and then deleting the 'copy' TSQ.

This way, you will get an accurate report from NUMITEMS.

**Q140) What CICS command would you use to read a VSAM KSDS sequentially in ascending order?**

A140) READNEXT reads the next record from a browse operation for any of the three VSAM files.

**Q141) How do you get data from a task that began with a START command?**

A141) The RETRIEVE command is used to get data from a task that began with a START command.

**Q142) What is interval control and what are some of the CICS commands associated with it?**

A142) CICS interval control provides a variety of time-related features - common commands are ASKTIME, FORMATTIME, START, RETRIEVE, and CANCEL.

**Q143) What is task control and what are the CICS commands associated with it?**

A143) Task control refers to the CICS functions that manage the execution of tasks. Task control commands are SUSPEND, ENQ, and DEQ.

**Q144) What is the CICS LOAD command?**

A144) The LOAD command retrieves an object program from disk and loads it into main storage - it's primarily used for a constant table that will be available system-wide.

**Q145) What is the ABEND command and when would you use it?**

A145) The ABEND command forces a task to end abnormally. It creates a transaction dump and invokes the dynamic transaction backout.

**Q146) DB2 What is the difference between a package and a plan. How does one bind 2 versions of a CICS**

**transaction with the same module name in two different CICS regions that share the same DB2 subsystem?**

A146) Package and plan are usually used synonymously, as in this site. Both contain optimized code for SQL statements - a package for a single program, module or subroutine contained in the database request module (DBRM) library. A

plan may contain multiple packages and pointers to packages. The one CICS module would then exist in a package that could be referenced in two different plans.

**Q147) How to build up LU 6.2 communication?" and "what Pseudo-conversational and real conversational transaction are and their differences."**

A147) Pseudo-conversational transactions are almost always the preferred method. In these mode CICS releases resources between responses to user input, i.e. the task is ended awaiting the user response.

**Q148) Why is it important not to execute a STOP RUN in CICS ?**

A148) Stop run will come out from the CICS region.

**Q149) Why must all CICS programs have a Linkage Section ?**

A149) To pass parameters from appl. Program to CICS.

**Q150) A mapset consists of three maps and 10 fields on each map . How many of the following will be needed ?**

A150) a) DFHMSD statements 1  
a b) DFHMDI statements 3  
b c) DFHMDF statements 30

**Q151) How are programs reinitiated under CICS ?**

A151) START COMMAND , RETURN COMMAND

**Q152) Why doesn't CICS use the Cobol Open and Close statements ?**

A152) CICS AUTOMATICALLY OPENS AND CLOSES THE FILES THOSE ARE PLASSED IN FCT

**Q153) What is the difference between a Symbolic map and Physical map ?**

A153) SYMBOLIC MAP IS USED BY USER AND PHYSICAL MAP IS USED BY SYSTEM

**Q154) Can a program change protected field ?**

A154) NO

**Q155) How is the stopper byte different from an auto skip byte ?**

A155) STOPPER command will stop after completing its field , whereas AUTOSKIP command Will skip to next unprotected field after completing its field.

**Q156) By which CICS defined field can you determine the position of the cursor on the map ?**

A156) ATTRIB FIELD

**Q157) How will you place cursor on a field called 'EMPNO'. This field belongs to mapset 'MAPEMPG'**

**and map 'MAPEMPM' and Symbolic map 'Empid-Rec' ?**  
A157) BY INSERTING IC IN THE ATTRIB COMMAND

**Q158) How do you place the cursor on a particular position on the screen? - GS**

A158) Move -1 to the length attribute of the field and use the CURSOR option.  
Define the field with IC in the BMS map.  
Use CURSOR(n m)??

**Q159) What are the two outputs created as a result of generation of a map? - GS**

A159) The map copybook and the load module.

- Q160) What is the difference between physical map and symbolic map? - GS**  
A160) The physical map is the load module and the symbolic map is the data structure.
- Q161) What is the attribute byte? - GS**  
A161) Defines the display/transmission of field. most cases is an output field from the program.
- Q162) How do you use extended attributes ?**  
A162) Define EXTATT=YES and the correct terminal type.
- Q163) What are the 3 working storage fields used for every field on the map? - GS**  
A163) Length, attribute and input/output field.
- Q164) What is MDT? What are FSET, FRSET ?**  
**A164) MDT:** Bit in the attribute byte indicating modification of field on screen. Happens on an input operation.  
**FSET:** Sets MDT on to ensure field is transmitted. Happens on an output operation.  
**FRSET:** Resets MDT. Until this happens, field continues to be sent.
- Q165) What is the use of DSECT parameter in BMS?**  
A165) Is the parameter to generate a symbolic map.
- Q166) Do you receive the attribute byte in the symbolic map?**  
A166) On EOF yes.
- Q167) How do you make your BMS maps case sensitive?**  
A167) Use ASIS???
- Q168) What is effect on RECEIVE MAP when PF key is pressed? PA key is pressed?**  
A168) When PF key is pressed, Data transmission may happen. When PA key is pressed, Data transmission will not happen.
- Q169) What is the difference between a PF key & a PA key ?**  
A169) PF keys wake up the task and transmit modified data, PA keys only wake up the task.
- Q170) Name the macros used to define the following: MAP            MAPSET            FIELD**  
A170) DFHMSD            DFHMDI            DFHMDF
- Q171) Can you use OCCURS in a BMS map? If you do, what are the issues related with its use?**  
A171) Yes. cannot use group by clause???
- Q172) Can you define multiple maps in a BMS mapset?**  
A172) Yes.
- Q173) How is the storage determined in the symbolic map, if you have multiple maps?**  
A173) Storage for maps redefine the first. This means largest map has to be the first.
- Q174) What is the meaning of BMS length of field = 0?**  
A174) Data was not entered in the field
- Q175) Can you simply check if length = 0 for checking if a field was modified?**  
A175) No, not if ERASE EOF was used.
- Q176) What do you do if you do not want characters entered by the user to be folded to uppercase ?**

A176) Use ASIS option on RECEIVE.

**Q177) What does the BUFFER option in RECEIVE mean ?**

A177) Brings the entire datastream from the terminal buffer.

**Q178) What are the steps you go through to create a BMS executable?**

A178) Assemble to create CSECT and Link

**Q179) When you compile a CICS program, the (pre)compiler puts an extra chunk of code. Where does it get**

**included and that is it called? What is its length? - GS**

A179) DFHEIBLK, DFHCOMMAREA.

**Q180) List all the CICS tables and explain their contents. - GS**

A180) PPT SIT  
PCT JCT  
FCT SNT  
DCT SRT  
RCT TCT

**Q181) I have written a CICS program. What tables should I setup to run this program? - GS**

A181) PPT, PCT, (FCT, DCT, RCT (if needed)).

**Q182) In which table would you make an entry for a BMS map? - GS**

A182) PPT

**Q183) What is the content of the PPT entry? - GS**

A183) Length, Source, Use count, Lang, Res count DFHRPL number

**Q184) For a CICS-DB2 program, how is the plan referenced? - GS**

A184) Uses a RCT table.

**Q185) How is dynamic memory allocated within a CICS application program? - GS**

A185) Use a GETMAIN

**Q186) What is the use of a TDQ, TSQ? - GS**

A186) Temporary data stores.

**Q187) How do you read from a TSQ? - GS**

A187) Temp storage read command

**Q188) If I create a TSQ from one transaction, can I read it from another transaction? - GS**

A188) Yes. As long as they run in the same region.

**Q189) What are extra partition & intra partition TDQs?**

A189) Extra partition TDQs are datasets used for communication b'n CICS and other CICS/Batch regions. Intrapartition TDQs are queues for communication within regn.

**Q190) What is trigger level in the context of TDQs?**

A190) For intrapartition TDQs specify the # records at which ATI happens. not applicable for extra partition TDQs.

**Q191) How do you fire a batch job from a CICS transaction ?**

A191) Define an extrapartition TDQ as an internal reader and write the JCL to it. Terminate the JCL with /\*EOF.

**Q192) What is ATI? What kind of TDQ can be used?**

A192) Automatic Task Initiation. Intra partition TDQ.

**Q193) Do you require a table entry for a TSQ?**

A193) If recovery is needed.

**Q194) Is there any entry for TSQs in CICS tables?**

A194) Yes in the DFHTST.

**Q195) What is the use of DCT?**

A195) Destination Control Table used to define TDQs

**Q196) What is ENQ, DEQ ?**

A196) Task control commands to make resources serially reusable.

**Q197) Can you issue SQL COMMIT from a CICS program? - GS**

A197) Yes.

**Q198) What is the other way of terminating a transaction? - GS**

A198) EXEC CICS SYNCPOINT. Assuming it is a LUW. This will not end the Xn.

**Q199) What is an ASRA abend ?**

A199) Any data exception problem SOC7, SOC4 etc.

**Q200) What is an AEY9 abend ?**

A200) DB2/IDMS not up.

**Q201) What are the situations under which NEWCOPY is required ?**

A201) When a program has been used in CICS atleast once and then changed and recompiled.

**Q202) What is EXEC CICS RETRIEVE ?**

A202) Used by STARTed tasks to get the parameters passed to them.

**Q203) Name some important fields in the EIB block ?**

A203) EIBRESP, EIBCALEN, EIBRRCDE, EIBTASK, EIBDATE, EIBTIME

**Q204) Can you use DYNAMIC calls in CICS ?**

A204) Yes, the called routine must be defined in PPT and the calling program must use CALL identifier..

**Q205) How do you handle errors in CICS pgms ?**

A205) Check EIBRESP after the call or use the HANDLE condition.

**Q206) Suppose pgm A passes 30 bytes to pgm B thru commarea and pgm B has defined its DFHCOMMAREA to be**

**50 bytes . Is there a problem ?**

A206) Yes, if B tries to access bytes 31-50.

**Q207) When an XCTL is done, does the tranid change ? Is a new task created ? Does it cause an implicit**

**SYNCPOINT to be issued ?**

A207) No, No, Yes.

**Q208) How do you execute a background CICS transaction ?**

A208) With a START or ATL.

**Q209) What is the difference between START and XCTL ?**

A209) START is used to start a new task. It is a interval control command. XCTL is used to pass control to a program within the same task. It is a program control command.

**Q210) What is the usage of language in the PPT entry?**

A210) Language interface and call parameters???

**Q211) Can you have CICS code in a copybook? If yes, what happens during compilation?**

A211) Yes. Needs to be preprocessed.

**Q212) What is an AICA abend?**

A212) Runaway Task.

**Q213) How would you resolve an ASRA abend?**

A213) In COBOL II start with CEBR, and get the offset/instruction.

**Q214) I invoke a transaction from CICS. The program has a code: MOVE DFHCOMMAREA TO WS-AREA.**

**What happens to this transaction? What happens to the other transactions?**

A214) Junk may get moved in. Will cause Storage violation. ????

**Q215) When you do a START, what will the value of EIBCALEN?**

A215) Zero.

**Q216) How are VSAM files Read in CICS pgms? - GS**

A216) File Control Commands. Random, Sequential, forward and backward.

**Q217) How will you access a VSAM file using an alternate index?**

A217) Thru the path. Define path as an FCT and use normal File control commands.

**Q218) How do you rollback data written to an ESDS file?**

A218) Define the file as recoverable. in cases where records have been inserted into the file, you may need to run a batch program to logically delete the inserted records.

**Q219) I have done a START BROWSE on a VSAM dataset. Can I do another START BROWSE without doing an END BROWSE?**

A219) No.

**Q220) Can you access QSAM (seq ) files from CICS ?**

A220) No.

**Q221) Can you access ESDS files from CICS ?**

A221) Yes.

**Q222) In the CICS command level all the re-entrancy issues are handled by the System(True or False).**

A222) True

**Q223) What are the three BMS options ?**

A223) Minimum, Standard, Full

**Q224) What are the beginning and end points of an LUW called?**

A224) Sync point

**Q225) The DL/I database is a hierarchical database and the DL/I access method is the access method of the**

**Information Management System (IMS)(True or False)**

A225) True

**Q226) Before you can use a Temporary Storage Queue you must first define the Queue name in the CICS**

**Temporary Queue Table)( True or False).**

A226) False

**Q227) The process of writing its own type of journal records by the application program, other than the automatic**

**journalling provided by CICS is called**

A227) Explicit Journalling

**Q228) In order to display a formatted screen, a terminal must receive a series of data stream called Native Mode**

**Data Stream(True or False).**

A228) True

**Q229) Which is the CICS control program which governs the flow of control among the CICS application**

**programs?**

A229) Program Control Program

**Q230) What is the option of the DFHDCT macro which makes it possible to recover logically deleted records from**

**an Intrapartition TDQ?**

A230) REUSE=YES

**Q231) CICS and DB2 can exist in the same region under the Operating system (True or False)**

A231) True

**Q232) What is the name of the facility provided by CICS to free the application program from the problems caused**

**by NMDS (device and format dependence)?**

A232) Terminal Paging

**Q233) What is the command which will delete a program LOADED into the main storage using LOAD command?**

A233) RELEASE

**Q234) Which is the option of the HANDLE AID command that will pass control to the specified label when any key**

**is pressed?**

A234) ANYKEY

**Q235) What is the name of the mapset definition macro?**

A235) DFHMSD

**Q236) What is the access method used by DB2?**

A236) SQL

**Q237) What is the command that is used to add a new record to the file?**

A237) READ with UPDATE followed by REWRITE

**Q238) What will happen when the resource security check has failed on the program which has been specified in the PROGRAM option of the LOAD command?**

A238) INVREQ

**Q239) What is the command used to send a map to a terminal?**

A239) SEND MAP

**Q240) What is the command used to request notification when the specified time has expired?**

A240) POST

**Q241) If DATAONLY option is specified in the SEND MAP command what will happen?**

A241) Only the symbolic map will be send

**Q242) What will happen if the TDQ that you want to delete is not in the DCT?**

A242) QIDERR will occur

**Q243) The read of a record from an Intrapartition TDQ is not destructive(True or False).**

A243) True

**Q244) An XCTL uses more CPU time than LINK (True or False)**

A244) False

**Q245) What is the primary function of the Sign-on Table?**

A245) Register security information of all programs

**Q246) Native Mode Data Stream (NMDS) is a mixture of Buffer Control Characters(BCC) and text data (True or False).**

A246) True

**Q247) When there are 2 records with the same key specified in a DELETE operation what will happen?**

A247) DUPKEY condition will be set

**Q248) The application programs that contain the SQL statements must be Pre-compiled for converting the SQL statements into equivalent COBOL statements (True or False)**

A248) True

**Q249) What are the databases that CICS can access?**

A249) DB2, DL/I, ORACLE

**Q250) The first step in the development of an application system is the Requirement Analysis(True or False).**

A250) True

**Q251) CICS provides an interface through which the all the DL/I services can be used under CICS(True or False).**

A251) True

**Q252) How to get the sign-on user-id from an application program?**

A252) ASSIGN command with USERID option

- Q253) What is a Logical Unit of Work (LUW)?**  
A253) A sequence of operations logically tied together
- Q254) Translation Time is not reduced if the Pre-compilation is done first(True or False).**  
A254) True
- Q255) What is the general Command format of CICS ?**  
A255) EXEC CICS followed by the command
- Q256) If you use the OPTIMIZE compiler option the size of the program can be reduced by 5 to 10%(True or False).**  
A256) True
- Q257) For multithreading an application program need not be re-entrant(True or False).**  
A257) True
- Q258) Before issuing an ASKTIME command what will be the values in the EIBDATE and EIBTIME fields if the EIB?**  
A258) The date and time at the task initiation
- Q259) What is the error condition that is set when the file specified in the NAME option is not in the FCT?**  
A259) PGMIDERR
- Q260) For protecting a transaction using the transaction security function, the two things that must be done are:**  
1. in the SNT entry of the user who you wish to allow to access a protected transaction, specify SCTKEY=n  
2. In the PCT entry of the transactions that you wish to protect specify the TRANSEC=n.  
(True or False)  
A260) True
- Q261) What are the various types of accesses that can be allowed by the SERVREQ option of the DFHFCT?**  
A261) ADD,BROWSE,DELETE,READ,UPDATE
- Q262) 'CICS' system services provides an interface between CICS and the operating system and carries out the functions like loading and releasing of application programs, acquiring and freeing of storage , task scheduling, etc (True or False).**  
A262) True
- Q263) What are the parameters that you have to give when you are using the CSSN transaction?**  
A263) None
- Q264) What is the command that is used to delay the processing of a task for a specified time interval or until a specified time?**  
A264) WAIT
- Q265) NMDS is both device dependent and format dependent (True or False)**  
A265) True

- Q266) Which is the EIB field that gives the date when a task was started?**  
A266) EIBDATE
- Q267) Which is the AID that will not be identified in the ANYKEY option of the HANDLE AID command?**  
A267) CLEAR
- Q268) Reading a record from a TSQ will logically delete the record from the Queue (True or False).**  
A268) True
- Q269) What is the option that is used to erase all unprotected fields during a SEND MAP operation?**  
A269) ERASEAUP
- Q270) What is the CICS command that is used to receive the un-formatted data from the terminal or logical unit of a communication network?**  
A270) RECEIVE
- Q271) What is the command for reading a record form a TSQ?**  
A271) READQ TS, READQ
- Q272) What will happen, if an out-of-range or negative value is specified in the LENGTH option of the SEND command?**  
A272) The OUTRAGE condition will be set
- Q273) Which is the control table where you specify all the transaction that are to be started by CICS after CICS start-up?**  
A273) Sign-on table
- Q274) A HANDLE CONDITION remains active until the end of the program or until another HANDLE CONDITION command (True or False).**  
A274) True
- Q275) In the conversational mode the system waits for the user to enter his response and then press an attention key, and while waiting the resources are held by the program or task. So conversational mode of programming is inefficient (True or False)**  
A275) True
- Q276) Which is the macro used for making an entry in the PPT**  
A276) DFHPPT
- Q277) The goal of a recovery process is to Maintain the integrity of the data processed by the system and to minimize the impact of a task or system failure (True or False).**  
A277) True
- Q278) What is the primary objective of CICS ?**

A278) To provide the control and services of the DB/DC system

**Q279) If no exception handling is provided in the program, what will happen ?**

A279) CICS will take the default action specified for the condition

**Q280) What is the CICS supplied transaction which performs syntax checking of a CICS command?**

A280) CEMT

**Q281) What is the process of converting the CICS commands into the equivalent host language statements called?**

A281) Translation

**Q282) What is the function of the LOAD command?**

A282) To fetch a program, table or map to the main storage.

**Q283) What is the CICS Command that is used for reading a record from the TDQ?**

A283) READQ

**Q284) LENGERR, NOTAUTH and PGMIDERR are some of the common exception conditions that can occur with**

**LINK and XCTL (True or False).**

A284) False

**Q285) Which of the following are recoverable CICS resources?**

A285) Data files and data bases, Intrapartition TDQs, Auxiliary TSQs

**Q286) Which is the program which determines whether a transaction should be restarted ?**

A286) DTB

**Q287) What is the command used for receiving a map from a terminal?**

A287) RECEIVE MAP

**Q288) The mode of achieving conversation with the user, by sending him the message and while waiting for his**

**response, freeing the system resources is called**

A288) Pseudo-conversation

**Q289) Which is the command used for terminating a browse operation?**

A289) ENDBR

**Q290) What is the primary function of the Processing Program Table (PPT)?**

A290) To register all programs and maps

**Q291) Sync points cannot be requested by the application programs(True or False).**

A291) False

**Q292) Which is the command that is used to dump the main storage areas related to a task?**

A292) DUMP

**Q293) What is the CICS command that is used to copy a screen image of a terminal into another terminal?**

A293) ISSUE COPY

**Q294) What is the name of the log which contains the information needed to restart the system, including the task sync point information and system activity key points, snapshots of key system tables, etc.**

A294) Dynamic Log

**Q295) The EIB field which gives the last CICS command executed is**

A295) EIBRCODE

**Q296) The READ command with INTO option will read the record specified into the data area specified (True or false).**

A296) False

**Q297) The attribute character is an visible 1 byte character which precedes a screen field and determines the characteristics of the field (True or False).**

A297) True

**Q298) What is the function of the Terminal Control table?**

A298) To register all CICS terminals

**Q299) Which is the CICS control program that provides communication services between user written application programs and terminals?**

A299) Terminal Control Program

**Q300) CICS Command level is**

A300) Low level version of CICS macro level

**Q301) TSQs can be written in the Main storage or Auxiliary storage (True or False).**

A301) True

**Q302) what is difference between call and link ?**

A302) In case of call , whenever you do changes to the called program you need to compile the calling program also. In case of link , it is not needed .

**Q303) what are the differences between DFHCOMMAREA and TSQ ?**

A303) Both are used to save data among tasks. but 1. COMMAREA is private to that transaction only . like every transaction has its own COMMAREA created by CICS as soon as the transaction is initiated . however TSQ , if queue id is known can be accessed by other transactions also 2. COMMAREA length is s9(4) comp i.e. 65k . but TSQ can have any length.3. COMMAREA is available only during the transaction is running. TSQ if created with auxiliary option resides in aux memory and available even if main memory crashes.4.normally COMMAREA is used to transfer data from one task to another while tsq is used widely within the task as a scratch pad.

**Q304) What is Communication Area?**

A304) Communication Area is used to pass data between the program or between the task.

**Q305) Which of the following statements correctly describe the syntax of CICS command language?**

A). If an EXEC CICS command must be continued onto a second line a hyphen (-) must be coded in column 7 of the continued line.

B). If an EXEC CICS command must be continued onto a second line an 'X' must be coded in column 72 of each line to be continued.

- C). An EXEC CICS command CANNOT be coded within a COBOL IF statement, between the IF command and the period (.) ending it.
  - D). The END-EXEC delimiter is optional and never needs to be placed at the end of a CICS command.
  - E). The options specified within an EXEC CICS command can be in any order.
- A305) **E.** The options specified within an EXEC CICS command can be in any order. For example 'exec CICS Send From(Msg1) Length(30) End-Exec' can also be coded 'exec Cics Send Length(30) From(Msg1) End-Exec'

**Q306) A CICS program ABENDS with an ASRA ABEND code. What is its meaning?**

- A) A link was issued to a program whose name does not exist in the PPT (Program Processing Table).
  - B) A program attempted to use a map that is not defined in the PCT (Program Control Table).
  - C) A security violation has occurred. The operator is not defined with the proper authority in the SNT (Sign-on Table) to use a particular file
  - D) A program interrupt (0C0 or 0C1 or 0C2 or ...) has occurred in a CICS program.
  - E) An I/O error has occurred when attempting to use a VSAM file from a CICS program
- A306) A program interrupt (0C0 or 0C1 or 0C2 or ...) has occurred in a CICS program.

**Q307) Which of the following commands, when issued by 2 different programs running at the same time, will prevent simultaneous use of resource 'SINGLE'?**

- B) EXEC CICS PROTECT RESOURCE('SINGLE') LENGTH(6) END-EXEC.
  - C) EXEC CICS HOLD RESOURCE('SINGLE') LENGTH(6) END-EXEC.
  - D) EXEC CICS TASK SINGLE('SINGLE') LENGTH(6) END-EXEC.
  - E) EXEC CICS EXCLUSIVE RESOURCE('SINGLE') LENGTH(6) END-EXEC.
- A307) EXEC CICS EXCLUSIVE RESOURCE('SINGLE') LENGTH(6) END-EXEC

**Q308) The map shown below is displayed with:**

EXEC CICS SEND MAP('MAP1') MAPSET('MAP1S') MAPONLY END-EXEC. After the screen is displayed, the operator enters 1 character, the letter 'X'. Where will the cursor now appear on the screen?

```
MAP1S DFHMSD
TYPE=MAP,MODE=INOUT,CTRL=(FREEKB,FRSET),LANG=COBOL, X
TIOAPFX=YESMAP1
DFHMDI SIZE=(24,80) DFHMDF POS=(5,1),ATTRB=UNPROT,LENGTH=1FIELD2
DFHMDF
POS=(5,3),ATTRB=UNPROT,LENGTH=1FIELD3 DFHMDF
POS=(5,5),ATTRB=(UNPROT,IC),LENGTH=1FIELD4 DFHMDF
POS=(5,7),ATTRB=ASKIP,LENGTH=1FIELD5 DFHMDF
POS=(5,9),ATTRB=UNPROT,LENGTH=1,INITIAL='Z' DFHMDF
POS=(5,11),ATTRB=ASKIP,LENGTH=1 DFHMSD TYPE=FINAL
```

- A) In the field with a POS=(5,1) B) In FIELD2. C) In FIELD3. D) In FIELD4. E) In FIELD5.
- A308) In FIELD5

**Q309) How can you accomplish breakpoint in intertest?**

- A309) U-for unconditional breakpoint, C-for conditional breakpoint, and A-for automatic breakpoint

**Q310) How many ways are there for initiating a transaction? what are they?**

- A310) There are six ways in initiating a transaction.they are as follows.
  1. embedding four character transid on the top left most corner of the screen.
  2. making use of EXEC CICS START TRANSID ( )
  3. making use of EXEC CICS RETURN TRANSID ( )

4. By defining the transid in DCT (destination control table) to enable ATI (AUTOMATIC TASK INITIATION)
5. Making use of PLT ( program list table)
6. By associating four character transid in PCT (program control table)

**Q311) Which type of TDQ is read destructive?**

A311) Intrapartition TDQ is read destructive. extra partition tdq is not read destructive.

**Q312) The error code AEIV?**

A312) This is the error code for length, if length of the source data is more than the receiving field, This error will occur.

**Q313) What is the size of commarea**

A313) The default commarea size is 65k.

**Q314) What is ASRAABEND in CICS?**

A314) It occurs when program interruption takes place. e.g.: when alphanumeric string moved to numeric data item OR when arithmetic calculations performed on nonnumeric data item OR when an attempt made to read an occurrence of a table beyond the defined occurrences.

**Q315) What is a two Phase commit in CICS?**

A315) This occurs when a programmer Issues a Exec CICS Syncpoint command. this is called two phase because CICS will first commit changes to the resources under its control like VSAM files. and the DB2 changes are committed. Usually CICS signals Db2 to complete the next phase and release all the locks.

**Q316) Difference between TSQ & TDQ**

A316) TDQ is read destructive, TSQ is not. TSQ can be created dynamically, TDQ cannot be created dynamically. TSQ is temporary in nature (i.e. it will be deleted when the program finishes execution, unless it is made permanent by making a entry in the Temporary Storage Table), TDQ is not.

**Q317) What is ENQ in CICS?**

A317) If any one want to restrict Trans-Id to single user, enter trans-id with ENQ. It won't allow any one else to use the same trans-id.

**Q318) In SYMBOLIC Cursor Positioning after moving -1 to the length field also the cursor is not positioned in that particular field. Give reasons?**

A318) You have to explicitly specify the word CURSOR between your EXEC CICS and END-EXEC in the program.

**Q319) What does EIB mean?**

A319) The EIB is the EXECUTIVE INTERFACE BLOCK. It is not the EXECUTE INTERFACE BLOCK. All TP monitors or transaction processors are know as EXECUTIVES as they carry out process on behalf of a program module. CICS and DB2 are executives.

**Q320) How many exceptional condition can be given in a HANDLE CONDITION?**

A320) Max. of 12 exceptional conditions can be given in a single HANDLE CONDITION.

**Q321) How do you access the records randomly in TSQ ?**

A321) By specifying the ITEM option

**Q322) What command do you issue to delete a record in a transient data queue ?**

A322) READQ TD, the read is destructive.

**Q323) What are different ways of initiating transaction in CICS ?**

A323) We can initiate cics transaction a) by giving transaction id b) by giving cics start command c) automatic task initiation.

**Q324) What is the difference between LINK and XCTL ?**

A324) The XCTL command passes control to another program, but the resources requested by the first program may still be allocated. A task does not end until a RETURN statement is executed. While in LINK command, program control resumes its instruction following the LINK parameter. The disadvantage of LINK is that it requires that both the calling program and the called program remain in main memory even though both are no longer needed.

**Q325) What is the difference between CICS Program Control Table (PCT) and CICS Processing Program Table (PPT) ?**

A325) PCT contains a list of valid transaction ID. Each transaction ID is paired with the name of the program, CICS will load and execute when the transaction is invoked. On the other hand, PPT indicates each program's location which pertains to a storage address if the program has already been loaded or a disk location if the program hasn't been loaded. PPT will also be used to determine whether it will load a new copy of the program when the transaction is invoked.

**Q326) What are the 3 common ways to create maps?**

A326) The first way is to code a physical map and then code a matching symbolic map in your COBOL program. The second way to create a physical map along with a matching symbolic map is to code only the physical map using the &SYSPARM option, CICS will automatically create a member in a COPY library. And the third way is to use a map generator such as SDF (Screen Definition Facility)

**Q327) What is Quasi-reentrancy?**

A327) There are times when many users are concurrently using the same program, this is what we call MultiThreading. For example, 50 users are using program A, CICS will provide 50 Working storage for that program but one Procedure Division. And this technique is known as quasi-reentrancy

**Q328) What is the difference between a physical BMS mapset and a logical BMS mapset?**

A328) The physical mapset is a load module used to map the data to the screen at execution time. The symbolic map is the actual copybook member used in the program to reference the input and output fields on the screen.

**Q329) How To Set MDT(Modified Data Tag) Thru Application Program?(Dynamically)?**

A329) You have to move the following macro DFHBMFSE to the Attribute field of that particular Variable.

**Q330) What CICS facilities can you use to save data between the transactions?**

A330) COMMONAREA, TSQ & TDQ.

**Q331) How would you release control of the record in a READ for UPDATE?**

A331) By issuing a REWRITE,DELETE, or UNLOCK command or by ending the task.

**Q332) What is the difference between a RETURN with TRANSID and XCTL ?For example prog. A is issuing REUTRN with TRANSID to prog B. Prog A. is issuing XCTL to prog B?**

A332) In RETURN with TRANSID the control goes to the CICS region and the user have to transfer the control to prog. B  
by pressing any of the AID KEYS.In XCTL the control is directly transfer to prog. B.

**Q333) What will be the length of the eibcalen ,if the transaction is used to cics first time?**

A333) The length will be 0(zero).

**Q334) What is DFHEIBLK?**

A334) DFHEIBLK is Execute Interface Block. It is placed in the linkage section automatically by CICS translator program.

It must be the first entry in linkage section. CICS places values prior to giving control to the program and we can find almost any information about our transaction.

**Q335) What is the difference between the XCTL and LINK commands?**

A335) The LINK command anticipates return of control to the calling program, the XCTL command does not. Return to the calling program will be the result of the CICS RETURN command, specifying TRANSID(name of the calling program).

**Q336) What CICS command would you use to read a VSAM KSDS sequentially in ascending order?**

A336) First issue a STARTBR(start browse), which will position the browse at the desired record. Retrieve records by using subsequent READNEXT commands. Indicate the end of sequential processing with the ENDBR command. If the generic key is specified in the STARTBR command positioning in the file will be before the first record satisfying the generic key.For reading in descending order use the READPREV instead of READNEXT.

**Q337) What is the difference between pseudo-conversational and conversational?**

A337) Pseudo-conversational will start a new task for each input. By coding a CICS RETURN command specifying TRANSID(itself). Conversational will have an active task during the duration of the data entry.

**Q338) What is the COMMAREA(communications area)?**

A338) An area used to transfer data between different programs or between subsequent executions of the same program.  
Needs to be defined in the Linkage Section.

1. What are the pros and cons of Conversation Vs Pseudo conversation programming ?
2. Explain IPC mechanisms and means in CICS?
3. Can we use EXEC SQL COMMIT/ROLLBACK in CICS? If so how? if not what are the alternatives?
4. What are the advantages of TDQ?
5. How do you implement locking in CICS?
6. What is multithreading?
7. Name 3 cobol commands that cannot be used with CICS
8. Why is it important not to execute a STOP RUN in CICS ?
9. How are programs reinitiated under CICS ?
10. Why must all CICS programs have a Linkage Section ?
11. Why doesn't CICS use the Cobol Open and Close statements ?
12. What is the difference between a Symbolic map and Physical map ?
13. If a physical map has six variable fields and nine constant fields, how many fields must the symbolic map has ?
14. In which column must label begin ?
15. Code the parameter that will assign a start value to the field
16. Can a program change protected field ?
17. How many columns will be needed on a screen to display a protected field that has 4 bytes of data
18. How many columns will be needed to on a screen to display an unprotected field that has 4 bytes of data
19. What are the 2 categories of extended attributes ?
20. When using extended attributes , how many attribute bytes will be needed for each symbolic map field ?
21. How is the stopper byte different from an autoskip byte ?
22. By which command do you preserve working storage fields ?
23. How do you restore working storage fields ?
24. Which command will release all the resources used by the program ?
25. What is the relationship between EIBCALEN and DFHCOMMAREA ?
26. How will you place cursor on a field called 'EMPNO'. This field belongs to mapset 'MAPEMPG' and map 'MAPEMPM' and Symbolic map 'Empid-Rec' ?
27. How will the program know which key has been pressed.
28. By which CICS defined field can you determine the position of the cursor on the map ?
29. What is the function of a STARTBR ?
30. Assume that a file contains 100 records ,If one start browse and 99 read next commands have been executed , which record will currently be in memory ?
31. True or False ? . In a browse program the program should remain active while a user is viewing a screen
32. Which condition will be triggered if a user attempts to start a browse beyond end-of file ?
33. Which condition will be triggered if a user attempts to continue reading backward beyond the beginning of file?
34. What will happen if a user enters a record key that is lower than the lowest record key in a file ?
35. How can this answer be affected by the Start-Browse option ?
36. Describe a method for beginning a browse at the beginning of a file .
37. When is the condition of NOTFND not an error ?
38. What will happen if you code a send map command or a return statement with the same transid option if a MAPFAIL occurs ?
39. Why is the Enter Key option explicitly coded in the Handle Aid command ?
40. What happens if you omit labels on a HANDLE Condition command ?
41. What is the difference between a NOHANDLE and an IGNORE condition ?
42. What are the 3 broad ways that a program can give up control ?
43. What is the difference between XCTL and RETURN.
44. What happens if a DELETEQ TS command is executed ?
45. Why is the terminal ID often used as a part of a TSQ ?
46. What is the maximum length of a TSQ name ?
47. What is the maximum length of a TDQ name ?

48. Is it necessary to define a TSQ in a CICS table ?
49. Can you read the 5th item of a TDQ ?
50. Where are TDQ's defined ?
51. Can you delete an individual record from a TSQ or a TDQ ?
52. Can you update a record in a TDQ ?
53. Why is it necessary to update PPT ?
54. In which CICS table do we define the transaction for a program?
55. Distinguish between TSQ and TDQ.
56. What is DFHBMSCA?
57. What is Pseudo conversational programming?
58. Name 3 cobol commands that cannot be used with CICS
59. If a physical map has six variable fields and nine constant fields , how many fields must the symbolic map has ?
60. In which column must label begin ?
61. Code the parameter that will assign a start value to the filed
62. How many columns will be needed on a screen to display a protected field that has 4 bytes of data?
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67. How do you restore working storage fields ?
68. Which command will release all the resources used by the program ?
69. What is the relationship between EIBCALEN and DFHCOMMAREA ?
70. How will the program know which key has been pressed.
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89. Is it necessary to define a TSQ in a CICS table ?
90. Can you read the 5th item of a TDQ ?
91. Where are TDQ's defined ?
92. Can you delete an individual record from a TSQ or a TDQ ?
93. Can you update a record in a TDQ ?
94. Why is it necessary to update PPT ?

95. In which CICS table do we define the transaction for a program ?
96. How do you do a browse Operation
97. If you have a new map, new program, and a newfile, which CICS tables do you update?
98. How to read a TS Queue
99. Differentiate between XCTL and LINK
100. What is START ?
101. How do you update a file in CICS In JCL,
102. What is a temporary dataset?
103. What is a PROC, and how is it different from a JCL
104. Differentiate instream procedures versus Catalogued procedures
105. What is difference between TDQ and TSQ ?
106. How do interval control transactions invoke themselves
107. How do we read a VSAM file in CICS
108. What are some of imp. CICS commands and their parameters
109. How do you protect a field from being overlaid? - GS
110. What are SEND MAP MAPONLY & SEND MAP DATAONLY ?
111. What are the restrictions while using GETMAIN and FREEMAIN? - GS
112. I have TSQ with 15 items. I want to delete the 10th item. How do I do that?
113. How do I find the name of the CICS region inside my COBOL program?
114. Can a CICS region be attached to more than one DB2 subsystem ?
115. What determines the DB2 subsystem to which a particular CICS region is attached ?
116. What is the DSNB transaction used for ?

## **SQL(Structured Query Language):**

Structured Query Language (SQL) provides the ability to create and define relational database objects. After these objects are defined, the language permits one to add data to these objects. Once data has been added, one can modify, retrieve, or delete that data. The language provides the capability of defining what type of authority one might have when accessing the data.

### **Data Definition Language**

As the name implies, there is a group of SQL statements that allows one to define the relational structures that will manage the data placed in them. The "CREATE" statements bring Relational Database Management System (RDMS) objects into existence. The types of objects one can create are STOGROUP, Database, Table space, Table, Index, View, Synonym, and Alias. The definitions of these objects are as follows:

**STOGROUP:** A storage group is a list of disk volume names to which one can assign a name. One defines the list of disk volumes and assigns the STOGROUP name with the Create STOGROUP statement.

**Database:** A database is a logical structure in which tables and indexes are later created. The database is defined and associated with a STOGROUP with a Create Database statement.

**Tablespace:** A tablespace is an area on disk that is allocated and formatted by the Create Table space statement.

**Table:** A table is an organizational structure which is defined in a Create Table statement. In this statement, the data attributes are defined by column, giving each column its own unique name within the table.

**Index:** A index is used in conjunction with the “Primary Key” parameter of the Create Table statement. It is made with the Create Index statement and provides the duplicate record-checking necessary for a unique key.

**View:** A view is an alternative perspective of the data present in a database. It is made with the Create View statement and can represent a subset of the columns defined in a table. It can also represents a set of columns combined from more than one table.

**Synonym:** The Create Synonym statement defines an unqualified name for a table or a view.

**Alias:** The Create Alias statement defines an alternate qualified name for a table or a view.

After a table is created, additional columns may be added with an Alter Table statement. Any RDMS object that was made with a create statement can be removed with a drop statement.

In order to define RDMS objects, one needs various levels of authority. The following is a list of authority levels that can be granted to a user ID to operate on a designated database.

DBADM	Database administrator authority
DBCTRL	Database control authority
DBMAINT	Database maintenance authority
CREATETS	Create Table space Authority
CREATETAB	Create Table authority
DROP	Drop authority on a database or subordinate objects

### **Data Manipulation Language**

There are four SQL data manipulation statements(DML) available: Insert, Select, Update, and Delete. After tables are defined, they are ready to store data. Data is added to tables through the SQL Insert statement. Once data has been inserted into a table, it can be retrieved by the use of the Select statement. Data stored in a table can be modified by executing the SQL Update statement. Data can be deleted from a table by using the SQL Delete statement.

The SQL statements perform RDMS operations that can affect only one row at a time if desired. The same statements can, if required, affect many or all of the rows in a table. It is possible to select one row and insert it into another with one statement. It is also just as easy to select all of the rows from one table and insert all of them into another with a single statement. The same scope of operation applied to the update and delete statements. The scope of operation is controlled by the use of the WHERE clause. The operation will affect only the rows that satisfy the search condition. When no search condition specified, the entire table is affected.

There are additional language elements available that provide the ability to process the table data while it is being retrieved. In addition, there are a variety of functions that modify the value of the data that is returned in a query. There are column functions that act on all of the values of the selected rows for a specified column and return a single answer. There are also scalar functions that return a specific answer for each row that satisfies the search condition.

As mentioned previously, SQL provides the ability to filter what data is retrieved in a select statement by including the WHERE clause. The WHERE clause specifies a variety of comparisons between two values. The values could be column values or the result of an operation involving more than one column or a constant. The comparison operation are the same as those used in COBOL, with the exception of two additional operators. The first is the IN operator that compares a single value has a match in the specified list of values. The other is the LIKE operator, in which you can specify a value string that includes “wildcard” characters in such a manner that you can select rows of a table where column values are similar to the extent you require.

SQL provides four arithmetic operations : addition, subtraction, multiplication, and division. An arithmetic expression may involve any combination of column name or numbers. The arithmetic expression may itself be used as a column name or in a Select, Insert, Update, or Delete statement.

SQL provides the ability to sort the data retrieved from a table via the ORDER BY clause. In this clause, you can specify one or more sort column names as well as if each sort key is ascending or descending.

SQL also provides the ability to perform set manipulation operations. Using SQL, one can SELECT the intersection of two or more sets of data by coding a JOIN. A JOIN is any SELECT statement that has more than one DBMS object listed in its FROM clause. One can combine different sets of data by using the UNION operator. Other set manipulations can be executed by combining different operators and search conditions.

**The Following are the most frequently asked questions....**

**Q1) What RDMS objects are created with the SQL CREATE statements?**

A1) The SQL CREATE statements are used to create the following objects:

STOGROUP	A storage group
DATABASE	A logical collection of tables
TABLESPACE	An area that stores tables
TABLE	A data structure organized by a specified columns
INDEX	An alternate path to a table data
VIEW	An alternate representation of one or more tables
SYNONYM	An alternate name for local table or view
ALIAS	An alternate name for a table definition which may be local or remote, existence or nonexistent

**Q2) What RDMS objects are required before you can create a table?**

A2) Before you can create a table, you need an existing database and tablespace.

**Q3) In what RDMS object does one first list column names?**

A3) One first uses the column name in the CREATE TABLE statement.

**Q4) What is the syntax for a CREATE TABLE statement?**

A4) CREATE TABLE table name  
(column name list  
primary key (column name))  
in database-name, tablespace-name.

**Q5) Can one add columns to a table after it has been defined?**

A5) Yes, one can add column to a table after it has been defined by using the SQL ALTER TABLE statement.

**Q6) Where in a table are added columns located?**

A6) The new columns are added to the end of the table.

**Q7) After a table is defined, can columns be removed?**

A7) The only way to remove columns from an existing table involves a migration program that extracts only the desired columns of data, redefining the table without the unwanted columns, then populating the new table. One have to handle all the old table's dependents programmatically.

**Q8) Which RDMS objects can you change with the SQL ALTER statements?**

A8) The SQL ALTER statement can change a table index, a table, a tablespace, or a STOGROUP.

**Q9) What authority is required to create a table?**

A9) In order to create tables, one needs CREATETAB privileges.

**Q10) What is minimum authority required for one to create a tablespace?**

A10) In order to create tablespaces, one needs CREATETS privileges.

**Q11) When is it necessary to create a table index?**

A11) It is necessary to create a table index whenever you want to enforce the uniqueness of the table's primary key.

**Q12) What is a synonym?**

A12) A synonym is an unqualified alternative name for a table or view.

**Q13) What is a foreign key?**

A13) A foreign key is the key defined in one table to reference the primary key of a reference table. This foreign key must have the same structure as the reference table's primary key.

**Q14) What is referential integrity?**

A14) Referential integrity is the automatic enforcement of referential constraints that exist between a reference table and a referencing table. When referential integrity is enforced, the value of a foreign key exists as a primary key value in the reference table. In other words, when referential integrity is enforced, all of the foreign key values in, for example, the "department code" column in an "employee" table exist as primary key values in a "department" table.

**Q15) What are the column name qualifiers?**

A15) A column name qualifier are used as a table designator to avoid ambiguity when the column names referenced exists in more than one table used in the SQL statement. Column name qualifiers are also used in correlated references.

**Q16) What is a correlation name?**

A16) A correlation name is a special type of column designator that connects specific columns in the various levels of a multilevel SQL query.

**Q17) What is a results table?**

A17) A result table is the product of a query against one or more tables or views (i.e., it is the place that holds the results of a query).

**Q18) What is a cursor?**

A18) A cursor is a named control structure used to make a set of rows available to a program. DB2 is the relational database system that runs in an MVS environment. It was developed by IBM and interfaces with SQL. With the use of SQL DB2, databases can be accessed by a wide range of host languages. SQL is the relational database " application

language " that interfaces with DB2. Because of its capabilities, SQL and, in turn, DB2 have gained considerable acceptance. Thus, a working knowledge of DB2 increases one's marketability.

**Q19) What is the basic difference between a join and a union?**

A19) A join selects columns from 2 or more tables. A union selects rows.

**Q20) What is normalization and what are the five normal forms?**

A20) Normalization is a design procedure for representing data in tabular format. The five normal forms are progressive rules to represent the data with minimal redundancy.

**Q21) What are foreign keys?**

A21) These are attributes of one table that have matching values in a primary key in another table, allowing for relationships between tables.

**Q22) Describe the elements of the SELECT query syntax?**

A22) SELECT element FROM table WHERE conditional statement.

**Q23) Explain the use of the WHERE clause?**

A23) WHERE is used with a relational statement to isolate the object element or row.

**Q24) What techniques are used to retrieve data from more than one table in a single SQL statement?**

A24) Joins, unions and nested selects are used to retrieve data.

**Q25) What is a view? Why use it?**

A25) A view is a virtual table made up of data from base tables and other views, but not stored separately.

**Q26) Explain an outer join?**

A26) An outer join includes rows from tables when there are no matching values in the tables.

**Q27) What is a subselect? Is it different from a nested select?**

A27) A subselect is a select which works in conjunction with another select. A nested select is a kind of subselect where the inner select passes to the where criteria for the outer select.

**Q28) What is the difference between group by and order by?**

A28) Group by controls the presentation of the rows, order by controls the presentation of the columns for the results of the SELECT statement.

**Q29) What keyword does an SQL SELECT statement use for a string search?**

A29) The LIKE keyword allows for string searches. The % sign is used as a wildcard.

**Q30) What are some SQL aggregates and other built-in functions?**

A30) The common aggregate, built-in functions are AVG, SUM, MIN, MAX, COUNT and DISTINCT.

**Q31) How is the SUBSTR keyword used in SQL?**

A31) SUBSTR is used for string manipulation with column name, first position and string length used as arguments. E.g.

SUBSTR (NAME, 1 3) refers to the first three characters in the column NAME.

**Q32) Explain the EXPLAIN statement?**

A32) The explain statement provides information about the optimizer's choice of access path of the SQL.

**Q33) What is referential integrity?**

A33) Referential integrity refers to the consistency that must be maintained between primary and foreign keys, i.e. every foreign key value must have a corresponding primary key value.

**Q34) What is a NULL value? What are the pros and cons of using NULLS?**

A34) A NULL value takes up one byte of storage and indicates that a value is not present as opposed to a space or zero value. It's the DB2 equivalent of TBD on an organizational chart and often correctly portrays a business situation.

Unfortunately, it requires extra coding for an application program to handle this situation.

**Q35) What is a synonym? How is it used?**

A35) A synonym is used to reference a table or view by another name. The other name can then be written in the

application code pointing to test tables in the development stage and to production entities when the code is migrated.

The synonym is linked to the AUTHID that created it.

**Q36) What is an alias and how does it differ from a synonym?**

A36) An alias is an alternative to a synonym, designed for a distributed environment to avoid having to use the location

qualifier of a table or view. The alias is not dropped when the table is dropped.

**Q37) When can an insert of a new primary key value threaten referential integrity?**

A37) Never. New primary key values are not a problem. However, the values of foreign key inserts must have

corresponding primary key values in their related tables. And updates of primary key values may require changes in

foreign key values to maintain referential integrity.

**Q38) What is the difference between static and dynamic SQL?**

A38) Static SQL is hard-coded in a program when the programmer knows the statements to be executed. For dynamic SQL

the program must dynamically allocate memory to receive the query results.

**Q39) Compare a subselect to a join?**

A39) Any subselect can be rewritten as a join, but not vice versa. Joins are usually more efficient as join rows can be

returned immediately, subselects require a temporary work area for inner selects results while processing the outer select.

**Q40) What is the difference between IN subselects and EXISTS subselect?**

A40) If there is an index on the attributes tested an IN is more efficient since DB2 uses the index for the IN. (IN for index is the mnemonic).

**Q41) What is a Cartesian product?**

A41) A Cartesian product results from a faulty query. It is a row in the results for every combination in the join tables.

**Q42) What is a tuple?**

A42) A tuple is an instance of data within a relational database.

**Q43) What is the difference between static and dynamic SQL?**

A43) Static SQL is compiled and optimized prior to its execution; dynamic is compiled and optimized during execution.

**Q44) Any SQL implementation covers data types in couple of main categories. Which of the following are those data types ? (Check all that apply)**

- A). NUMERIC
- B). CHARACTER
- C). DATE AND TIME
- D). BLOBS E. BIT

A44) A,B,C. Not all SQL implementations have a BLOB or a BIT data types.

**Q45) We have a table with a CHARACTER data type field. We apply a ">" row comparison between this field and another CHARACTER field in another table. What will be the results for records with field value of NULL?**

**(Check one that applies the best)**

- A. TRUE
- B. B. FALSE
- C. C. UNKNOWN
- D. D. Error.
- E. E. Those records will be ignored

A45) C. NULL in a row when compared will give an UNKNOWN result.

**Q46) Any database needs to go through a normalization process to make sure that data is represented only once. This will eliminate problems with creating or destroying data in the database. The normalization process is done**

**usually in three steps which results in first, second and third normal forms. Which best describes the process to obtain the third normal form? (Check one that applies the best)**

- A. Each table should have related columns.
- B. Each separate table should have a primary key.
- C. We have a table with multi-valued key. All columns that are dependent on only one or on some of the keys should be moved in a different table.
- D. If a table has columns not dependent on the primary keys, they need to be moved in a separate table.
- E. E. Primary key is always UNIQUE and NOT NULL.

A46) D. All columns in a table should be dependent on the primary key. This will eliminate transitive dependencies in which A depends on B, and B depends on C, but we're not sure how C depends on A.

**Q47) SQL can be embedded in a host program that uses a relational database as a persistent data repository. Some of the most important pre-defined structures for this mechanism are SQLDA ("SQL Descriptor Area") and**

**SQLCA ("SQL Communications Area") SQLCA contains two structures - SQLCODE and SQLSTATE.**

**SQLSTATE is a standard set of error messages and warnings in which the first two characters defines the class**

and the last three defines the subclass of the error. Which of the following SQLSTATE codes is interpreted as

"No data returned"?(Check one that applies the best)

- A). 00xxx
- B). 01xxx
- C). 02xxx
- D). 22xxx
- E). 2Axxx

A47) C. 00 - is successful completion, 01 - warnings, 22 - is data exception and 2A is syntax error. The SQLSTATE code format returned for "No data returned" is "02xxx".

**Q48) What are common SQL abend codes? (e.g. : 0,100 etc.,)**

- A48) -818 time stamp mismatch
- 180 wrong data moved into date field

**Q49) What is meant by dynamic SQL?**

A49) Dynamic SQL are SQL statements that are prepared and executed within a program while the program is executing.

The SQL source is contained in host variables rather than being hard coded into the program. The SQL statement may change from execution to execution.

**Q50) What is meant by embedded SQL?**

A50) They are SQL statements that are embedded with in application program and are prepared during the program

preparation process before the program is executed. After it is prepared, the statement itself does not change(although values of host variables specified within the statement might change).

**Q51) What is meant by entity integrity?**

A51) Entity integrity is when the primary key is in fact unique and not null.

**Q52) What will EXPLAIN do?**

A52) EXPLAIN obtains information (which indexes are used, whether sorting is necessary, which level of locking is

applied) about how SQL statements in the DBRM will be executed, inserting this information into the

"X".PLAN.TABLE where the "X" is the authorization ID of the owner of the plan.

**Q53) What is the foreign key?**

A53) A foreign key is a column (or combination of columns) in a table whose values are required to match those of the primary key in some other table.

**Q54) What will GRANT option do?**

A54) It will grant privileges to a list of one or more users. If the GRANT option is used in conjunction with the "PUBLIC"

option, then all users will be granted privileges. Also you can grant privileges by objects and types.

**Q55) What does the term "grant privileges" mean?**

A55) Grant privileges means giving access/authority to DB2 users.

**Q56) What is an image copy?**

A56) It is an exact reproduction of all or part of a tablespace. DB2 provides utility programs to make full-image copies (to copy the entire tablespace) or incremental image copies to copy only those pages that have been modified since the last image copy.

**Q57) What is meant by an index?**

A57) An index is a set of row identifiers (RIDs) or pointers that are logically ordered by the values of a column that has been specified as being an index. Indexes provide faster access to data and can enforce uniqueness on the row in a table.

**Q58) What is an index key?**

A58) It is a column or set of columns in a table used to determine the order of index entries.

**Q59) What is a join?**

A59) A join is a relational operation that allows retrieval of data from two or more tables based on matching columns values.

**Q60) What is meant by locking?**

A60) Locking is a process that is used to ensure data integrity. It also prevents concurrent users from accessing inconsistent data. The data (row) is locked until a commit is executed to release the updated data.

**Q61) What is meant by null?**

A61) This is a special value that indicates the absence of data in a column. This value is indicated by a negative value, usually -1.

**Q62) What is an object?**

A62) An object is anything that is managed by DB2 (that is databases, table spaces, tables, views, indexes or synonyms), but not the data itself.

**Q63) Describe referential integrity?**

A63) Referential integrity refers to a feature in DB2 that is used to ensure consistency of the data in the database.

**Q64) Describe a primary key?**

A64) A primary key is a key that is unique, non-null, and is part of the definition of a table. A table must have a primary key to be defined as a parent.

**Q65) How would you find out the total number of rows in a table? - GS**

A65) Use SELECT COUNT(\*) ...

**Q66) How do you eliminate duplicate values in SELECT? - GS**

A66) Use SELECT DISTINCT ...

**Q67) How do you select a row using indexes? - GS**

A67) Specify the indexed columns in the WHERE clause.

**Q68) What are aggregate functions?**

A68) Bulit-in mathematical functions for use in SELECT clause.

**Q69) How do you find the maximum value in a column? - GS**

A69) Use SELECT MAX(...

**Q70) Can you use MAX on a CHAR column?**

A70) YES.

**Q71) My SQL statement SELECT AVG(SALARY) FROM EMP-TABLE yields inaccurate results. Why?**

A71) Because SALARY is not declared to have Null's and the employees for whom the salary is not known are also counted.

**Q72) How do you retrieve the first 5 characters of FIRSTNAME column of EMP table?**

A72) SELECT SUBSTR(FIRSTNAME,1,5) FROM EMP;

**Q73) How do you concatenate the FIRSTNAME and LASTNAME from EMP table to give a complete name?**

A73) SELECT FIRSTNAME || ' ' || LASTNAME FROM EMP;

**Q74) What is the use of VALUE function?**

A74) Avoid negative SQLCODEs by handling nulls and zeroes in computations. Substitute a numeric value for any nulls used in computation.

**Q75) What is UNION,UNION ALL? - GS**

A75) UNION eliminates duplicates  
UNION ALL: retains duplicates  
Both these are used to combine the results of different SELECT statements.

**Q76) Suppose I have five SQL SELECT statements connected by UNION/UNION ALL, how many times should I specify UNION to eliminate the duplicate rows? - GS**

A76) Once.

**Q77) What is the restriction on using UNION in embedded SQL?**

A77) It has to be in a CURSOR.

**Q78) In the WHERE clause what is BETWEEN and IN? - GS**

A78) BETWEEN supplies a range of values while IN supplies a list of values.

**Q79) Is BETWEEN inclusive of the range values specified? - GS**

A79) Yes.

**Q80) What is 'LIKE' used for in WHERE clause? What are the wildcard characters? - GS**

A80) LIKE is used for partial string matches. '%' ( for a string of any character ) and '\_' (for any single character ) are the two wild card characters.

**Q81) When do you use a LIKE statement?**

A81) To do partial search e.g. to search employee by name, you need not specify the complete name; using LIKE, you can search for partial string matches.

**Q82) What is the meaning of underscore ( '\_' ) in the LIKE statement? - GS**

A82) Match for any single character.

**Q83) What do you accomplish by GROUP BY ... HAVING clause? - GS**

A83) GROUP BY partitions the selected rows on the distinct values of the column on which you group by.  
HAVING selects  
GROUPs which match the criteria specified

**Q84) Consider the employee table with column PROJECT nullable. How can you get a list of employees who are not assigned to any project?**

A84) SELECT EMPNO FROM EMP WHERE PROJECT IS NULL;

**Q85) What is the result of this query if no rows are selected:**

SELECT SUM(SALARY) FROM EMP WHERE QUAL='MSC';  
A85) NULL

**Q86) Why SELECT \* is not preferred in embedded SQL programs?**

For three reasons:

If the table structure is changed (a field is added), the program will have to be modified  
Program might retrieve the columns which it might not use, leading on I/O over head.  
The chance of an index only scan is lost.

**Q87) What are correlated subqueries? - GS**

A subquery in which the inner ( nested ) query refers back to the table in the outer query. Correlated subqueries must be evaluated for each qualified row of the outer query that is referred to.

**Q88) What is a cursor? Why should it be used? - GS**

Cursor is a programming device that allows the SELECT to find a set of rows but return them one at a time.  
Cursor should be used because the host language can deal with only one row at a time.

**Q89) How would you retrieve rows from a DB2 table in embedded SQL? - GS**

Either by using the single row SELECT statements, or by using the CURSOR.

**Q90) Apart from cursor, what other ways are available to you to retrieve a row from a table in embedded SQL? - GS**

Single row SELECTs.

**Q91) How do you specify and use a cursor in a COBOL program? - GS**

Use DECLARE CURSOR statement either in working storage or in procedure division (before open cursor),  
to specify the SELECT statement. Then use OPEN, FETCH rows in a loop and finally CLOSE.

**Q92) What happens when you say OPEN CURSOR?**

If there is an ORDER BY clause, rows are fetched, sorted and made available for the FETCH statement.  
Other wise simply the cursor is placed on the first row.

**Q93) Is DECLARE CURSOR executable?**

No.

**Q94) Can you have more than one cursor open at any one time in a program ? - GS**

Yes.

**Q95) When you COMMIT, is the cursor closed?**

Yes.

1. What is SQLCA and SQLDA?
2. What is 2 phase commit?

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## **DATABASE 2(DB2)**

The questions and answers that follow are intended for those with a working knowledge of DB2 as a “self-test”.

**Q1) What is DB2 (IBM Database 2)?**

A1) DB2 is a subsystem of the MVS operating system. It is a Database Management System (DBMS) for that operating system.

**Q2) What is an access path?**

A2) The path that is used to get to data specified in SQL statements.

**Q3) What is an alias?**

A3) It is an alternate name that can be used in SQL statements to refer to a table or view in the same or remote DB2 subsystem.

**Q4) Explain what a plan is?**

A4) Plan is a DB2 object (produced during the bind process) that associates one or more database request modules with a plan name.

**Q5) What is a DB2 bind?**

A5) Bind is a process that builds “access paths” to DB2 tables. A bind uses the Database Request Modules(s) (DBRM(s)) from the DB2 pre-compile step as input and produces an application plan. It also checks the user’s authority and validates the SQL statements in the DBRM(s).

**Q6) What information is used as input to the bind process?**

A6) The database request module produced during the pre-compile. The SYSIBM.SYSSTMT table of the DB2 catalog.

**Q7) What is meant by the attachment facility?**

A7) The attachment facility is an interface between DB2 and TSO, IMS/VS, CICS, or batch address spaces. It allows application programs to access DB2.

**Q8) What is meant by AUTO COMMIT?**

A8) AUTO COMMIT is a SPUIFI option that commits the effects of SQL statements automatically if they are successfully executed.

**Q9) What is a base table?**

A9) A base table is a real table - a table that physically exists in that there are physical stored records.

**Q10) What is the function of buffer manager?**

A10) The buffer manager is the DB2 component responsible for physically transferring data between an external medium and (virtual) storage (performs the actual I/O operations). It minimizes the amount of physical I/O actually performed with sophisticated buffering techniques(i.e., read-ahead buffering and look-aside buffering).

**Q11) What is a buffer pool?**

A11) A buffer pool is main storage that is reserved to satisfy the buffering requirements for one or more tablespaces or indexes, and is made up of either 4K or 32K pages.

**Q12) How many buffer pools are there in DB2?**

A12) There are four buffer pools: BP0, BP1, BP2, and BP32.

**Q13) On the create tablespace, what does the CLOSE parameter do?**

A13) CLOSE physically closes the tablespace when no one is working on the object. DB2 (release 2.3) will logically close tablespaces.

**Q14) What is a clustering index?**

A14) It is a type of index that (1) locates table rows and (2) determines how rows are grouped together in the tablespace.

**Q15) What will the COMMIT accomplish?**

A15) COMMIT will allow data changes to be permanent. This then permits the data to be accessed by other units of work. When a COMMIT occurs, locks are freed so other applications can reference the just committed data.

**Q16) What is meant by concurrency?**

A16) Concurrency is what allows more than one DB2 application process to access the same data at essentially the same time. Problems may occur, such as lost updates, access to uncommitted data, and un-repeatable reads.

**Q17) What is cursor stability?**

A17) It is cursor stability that "tells" DB2 that database values read by this application are protected only while they are being used. (Changed values are protected until this application reaches the commit point). As soon as a program moves from one row to another, other programs may read or the first row.

**Q18) What is the function of the Data Manager?**

A18) The Data Manager is a DB2 component that manages the physical databases. It invokes other system components, as necessary, to perform detailed functions such as locking, logging, and physical I/O operations (such as search, retrieval, update, and index maintenance).

**Q19) What is a Database Request Module(DBRM)?**

A19) A DBRM is a DB2 component created by the DB2 pre-compiler containing the SQL source statements extracted from the application program. DBRMs are input to the bind process.

**Q20) What is a data page?**

A20) A data page is a unit of retrievable data, either 4K or 32K (depending on how the table is defined), containing user or catalog information.

**Q21) What are data types?**

A21) They are attributes of columns, literals, and host variables. The data types are SMALLINT, INTEGER, FLOAT, DECIMAL, CHAR, VARCHAR, DATE and TIME.

**Q22) What is Declaration Generator(DCLGEN)?**

A22) DCLGEN is a facility that is used to generate SQL statements that describe a table or view. These table or view descriptions are then used to check the validity of other SQL statements at precompile time. The table or view declarations are used by the DB2I utility DCLGEN to build a host language structure, which is used by the DB2 precompiler to verify that correct column names and data types have been specified in the SQL statement.

**Q23) What does DSNDB07 database do?**

A23) DSNDB07 is where DB2 does its sorting. It includes DB2's sort work area and external storage.

**Q24) What will the FREE command do to a plan?**

A24) It will drop(delete) that existing plan.

**Q25) What is a host variable?**

A25) This is a data item that is used in an SQL statement to receive a value or to supply a value. It must be preceded by a colon (:) to tell DB2 that the variable is not a column name.

**Q26) What will the DB2 optimizer do?**

A26) The optimizer is a DB2 component that processes SQL statements and selects the access paths.

**Q27) What is a page?**

A27) This is the unit of storage within a table space or indexspace that is accessed by DB2.

**Q28) What is pagespace?**

A28) Pagespace refers to either to an unpartitioned table, to an index space, or to a single partition of a partitioned table of index space.

**Q29) What is a predicate?**

A29) A predicate is an element of a search condition that expresses or implies a comparison operation.

**Q30) What is a recovery log?**

A30) A recovery log is a collection of records that describes the sequence of events that occur in DB2. The information is needed for recovery in the event of a failure during execution.

**Q31) What is a Resource Control Table(RCT)? Describe its characteristics.**

A31) The RCT is a table that is defined to a DB2/CICS region. It contains control characteristics which are assembled via the DSNCRCT macros. The RCT matches the CICS transaction ID to its associated DB2 authorization ID and plan ID(CICS attachment facility).

**Q32) Where are plans stored?**

A32) Each plan is defined uniquely in the SYSIBM.SYSPLANS table to correspond to the transaction (s) that are to execute that plan.

**Q33) What is meant by repeatable read?**

A33) When an application program executes with repeatable read protection, rows referenced by the program can't be changed by other programs until the program reaches a commit point.

**Q34) Describe what a storage group(STOGROUP) is?**

A34) A STOGROUP is a named collection of DASD volumes to be used by tablespaces and index spaces of databases. The volumes of STOGROUP must be of the same device type.

**Q35) How would you move a tablespace (using STOGROUP) to a different DASD volume allocated to that tablespace?**

A35) If the tablespace used is only allocated to that STOGROUP:  
- ALTER STOGROUP - add volume (new) delete volume(old)  
- REORG TABLESPACE or RECOVER TABLESPACE  
Create a new STOGROUP that points to the new volume. ALTER the tablespace and REORG or RECOVER the tablespace.

**Q36) What is the format (internal layout) of "TIMESTAMP"?**

A36) This is a seven part value that consists of a date (yymmdd) and time(hhmmss and microseconds).

**Q37) What is meant by a unit of recovery?**

A37) This is a sequence of operations within a unit of work(i.e., work done between commit points).

**Q38) Can DASD types assigned to storage groups be intermixed(i.e., 3350s and 3380s)?**

A38) No

**Q39) What are the three types of page locks that can be held?**

A39) Exclusive, update, and share.

**Q40) Can DB2 be accessed by TSO users? If yes, which command is used to invoke DB2?**

A40) DB2 can be invoked by TSO users by using the DSN RUN command.

**Q41) How are write I/Os from the buffer pool executed?**

A41) Asynchronously.

**Q42) What is a DB2 catalog?**

A42) The DB2 catalog is a set of tables that contain information about all of the DB2 objects (tables, views, plans etc.).

**Q43) In which column of which DB2 catalog would you find the length of the rows for all tables?**

A43) In the RECLENGTH column of SYSIBM.SYSTABLES

**Q44) What information is held in SYSIBM.SYSCOPY?**

A44) The SYSIBM.SYSCOPY table contains information about image copies made of the tablespaces.

**Q45) What information is contained in a SYSCOPY entry?**

A45) Included is the name of the database, the table space name, and the image copy type (full or incremental etc.) as well as the date and time each copy was made.

**Q46) What information can you find in SYSIBM.SYSLINKS table?**

A46) The SYSIBM.SYSLINKS table contains information about the links between tables created by referential constraints.

**Q47) Where would you find information about the type of database authority held by the user?**

A47) SYSIBM.SYSDBAUTH.

**Q48) Where could you look if you had a question about whether a column has been defined as an index?**

A48) This information can be found in SYSIBM.SYSINDEXES.

**Q49) Once you create a view, where would information about the view be stored?**

A49) When a view is created, system information about the view is stored in SYSIBM.SYSVIEWS.

**Q50) What is the SQL Communications Area and what are some of its key fields?**

A50) It is a data structure that must be included in any host-language program using SQL. It is used to pass feedback about the sql operations to the program. Fields are return codes, error messages, handling codes and warnings.

**Q51) What is DCLGEN?**

A51) DCLGEN stands for declarations generator; it is a facility to generate DB2 sql data structures in COBOL or PL/I programs.

**Q52) How do you leave the cursor open after issuing a COMMIT? (for DB2 2.3 or above only)**

A52) Use WITH HOLD option in DECLARE CURSOR statement. But, it has not effect in psuedo-conversational CICS programs.

**Q53) Give the COBOL definition of a VARCHAR field.**

A53) A VARCHAR column REMARKS would be defined as follows:

```
...  
10 REMARKS.  
49 REMARKS-LEN PIC S9(4) USAGE COMP.
```

49 REMARKS-TEXT PIC X(1920).

**Q54) What is the physical storage length of each of the following DB2 data types: DATE, TIME, TIMESTAMP?**

A54) DATE: 4bytes  
TIME: 3bytes  
TIMESTAMP: 10bytes

**Q55) What is the COBOL picture clause of the following DB2 data types: DATE, TIME, TIMESTAMP?**

A55) DATE: PIC X(10)  
TIME : PIC X(08)  
TIMESTAMP: PIC X(26)

**Q56) What is the COBOL picture clause for a DB2 column defined as DECIMAL(11,2)? - GS**

A56) PIC S9(9)V99 COMP-3.

Note: In DECIMAL(11,2), 11 indicates the size of the data type and 2 indicates the precision.

**Q57) What is DCLGEN ? - GS**

A57) DeCLarations GENerator: used to create the host language copy books for the table definitions. Also creates the DECLARE table.

**Q58) What are the contents of a DCLGEN? - GS**

A58) EXEC SQL DECLARE TABLE statement which gives the layout of the table/view in terms of DB2 datatypes.

A host language copy book that gives the host variable definitions for the column names.

**Q59) Is it mandatory to use DCLGEN? If not, why would you use it at all? - GS**

A59) It is not mandatory to use DCLGEN. Using DCLGEN, helps detect wrongly spelt column names etc. during the pre-compile stage itself (because of the DECLARE TABLE ). DCLGEN being a tool, would generate accurate host variable definitions for the table reducing chances of error.

**Q60) Is DECLARE TABLE in DCLGEN necessary? Why it used?**

A60) It not necessary to have DECLARE TABLE statement in DCLGEN. This is used by the pre-compiler to validate the table-name, view-name, column name etc., during pre-compile.

**Q61) Will precompile of an DB2-COBOL program bomb, if DB2 is down?**

A61) No. Because the precompiler does not refer to the DB2 catalogue tables.

**Q62) How is a typical DB2 batch program executed ?**

A62) There are two methods of executing a DB2-batch program

1. Use DSN utility to run a DB2 batch program from native TSO. An example is shown:

```
DSN SYSTEM(DSP3)
```

```
RUN PROGRAM(EDD470BD) PLAN(EDD470BD) LIB('EDGS01T.OBJ.LOADLIB')
```

```
END
```

2. Use IKJEFT01 utility program to run the above DSN command in a JCL.

**Q63) Assuming that a site's standard is that pgm name = plan name, what is the easiest way to find out which**

**programs are affected by change in a table's structure?**

A63) Query the catalogue tables SYSPLANDEP and SYSPACKDEP.

**Q64) Name some fields from SQLCA.**

A64) SQLCODE, SQLERRM, SQLERRD

**Q65) How can you quickly find out the number of rows updated after an update statement?**

A65) Check the value stored in SQLERRD(3).

**Q66) What is EXPLAIN? - GS**

A66) EXPLAIN is used to display the access path as determined by the optimizer for a SQL statement. It can be used in SPUFI (for single SQL statement) or in BIND step (for embedded SQL). The results of EXPLAIN is stored in U.PLAN\_TABLE where U is the authorization id of the user

**Q67) What do you need to do before you do EXPLAIN?**

A67) Make sure that the PLAN\_TABLE is created under the AUTHID.

**Q68) Where is the output of EXPLAIN stored? - GS**

A68) In USERID.PLAN\_TABLE

**Q69) EXPLAIN has output with MATCHCOLS = 0. What does it mean? - GS**

A69) A nonmatching index scan if ACCESSTYPE = I.

**Q70) How do you do the EXPLAIN of a dynamic SQL statement?**

A70) There are two methods to achieve this:

1. Use SPUFI or QMF to EXPLAIN the dynamic SQL statement
2. Include EXPLAIN command in the embedded dynamic SQL statements

**Q71) How do you simulate the EXPLAIN of an embedded SQL statement in SPUFI/QMF? Give an example with a host variable in WHERE clause)**

A71) Use a question mark in place of a host variable (or an unknown value). For instance,  
SELECT EMP\_NAME FROM EMP WHERE EMP\_SALARY > ?

**Q72) What are the isolation levels possible ? - GS**

A72) CS: Cursor Stability  
RR: Repeatable Read

**Q73) What is the difference between CS and RR isolation levels?**

A73) CS: Releases the lock on a page after use  
RR: Retains all locks acquired till end of transaction

**Q74) When do you specify the isolation level? How?**

A74) During the BIND process (ISOLATION LEVEL is a parameter for the bind process).  
ISOLATION ( CS/RR )...

**Q75) I use CS and update a page. Will the lock be released after I am done with that page?**

A75) No.

**Q76) What are the various locking levels available?**

A76) PAGE, TABLE, TABLESPACE

**Q77) How does DB2 determine what lock-size to use?**

A77) There are three methods to determine the lock-size. They are:

1. Based on the lock-size given while creating the tablespace
2. Programmer can direct the DB2 what lock-size to use
3. If lock-size ANY is specified, DB2 usually chooses a lock-size of PAGE

**Q78) What are the disadvantages of PAGE level lock?**

A78) High resource utilization if large updates are to be done

**Q79) What is lock escalation?**

A79) Promoting a PAGE lock-size to table or tablespace lock-size when a transaction has acquired more locks than specified in NUMLKTS. Locks should be taken on objects in single tablespace for escalation to occur.

**Q80) What are the various locks available?**

A80) SHARE, EXCLUSIVE, UPDATE

**Q81) Can I use LOCK TABLE on a view?**

A81) No. To lock a view, take lock on the underlying tables.

**Q82) What is ALTER ? - GS**

A82) SQL command used to change the definition of DB2 objects.

**Q83) What is a DBRM, PLAN ?**

A83) DBRM: Data Base Request Module, has the SQL statements extracted from the host language program by the pre-compiler. PLAN: A result of the BIND process. It has the executable code for the SQL statements in the DBRM.

**Q84) What is ACQUIRE/RELEASE in BIND?**

A84) Determine the point at which DB2 acquires or releases locks against table and tablespaces, including intent locks.

**Q85) What else is there in the PLAN apart from the access path? - GS**

A85) PLAN has the executable code for the SQL statements in the host program

**Q86) What happens to the PLAN if index used by it is dropped?**

A86) Plan is marked as invalid. The next time the plan is accessed, it is rebound.

**Q87) What are PACKAGES ? - GS**

A87) They contain executable code for SQL statements for one DBRM.

**Q88) What are the advantages of using a PACKAGE?**

A88) The advantages of using PACKAGE are:

1. Avoid having to bind a large number of DBRM members into a plan
2. Avoid cost of a large bind
3. Avoid the entire transaction being unavailable during bind and automatic rebound of a plan
4. Minimize fallback complexities if changes result in an error.

**Q89) What is a collection?**

A89) A user defined name that is the anchor for packages. It has no physical existence. Main usage is to group packages.

**Q90) In SPUIFI suppose you want to select maximum of 1000 rows, but the select returns only 200 rows. What are the 2 SQLCODEs that are returned? - GS**

A90) +100 (for successful completion of the query), 0 (for successful COMMIT if AUTOCOMMIT is set to Yes).

**Q91) How would you print the output of an SQL statement from SPUIFI? - GS**

A91) Print the output dataset.

**Q92) Lot of updates have been done on a table due to which indexes have gone haywire. What do you do?**

A92) Looks like index page split has occurred. DO a REORG of the indexes.

**Q93) What is dynamic SQL? - GS**

A93) Dynamic SQL is a SQL statement created at program execution time.

**Q94) When is the access path determined for dynamic SQL? - GS**

A94) At run time, when the PREPARE statement is issued.

**Q95) Suppose I have a program which uses a dynamic SQL and it has been performing well till now. Off late, I find that the performance has deteriorated. What happened? - GS**

A95) There may be one of the following reasons:

Probably RUN STATS is not done and the program is using a wrong index due to incorrect stats.

Probably RUNSTATS is done and optimizer has chosen a wrong access path based on the latest statistics.

**Q96) How does DB2 store NULL physically?**

A96) As an extra-byte prefix to the column value. Physically, the null prefix is Hex '00' if the value is present and Hex 'FF' if it is not.

**Q97) How do you retrieve the data from a nullable column? - GS**

A97) Use null indicators. Syntax ... INTO :HOSTVAR:NULLIND

**Q98) What is the picture clause of the null indicator variable? - GS**

A98) S9(4) COMP.

**Q99) What does it mean if the null indicator has -1, 0, -2? - GS**

A99) -1 : the field is null; 0 : the field is not null; -2 : the field value is truncated

**Q100) How do you insert a record with a nullable column?**

A100) To insert a NULL, move -1 to the null indicator, To insert a valid value, move 0 to the null indicator

**Q101) What is RUNSTATS? - GS**

A101) A DB2 utility used to collect statistics about the data values in tables which can be used by the optimizer to decide the access path. It also collects statistics used for space management. These statistics are stored in DB2 catalog tables.

**Q102) When will you chose to run RUNSTATS?**

A102) After a load, or after mass updates, inserts, deletes, or after REORG.

**Q103) Give some example of statistics collected during RUNSTATS?**

A103) Number of rows in the table, Percent of rows in clustering sequence, Number of distinct values of indexed column, Number of rows moved to a nearby/fairway page due to row length increase

**Q104) What is REORG? When is it used?**

A104) REORG reorganizes data on physical storage to reclutser rows, positioning overflowed rows in their proper sequence, to reclaim space, to restore free space. It is used after heavy updates, inserts and delete activity and after segments of a segmented tablespace have become fragmented.

**Q105) What is IMAGECOPY ? - GS**

A105) It is full backup of a DB2 table which can be used in recovery.

**Q106) When do you use the IMAGECOPY? - GS**

A106) To take routine backup of tables, After a LOAD with LOG NO and After REORG with LOG NO

**Q107) What is COPY PENDING status?**

A107) A state in which, an image copy on a table needs to be taken, In this status, the table is available only for queries. You cannot update this table. To remove the COPY PENDING status, you take an image copy or use REPAIR utility.

**Q108) What is CHECK PENDING ?**

A108) When a table is LOADED with ENFORCE NO option, then the table is left in CHECK PENDING status. It means that the LOAD utility did not perform constraint checking.

**Q109) What is QUIESCE?**

A109) A QUIESCE flushes all DB2 buffers on to the disk. This gives a correct snapshot of the database and should be used before and after any IMAGECOPY to maintain consistency.

**Q110) What is a clustering index ? - GS**

A110) Causes the data rows to be stored in the order specified in the index. A mandatory index defined on a partitioned table space.

**Q111) How many clustering indexes can be defined for a table?**

A111) Only one.

**Q112) What is the difference between primary key & unique index ?**

A112) Primary Key: a relational database constraint. Primary key consists of one or more columns that uniquely identify a row in the table. For a normalized relation, there is one designated primary key.

Unique index: a physical object that stores only unique values. There can be one or more unique indexes on a table.

**Q113) What is sqlcode -922 ?**

A113) Authorization failure

**Q114) What is sqlcode -811?**

A114) SELECT statement has resulted in retrieval of more than one row.

**Q115) What does the sqlcode of -818 pertain to? - GS**

A115) This is generated when the consistency tokens in the DBRM and the load module are different.

**Q116) Are views updatable ?**

A116) Not all of them. Some views are updatable e.g. single table view with all the fields or mandatory fields. Examples of non-updatable views are views which are joins, views that contain aggregate functions (such as MIN), and views that have GROUP BY clause.

**Q117) If I have a view which is a join of two or more tables, can this view be updatable? - GS**

A117) No.

**Q118) What are the 4 environments which can access DB2 ?**

A118) TSO, CICS, IMS and BATCH

**Q119) What is an inner join, and an outer join ?**

A119) Inner Join: combine information from two or more tables by comparing all values that meet the search criteria in the designated column or columns of one table with all the values in corresponding columns of the other table or tables. This kind of join which involve a match in both columns are called inner joins.

Outer join : Is one in which you want both matching and non matching rows to be returned. DB2 has no specific operator for outer joins, it can be simulated by combining a join and a correlated sub query with a UNION.

**Q120) What is FREEPAGE and PCTFREE in TABLESPACE creation?**

A120) PCTFREE: percentage of each page to be left free  
FREEPAGE: Number of pages to be loaded with data between each free page

**Q121) What are simple, segmented and partitioned table spaces ?**

A121) Simple Tablespace: Can contain one or more tables. Rows from multiple tables can be interleaved on a page

under the DBA's control and maintenance

Segmented Tablespace: Can contain one or more tables. Tablespace is divided into segments of 4 to 64 pages in

increments of 4 pages. Each segment is dedicated to single table. A table can occupy

multiple segments

Partitioned Tablespace: Can contain one table. Tablespace is divided into parts and each part is put in a separate

VSAM dataset.

**Q122) What is filter factor?**

A122) One divided by the number of distinct values of a column.

**Q123) What is index cardinality? - GS**

A123) The number of distinct values a column or columns contain.

**Q124) What is a synonym ?**

A124) Synonym is an alternate name for a table or view used mainly to hide the leading qualifier of a table or view.. A synonym is accessible only by the creator.

**Q125) What is the difference between SYNONYM and ALIAS?**

A125) SYNONYM : is dropped when the table or tablespace is dropped. Synonym is available only to the creator.

ALIAS : is retained even if table or tablespace is dropped. ALIAS can be created even if the table does

not exist. It is used mainly in distributed environment to hide the location information from

programs. Alias is a global object & is available to all.

**Q126) What do you mean by NOT NULL WITH DEFAULT? When will you use it?**

A126) This column cannot have nulls and while insertion, if no value is supplied then it will have zeroes, spaces or date/time depending on whether it is numeric, character or date/time. Use it when you do not want to have nulls but at the same time cannot give values all the time you insert this row.

**Q127) What do you mean by NOT NULL? When will you use it?**

A127) The column cannot have nulls. Use it for key fields.

**Q128) When would you prefer to use VARCHAR?**

A128) When a column which contains long text, e.g. remarks, notes, may have in most cases less than 50% of the maximum length.

**Q129) What are the disadvantages of using VARCHAR?**

A129) Can lead to high space utilization if most of the values are close to maximum.

Positioning of VARCHAR column has to be done carefully as it has performance implications.

Relocation of rows to different pages can lead to more I/Os on retrieval.

**Q130) How do I create a table MANAGER (EMP-NO, MANAGER) where MANAGER is a foreign key which references to EMP-NO in the same table? Give the exact DDL.**

A130) First CREATE MANAGER table with EMP-NO as the primary key. Then ALTER it to define the foreign key.

**Q131) When is the authorization check on DB2 objects done - at BIND time or run time?**

A131) At run time.

**Q132) What is auditing?**

A132) Recording SQL statements that access a table. Specified at table creation time or through alter.

**Q133) max number of columns in a db2 table**

A133) 224

**Q134) I need to view the number of tables existing under one particular Owner. Is it possible? If so, pl give the SQL query for this?**

A134) The query SELECT \* FROM SYSIBM.SYSTABLES WHERE CREATOR = 'owner id' This displays the table names with that If you want only the number of tables give the following query. SELECT COUNT(\*) FROM SYSIBM.SYSTABLES WHERE CREATOR = 'owner id' Make sure that you are in correct subsystem.

**Q135) I need to view the number of tables existing under one particular Owner. Is it possible? If so, pl give the SQL query for this?**

A135) The query SELECT \* FROM SYSTABLES WHERE OWNER= should work.

**Q136) I need to view the number of tables existing under one particular Owner. Is it possible? If so, pl give the SQL query for this?**

A136) Db2 records information for its operation in a catalog which is actually a group of tables. So we can use the SYSTABLES to get answer to ur query.

**Q137) What is JOIN and different types of JOIN.**

A137) The ability to join rows and combine data from two or more tables is one of the most powerful features of relational system. Three type of joins:1. Equi-join 2.Non-equi-join 3.self-join

**Q138) can I alter a table (e.g. adding a column) when other user is selecting some columns or updating some columns from the same table?**

A138) yes possible. until the updation or selection is committed db2 table will not be restructured. new column definition will be there but it will not be included until all the tasks on the table are committed.

**Q139) How many sub queries can you combine together ?**

A139) Total 16 queries and sub queries are 15

**Q140) What are the different methods of accessing db2 from tso? How is the connection established between TSO & DB2?**

A140) There are three ways in establishing tso/db2 connection 1. SPUFI 2. QMF 3. CATALOG VISIBILITY B. A thread between TSO & DB2 is established while attempting to make connection between tso & db2.

**Q141) How many buffer pools are available in db2?**

A141) Ten 32k size buffer pools and fifty 4k size buffer pools (bp0 to bp49)default buffer pools are bp0,bp1,bp2 & bp32

**Q142) B37 abend during SPUFI**

A142) The b37abend in the SPUFI is because of space requirements, the query has resulted in so many rows that the SPUFI out file is not large enough to handle it, increase the space allocation of SPUFI out file.

**Q143) How many Buffer pools are there in DB2 and what are they?**

A143) There are 4 Buffer pools. They are BP0, BP1, BP2 and BP3.

**Q144) What is the command used by TSO users to invoke DB2?**

A144) DSN RUN

**Q145) What is the error code -803 ?**

A145) unique index violation

**Q146) How do you filter out the rows retrieved from a Db2 table ?**

A146) one way is to use The SQL WHERE clause.

**Q147) what is a collection?**

A147) collection is something that every programmer should assign/Specify for every package. this about 1-18 characters long.

**Q148) What is Skeleton cursor table (SKCT)?**

A148) The Executable form of a Plan. This is stored in sysibm.sct02 table.

**Q149) what's the equivalent Cobol Data type for Decimal(x,y) in DB2? what does the current SQLID register contain?**

A149) Pic s9(x-y)V9(Y) Comp-3; the current SQLID contains the current authorization ID.

**Q150) Can we declare DB2 HOST variable in COBOL COPY book?**

A150) NO. If we declare DB2 host variable in COBOL COPY book, at the time of Pre-compilation we get the host variable not defined, because pre-compiler will not expand COBOL COPY book. So we declare it either in DCLGEN with EXEC SQL INCLUDE DCLGEN name END-EXEC or we directly hardcode it in the working storage section.

**Q151) What should be specified along with a cursor in order to continue updating process after commit?**

A151) With Hold option.

**Q152) what is the name of the default db2 catalog database?**

A152) DSNDB06

**Q153) When Can you be sure that a query will return only one row?**

A153) When you use the primary key and only the primary key in the where clause.

**Q154) what is the difference between join and union?**

A154) join is used to retrieve data from different tables using a single sql statement. union is used to combine the results of two or more sql queries.

**Q155) What is a correlated sub query?**

A155) In a sub query, if the outer query refers back to the outcome of inner query it is called correlated sub query. That's why the outer query is evaluated first unlike an ordinary sub query

**Q156) What are the functions of Bind?**

A156) BIND mainly performs two things syntax checking and authorization checking. It binds together all packages into an application plan hence the name BIND. Apart from this bind has optimiser as a subcomponent. Its function is to determine the optimum access strategy.

**Q157) Max. No of rows per page**

A157) 127

**Q158) The only place of VSAM KSDS in DB2 is?**

A158) BSDS is a VSAM KSDS.

**Q159) Can All Users Have The Privilege To Use The SQL Statement Select \* (DML)?**

A159) No the user should be granted privilege to use it.

**Q160) What is the size of a data page?**

A160) 4K to 8K

**Q161) what's the best lock size that you could use when you create a tablespace?**

A161) The answer is Locksize = ANY. Unless you are Sure what's the Purpose of tablespace ie., Read-only or R/W. If you use lock size =any, Db2 would automatically determine what type of locks it should use.

**Q162) what's the error code for Unique Index Violation?**

A162) -803

**Q163) Can you define an Index if the table size less than 10 PAGES?**

A163) NO

**Q164) What's the Maximum Length of SQLCA and what's the content of SQLCABC?**

A164) The Max length is 136. and the SQLCABC has the Value of SQLCA.

**Q165) What's the maximum number of volumes that can be added to a STOGROUP?**

A165) The answer is 133.Usually it will be difficult monitor more than 3 or 4 volumes to a Stogroup.

**Q166) What's the maximum number of characters that a tablename can have?**

A166) The answer is 18 characters.

**Q167) What is the meaning of -805 SQL return code?**

A167) Program name not in plan. Bind the plan and include the DBRM for the program named as part of the plan.

**Q168) when does the SQL statement gets executed when you use cursor in the application programming ?**

A168) SQL statement gets executed when we open cursor

**Q169) What does CURRENTDATA option in bind indicate**

A169) CURRENTDATA option ensures block fetch while selecting rows from a table. In DB2V4 the default has been changed to NO. Therefore it is necessary to change all the bind cards with CURRENTDATA(YES) which is default in DB2V3 & earlier to CURRENTDATA(NO).

**Q170) What is the difference between TYPE 1 index & TYPE 2 index**

A170) TYPE 1 & TYPE 2 are specified when an index is created on the table. TYPE 2 index is the option which comes with DB2V4. With TYPE 2 index data can be retrieved faster as only the data pages are locked and not the index pages. Hence TYPE 2 index is recommended.

**Q171) What are the levels of isolation available with DB2V4**

A171) CS RR UR( added new for DB2V4 which stands for uncommitted read which allows to retrieve records from the space which has exclusive locks also but data integrity will be affected if this option is used )The best available option for data integrity & data concurrency is CS.

**Q172) How do u achieve record level locking in DB2 versions when record level locking is not allowed?**

A172) By having the length of the record greater than that of a page!

**Q173) In a DB2-CICS program which is acts as co-ordinator and which is participant?**

A173) DB2 - participant CICS- coordinator

**Q174) What does DML stand for and what are some examples of it?**

A174) Data Manipulation Language. Some examples are SELECT, INSERT, DELETE, REPLACE.

**Q175) How to define the data items to receive the fetch items for the SQL?**

A175) Using the DSECT, followed by lines of - 'data items DS datatype'.

**Q176) How will you delete duplicate records from a table?**

A176) Delete From Table1Where Id In (Select Id From Table1 As Temp Group By Id Having Count(\*) >1)

**Q177) What is the difference between Where and Having Clause**

A177) WHERE is for Rows and HAVING is for Groups

**Q178) How to see the structure of db2 table??**

A178) Using QMF.

**Q179) How do you declare a host variable (in COBOL) for an attribute named emp-name of type VARCHAR(25) ?**

A179) 01 EMP-GRP. 49 E-LEN PIC S9(4) COMP. 49 E-NAME PIC X(25).

**Q180) What is the maximum number of tables that can be stored on a Partitioned Table Space ?**

A180) ONE

**Q181) Name the different types of Table spaces.**

A181) Simple Table Space, Segmented Table Space and Partitioned Table Space

**Q182) what are the max. & min. no. of partitions allowed in a partition tablespace?**

A182) minimum is 4. maximum is 64.

**Q183) what is the maximum number of tables that can be joined ?**

A183) fifteen

**Q184) What technique is used to retrieve data from more than one table in a single SQL statement?**

A184) The Join statement combines data from more that two tables

**Q185) Explain the use of the WHERE clause.**

A185) It directs DB2 to extract data from rows where the value of the column is the same as the current value of the host variable.

**Q186) What is a DB2 bind?**

A186) DB2 bind is a process that builds an access path to DB2 tables.

**Q187) What is a DB2 access path?**

A187) An access path is the method used to access data specified in DB2 SQL statements.

**Q188) What is a DB2 plan?**

A188) An application plan or package is generated by the bind to define an access path.

**Q189) What is normalization and what are the five normal forms?**

A189) Normalization is a design procedure for representing data in tabular format. The five normal forms are progressive rules to represent the data with minimal redundancy.

**Q190) What are foreign keys?**

A190) These are attributes of one table that have matching values in a primary key in another table, allowing for relationships between tables.

**Q191) Describe the elements of the SELECT query syntax?**

A191) SELECT element FROM table WHERE conditional statement.

**Q192) Explain the use of the WHERE clause?**

A192) WHERE is used with a relational statement to isolate the object element or row.

**Q193) What techniques are used to retrieve data from more than one table in a single SQL statement?**

A193) Joins, unions and nested selects are used to retrieve data.

**Q194) What do the initials DDL and DML stand for and what is their meaning?**

A194) DDL is data definition language and DML is data manipulation language. DDL statements are CREATE, ALTER, TRUNCATE. DML statements are SELECT, INSERT, DELETE and UPDATE.

**Q195) What is a view? Why use it?**

A195) A view is a virtual table made up of data from base tables and other views, but not stored separately.

**Q196) Explain an outer join?**

A196) An outer join includes rows from tables when there are no matching values in the tables.

**Q197) What is a subselect? Is it different from a nested select?**

A197) A subselect is a select which works in conjunction with another select. A nested select is a kind of subselect where the inner select passes to the where criteria for the outer select.

**Q198) What is the difference between group by and order by?**

A198) Group by controls the presentation of the rows, order by controls the presentation of the columns for the results of the SELECT statement.

**Q199) Explain the EXPLAIN statement?**

A199) The explain statement provides information about the optimizer's choice of access path of the sql.

**Q200) What is tablespace?**

A200) Tables are stored in tablespaces (hence the name)! There are three types of tablespaces: simple, segmented and partitioned.

**Q201) What is a cursor and what is its function?**

A201) An embedded SQL statement may return a number of rows while the programming language can only access one row at a time. The programming device called a cursor controls the position of the row.

**Q202) What is referential integrity?**

A202) Referential integrity refers to the consistency that must be maintained between primary and foreign keys, i.e. every foreign key value must have a corresponding primary key value.

**Q203) Usually, which is more important for DB2 system performance - CPU processing or I/O access?**

A203) I/O operations are usually most critical for DB2 performance (or any other database for that matter).

**Q204) Is there any advantage to denormalizing DB2 tables?**

A204) Denormalizing DB2 tables reduces the need for processing intensive relational joins and reduces the number of foreign keys.

**Q205) What is the database descriptor?**

A205) The database descriptor, DBD is the DB2 component that limits access to the database whenever objects are created, altered or dropped.

**Q206) What is lock contention?**

A206) To maintain the integrity of DB2 objects the DBD permits access to only on object at a time. Lock contention happens if several objects are required by contending application processes simultaneously.

**Q207) What is SPUFI?**

A207) SPUFI stands for SQL processing using file input. It is the DB2 interactive menu-driven tool used by developers to create database objects.

**Q208) What is the significance of DB2 free space and what parameters control it?**

A208) The two parameters used in the CREATE statement are the PCTFREE which specifies the percentage of free space for each page and FREEPAGE which indicates the number of pages to be loaded with data between each free page. Free space allows room for the insertion of new rows.

**Q209) What is a NULL value? What are the pros and cons of using NULLS?**

A209) A NULL value takes up one byte of storage and indicates that a value is not present as opposed to a space or zero value. It's the DB2 equivalent of TBD on an organizational chart and often correctly portrays a business situation. Unfortunately, it requires extra coding for an application program to handle this situation.

**Q210) What is a synonym? How is it used?**

A210) A synonym is used to reference a table or view by another name. The other name can then be written in the application code pointing to test tables in the development stage and to production entities when the code is migrated. The synonym is linked to the AUTHID that created it.

**Q211) What is an alias and how does it differ from a synonym?**

A211) An alias is an alternative to a synonym, designed for a distributed environment to avoid having to use the location qualifier of a table or view. The alias is not dropped when the table is dropped.

**Q212) What is a LIKE table and how is it created?**

A212) A LIKE table is created by using the LIKE parameter in a CREATE table statement. LIKE tables are typically created for a test environment from the production environment.

**Q213) If the base table underlying a view is restructured, eg. attributes are added, does the application code accessing the view need to be redone?**

A213) No. The table and its view are created anew, but the programs accessing the view do not need to be changed if the view and attributes accessed remain the same.

**Q214) Under what circumstances will DB2 allow an SQL statement to update more than one primary key value at a time?**

A214) Never. Such processing could produce duplicate values violating entity integrity. Primary keys must be updated one at a time.

- Q215) What is the cascade rule and how does it relate to deletions made with a subselect?**  
A215) The cascade rule will not allow deletions based on a subselect that references the same table from which the deletions are being made.
- Q216) What is the self-referencing constraint?**  
A216) The self-referencing constraint limits in a single table the changes to a primary key that the related foreign key defines. The foreign key in a self referencing table must specify the DELETE CASCADE rule.
- Q217) What are delete-connected tables?**  
A217) Tables related with a foreign key are called delete-connected because a deletion in the primary key table can affect the contents of the foreign key table.
- Q218) When can an insert of a new primary key value threaten referential integrity?**  
A218) Never. New primary key values are not a problem. However, the values of foreign key inserts must have corresponding primary key values in their related tables. And updates of primary key values may require changes in foreign key values to maintain referential integrity.
- Q219) In terms of DB2 indexing, what is the root page?**  
A219) The simplest DB2 index is the B-tree and the B-tree's top page is called the root page. The root page entries represent the upper range limits of the index and are referenced first in a search.
- Q220) How does DB2 use multiple table indexes?**  
A220) DB2 use the multiple indexes to satisfy multiple predicates in a SELECT statement that are joined by an AND or OR.
- Q221) What are some characteristics of columns that benefit from indexes?**  
A221) Primary key and foreign key columns; columns that have unique values; columns that have aggregates computed frequently and columns used to test the existence of a value.
- Q222) What is a composite index and how does it differ from a multiple index?**  
A222) A multiple index is not one index but two indexes for two different columns of a table. A composite index is one index made up of combined values from two columns in a table. If two columns in a table will often be accessed together a composite index will be efficient.
- Q223) What is meant by index cardinality?**  
A223) The number of distinct values for a column is called index cardinality. DB2's RUNSTATS utility analyzes column value redundancy to determine whether to use a tablespace or index scan to search for data.
- Q224) What is a clustered index?**  
A224) For a clustered index DB2 maintains rows in the same sequence as the columns in the index for as long as there is free space. DB2 can then process that table in that order efficiently.
- Q225) What keyword does an SQL SELECT statement use for a string search?**  
A225) The LIKE keyword allows for string searches. The % sign is used as a wildcard.
- Q226) What are some SQL aggregates and other built-in functions?**  
A226) The common aggregate, built-in functions are AVG, SUM, MIN, MAX, COUNT and DISTINCT.
- Q227) How is the SUBSTR keyword used in sql?**  
A227) SUBSTR is used for string manipulation with column name, first position and string length used as arguments. E.g. SUBSTR (NAME, 1 3) refers to the first three characters in the column NAME.

**Q228) What are the three DB2 date and time data types and their associated functions?**

A228) The three data types are DATE, TIME and TIMESTAMP. CHAR can be used to specify the format of each type. The DAYS function calculates the number of days between two dates. (It's Y2K compliant).

**Q229) Explain transactions, commits and rollbacks in DB2.**

A229) In DB2 a transaction typically requires a series of updates, insertions and deletions that represent a logical unit of work. A transaction puts an implicit lock on the DB2 data. Programmers can use the COMMIT WORK statement to terminate the transaction creating smaller units for recovery. If the transaction fails DB2 uses the log to roll back values to the start of the transaction or to the preceding commit point.

**Q230) What is deadlock?**

A230) Deadlock occurs when transactions executing at the same time lock each other out of data that they need to complete their logical units of work.

**Q231) What are the four lockable units for DB2?**

A231) DB2 imposes locks of four differing sizes: pages, tables, tablespace and for indexes subpage.

**Q232) What are the three lock types?**

A232) The three types are shared, update and exclusive. Shared locks allow two or more programs to read simultaneously but not change the locked space. An exclusive lock bars all other users from accessing the space. An update lock is less restrictive; it allows other transactions to read or acquire shared locks on the space.

**Q233) What is isolation level?**

A233) SQL statements may return any number of rows, but most host languages deal with one row at a time by declaring a cursor that presents each row at a unique isolation level.

**Q234) What is an intent lock?**

A234) An intent lock is at the table level for a segmented tablespace or at the tablespace level for a non-segmented tablespace. They indicate at the table or tablespace level the kinds of locks at lower levels.

**Q235) What is the difference between static and dynamic SQL?**

A235) Static SQL is hard-coded in a program when the programmer knows the statements to be executed. For dynamic sql the program must dynamically allocate memory to receive the query results.

**Q236) What is cursor stability?**

A236) Cursor stability means that DB2 takes a lock on the page the cursor is accessing and releases the lock when the cursor moves to another page.

**Q237) What is the significance of the CURSOR WITH HOLD clause in a cursor declaration?**

A237) The clause avoids closing the cursor and repositioning it to the last row processed when the cursor is reopened.

**Q238) What is the SQL Communications Area and what are some of its key fields?**

A238) It is a data structure that must be included in any host-language program using SQL. It is used to pass feedback about the SQL operations to the program. Fields are return codes, error messages, handling codes and warnings.

**Q239) What is the purpose of the WHENEVER statement?**

A239) The WHENEVER statement is coded once in the host program to control program actions depending on the SQL-CODE returned by each sql statement within the program.

**Q240) What is the FREE command?**

A240) The FREE command can be used to delete plans and/or packages no longer needed.

**Q241) DB2 can implement a join in three ways using a merge join, a nested join or a hybrid join. Explain the differences?**

A241) A merge join requires that the tables being joined be in a sequence; the rows are retrieved with a high cluster ratio index or are sorted by DB2. A nested join does not require a sequence and works best on joining a small number of rows. DB2 reads the outer table values and each time scans the inner table for matches. The hybrid join is a nested join that requires the outer table be in sequence.

**Q242) Compare a subselect to a join?**

A242) Any subselect can be rewritten as a join, but not vice versa. Joins are usually more efficient as join rows can be returned immediately, subselects require a temporary work area for inner selects results while processing the outer select.

**Q243) What is the difference between IN subselects and EXISTS subselect?**

A243) If there is an index on the attributes tested an IN is more efficient since DB2 uses the index for the IN. (IN for index is the mnemonic).

**Q244) What is a Cartesian product?**

A244) A Cartesian product results from a faulty query. It is a row in the results for every combination in the join tables.

**Q245) DB2 What is the difference between a package and a plan? How does one bind 2 versions of a CICS transaction with the same module name in two different CICS regions that share the same DB2 subsystem?**

A245) Package and plan are usually used synonymously, as in this site. Both contain optimized code for SQL statements - a package for a single program, module or subroutine contained in the database request module (DBRM) library. A plan may contain multiple packages and pointers to packages. The one CICS module would then exist in a package that could be referenced in two different plans.

**Q246) What is an asynchronous write?**

A246) It is a write to disk that may occur before or long after a commit. The write is controlled by the buffer manager.

**Q247) What is a lock?**

A247) A lock is the mechanism that controls access to data pages and tablespaces.

**Q248) What is meant by isolation level?**

A248) This is a key concept for any relational database. Isolation level is the manner in which locks are applied and released during a transaction. For DB@ a 'repeatable read' holds all locks until the transaction completes or a syncpoint is issued. For transactions using 'cursor stability' the page lock releases are issued as the cursor 'moves', i.e. as the transaction releases addressability to the records.

**Q249) What are leaf pages?**

A249) They are the opposite of root pages. Leaf pages are the lowest level index pages - the pages that contain index entries and information to the corresponding table rows.

**Q250) What is a precompiler?**

A250) It is a DB2 facility for static SQL statements - it replaces these statements with calls to the DB2 language interface module.

**Q251) What is a root page?**

A251) The opposite of a leaf page; it is the highest level index page. An index can contain only the one root page; all other index pages are associated to the root.

**Q252) What is a thread?**

A252) A thread is the connection between DB2 and some other subsystem, such as CICS or IMS/DC.

**Q253) Which transaction use a command thread ?**

A253) Only the DSNB transaction uses a command thread.

**Q254) What is the purpose of the DSNB transaction ?**

A254) The DSNB transaction is used for controlling the CICS Call Attach Facility(CAF) and for Displaying CAF statistics.

## **DB2 Utilities**

**Q255) What does the CHECK Utility do ?**

A255) The CHECK Utility checks the referential integrity of table relations and checks the integrity of the indexes by matching index column values to table column values.

**Q256) what types of copies can be made with the COPY Utility ?**

A256) The copy Utility can make a full image copy or an incremental image copy .

**Q257) Why might full image copies be faster to implement than an incremental image copy?**

A257) Because an incremental image copy has to search for changed data and cannot make use of sequential pre fetch. Conversely, a full image copy has no checking to do as it takes advantage of sequential pre fetch.

**Q258) How could one combine a set of incremental image copies into a single copy?**

A258) By using the MERGECOPY Utility.

**Q259) What is the purpose of the QUIESE Utility?**

A259) The QUIESE Utility prevents the start of any new table space activity while it gives active threads a chance to finish their tasks. Once all thread are inactive, it records information to establish a point of consistency for future recovery.

**Q260) What does the REORG Utility do?**

A260) The REORG Utility will sort the index space and table space to conform with the primary index or clustering index specified in the DDL. It will also reclaim the space from dropped simple table spaces.

**Q261) What can the SET option of the Repair Utility accomplish?**

A261) The set option of the Repair utility can reset a copy pending, check pending, and recover pending flags.

**Q262) What can the Locate option of the Repair Utility accomplish?**

A262) The Locate option of the Repair Utility can delete a row from a table space, repair broken table space pages, and replace data at specific locations in a table space or index.

**Q263) What does the RUNSTATS Utility do?**

A263) The RUNSTATS Utility collects statistical information for DB2 table spaces, partitions, indexes, tables and columns and stores this data in the DB2 Catalog.

**Q264) Why use RUNSTAT Utility?**

A264) Because the DB2 Optimizer need accurate data in order to formulate the most efficient access path given the state of the environment and because the information will help the DBA to monitor the condition of the object in the DB2 subsystem.

**Q265) What statistic will tell the DBA how much space can be reclaimed from dropped table spaces on the next reorg run?**

A265) The DBA can see this in the PERCDROP column of the SYSIBM.SYSTABLEPART catalog table.

**Q266) What DB2 Catalog column tell you when an index needs table reorganized ?**

A266) The FAROFFPOS column of the SYSIBM.SYSINDEXPART table.

**Q267) What is the STOSPACE Utility used for?**

A267) The STOSPACE Utility updates the DB2 catalog with the DASD utilization of the table space and index space data sets.

**Q268) What is a SELECT statement?**

A268) A select statement is an SQL statement that retrieves data from a table or view.

**Q269) What is the syntax of SELECT statement when embedded in a COBOL program?**

A269) Exec SQL  
SELECT col\_name1,col\_name2,col\_name3  
INTO hos:\_var1,hos\_var2,hos\_var3  
FROM owner.tablename  
WHERE condition  
END\_EXEC.

**Q270) What are column-name qualifiers used?**

A270) Column-name qualifier are used as table designator to avoid ambiguity when the column names referenced exist in more than one table used in the SQL statement. Column-name qualifiers are used in correlated references.

**Q271) What is correlation names?**

A271) IT is a special type of column designator that connects specific column in the various levels of a multilevel SQL query.

**Q272) How do you define a correlated name?**

A272) A correlated name can be defined in the FROM clause of a query and in the first clause of an UPDATE or DELETE statement.

**Q273) What is subquery ?**

A273) A subquery is a query that is written as part of another query's WHERE clause. For example :

```
SELECT col_name1,col_name2
FROM table_A
WHERE col_name3 < ( SELECT Avg(col_name)
                    FROM table_A
                    WHERE col_name4 = 'constant' )
```

**Q274) What is correlated subquery?**

A274) A correlated subquery is one that has a correlation name as a table or view designator in the FROM clause of the outer query and the same correlation name as a qualifier of a search condition in the WHERE clause of the subquery. For example:

```
SELECT col_name1,col_name2
FROM table_A x1
```

```

WHERE col_name3 <
      ( SELECT Avg(column_name3)
        FROM table_A
        WHERE col_name4 = x1.col_name4 )

```

**Q275) How does the processing of a correlated subquery differ from a non correlated subquery?**

A275) The subquery in a correlated subquery is reevaluated for every row of the table or view named in the outer query, while the subquery of a non correlated subquery is evaluated only once.

**Q276) What is a result table?**

A276) A result table is the product of a query against one or more tables or views ( i.e. it is the place that holds the results of a query).

**Q277) What is a cursor?**

A277) A cursor is a named control structure used to make a set of rows available to a program.

**Q278) What is the syntax required for the creation of a cursor?**

```

A278) EXEC SQL
      DECLARE cur_name CURSOR for
            SELECT col1,col2
            FROM table1
            WHERE col1 = search_condition
      END-EXEC.

```

**Q279) When is the results table for the query in a DECLARE CURSOR statement created?**

A279) The results table for a query specified in a DECLARE CURSOR statement of a cursor is created during the execution of the OPEN CURSOR statement.

**Q280) What is read-only cursor?**

A280) A read-only cursor is one in which the result table was created by a query containing one of the following :

- a DISTINCT keyword
- a UNION operator
- a column or scalar function
- a GROUP BY clause
- a ORDER BY clause
- a HAVING clause
- a read-only view in the FROM clause
- a FROM clause identifying more than one table or view

## DB2 Catalog

**Q281) Which DB2 catalog tables are used to produce a list of table column by table for all tables in a database?**

A281) The catalog tables to use are the SYSIBM.SYSTABLES and the SYSIBM.SYSCOLUMNS.

**Q282) Which catalog tables contain authorization information?**

A282) The SYSIBM table that contain authorization information are SYSCOLAUTH, SYSDBAUTH, SYSPLANAUTH, SYSTABAUTH and SYSUSERAUTH.

**Q283) Which catalog table stores referential constraints?**

A283) The SYSIBM.SYSRELS table.

## DB2 Directory

**Q284) What Utility is used to migrate DB2 from one release to the next?**

A284) The DUMPCAT Utility.

**Q285) How would one remove old reorg information from the DB2 catalog?**

A285) Run the MODIFY RECOVERY Utility.

**Q286) What happens to a tablespace when its recovery information has been removed and a full recovery is no longer possible?**

A286) The tablespace is put into copy pending status.

**Q287) Where is the access path logic created by the DB2 Optimizer stored?**

A287) The access path logic is stored as skeleton cursor tables in the SCT02 Directory table.

**Q288) When is the skeleton cursor table created?**

A288) During the execution of the BIND PLAN command.

**Q289) How does one remove entries from the SCT02 table?**

A289) Run the FREE PLAN command.

**Q290) When one binds a PACKAGE ( of a plan ) what package information is stored and where it is stored?**

A290) The access path information for the PACKAGE is stored as skeleton package tables in the SPT01 table.

**Q291) Where besides the DB2 catalog is database object information stored by DB2?**

A291) DB2 also stores information about DB2 objects as database descriptors (DBDs) in the DBD Directory table.

**Q292) Can you access the DB2 Directory table using SQL?**

A292) No. These tables are exclusively accessed by internal DB2 processes.

## DB2 Commands

**Q293) Which DB2 command is used to retrieve environmental information?**

A293) The DISPLAY command can return the following environmental data: DATABASE info, RLIMIT info, THREAD info, TRACE info, and UTILITY info.

**Q294) Which command is issued to establish the Boot Strap Data Set after an I/O failure?**

A294) The DBA would issue a RECOVER BSDS command.

**Q295) How is the status of a utility reset after it has been stopped by DB2 ?**

A295) By issuing the START RLIMIT command.

**Q296) How can one determine the status of a tablespace?**

A296) By using the DISPLAY DATABASE command.

**The following is the checklist to complete a DB2 batch or on-line program....**

**Batch DB2 COBOL program....**

1. If the program is main program it should have both DBB and DPK components.
2. If the program is linked (called) program it should have only DPK component. But the package generated should be binded in Calling program DBB component.

For example the **DBB** component looks like ....

```

BIND PLAN(????????) - *****>>> ENTER PLAN NAME
PKLIST (SEALAND.????????, - *****>>> ENTER MEMBER NAME
        SEALAND.????????, - *****>>> (MULTIPLE MEMBERS
        SEALAND.????????) - *****>>> FOR EACH PLAN)
QUALIFIER (TEST) - *****>>> MUST ALWAYS BE TEST
OWNER (????) - *****>>> ENTER YOUR TSO ID
ACTION (REPLACE) -
RETAIN -
VALIDATE (BIND) -
ISOLATION (CS) -
FLAG (I) -
ACQUIRE (USE) -
RELEASE (COMMIT) -
EXPLAIN (YES)

*****
* THIS IS A SAMPLE DBB CARD FOR DB2 PACKAGING *
* *
* IF MULTIPLE MEMBERS ARE ENTERED IN PKLIST, *
* THERE MUST BE A DPK CARD FOR EACH ONE. *
*****

```

The following is the format of the **DPK** card....

```

BIND PACKAGE (SEALAND) -
MEMBER (????????) - *****>>> ENTER MEMBER NAME
VALIDATE (BIND) -
OWNER (????) - *****>>> ENTER YOUR TSO ID
EXPLAIN (NO) -
QUALIFIER (TEST) - *****>>> MUST ALWAYS BE TEST

*****
* THIS IS A SAMPLE DPK CARD FOR DB2 PACKAGING *
* *
* *
*****

```

3. As we are all aware that RCT is a concept of CICS. So batch DB2 program will not have any RCT entry.

4. To run this DB2 program the following is the model JCL...

```

//TESTXXX JOB (AAAA), 'ACCOUNTS PAYABLE', CLASS=A,
// USER=XXXX, MSGCLASS=H, REGION=4096K
/*JOBPARM SYSAFF=B158
//JOBLIB DD DSN=TEST.JOBLIB, DISP=SHR
/*
//STEP010 EXEC PGM=IKJEFT01, DYNAMNBR=20
//STEPLIB DD DSN=DB2T.DSNEXIT, DISP=SHR
// DD DSN=DB2T.DSNLOAD, DISP=SHR
// DD DSN=TEST.JOBLIB, DISP=SHR
//INPUT1 DD DSN=XYZ.ABC.DBF, DISP=SHR
//OUTPUT1 DD DSN=XYZ.BCD.LEY,

```

```

//          DISP= (NEW, CATLG, DELETE) ,
//          DCB= (RECFM=FB, LRECL=122, BLKSIZE=2440) , UNIT=SYSDA,
//          SPACE= (CYL, (10, 2) , RLSE)
//SYSPRINT DD SYSOUT=*
//SYSTSPRT DD SYSOUT=*
//SYSOUT  DD SYSOUT=*
//SYSERR  DD SYSOUT=*
//SYSDUMP DD SYSOUT=*
//TESTDUMP DD SYSOUT=*
//SYSMSG  DD SYSOUT=*
//SYSTSIN DD *
DSN SYSTEM(DB2T)
RUN PROG (TESTPROG) PLAN (TESTPLAN)
END
//*

```

As shown in above JCL program IKJEFT01 is used to run DB2 program (TESTPROG in our example). In the above JCL program name and plan names are specified in SYSTSIN dataset as in-stream data.

### **The following is the check list to complete CICS(on-line) DB2 program...**

1. If the program is main program it should have both DBB and DPK components.
2. If the program is LINKed, XCTLed program it should have only DPK component. But the package generated should be binded in Calling program DBB component.
3. RCT entry has to be created if the program is main program(which consists of TRANSID). If the program is LINKed or XCTLed it need not have a RCT entry. RCT entry basically used to attach CICS system to DB2 system.
4. No JCL business here because it is on-line.
5. The DBB and DPK s shown for batch program are also applicable to this.

1. What does SQLCODE +100 means
2. What does the SQLCODE +818 means
3. What are the pars of a SELECT statement
4. What is DB2 etc.....,

## Information Management System(IMS)

**Q1) What is the physical nature of a database called?**

A1) DBD

**Q2) Is it necessary that all the segments in a DI/I database have key fields ?**

A2) It is not necessary that all the segments in the database should have key field, except for the database.

**Q3) How man key fields and search fields can a segment have?**

A3) One key field and as many search fields in the segment can be declared.

**Q4) Is it necessary that the key field in a DI/I database be unique?**

A4) No, it is no necessary.

**Q5) What is a key field in an IMS database?**

A5) A Field that DL/I uses to maintain the segments in the ascending order is called the key field

**Q6) What is a database record?**

A6) A single occurrence of the root along with all its dependents is called the database record.

**Q7) What is a Hierarchy path?**

A7) A line that starts at the root and passes thru the inter mediate levels in the hierarchy and ends at the a segment at the bottom of the hierarchy is called the Hierarchy path.

**Q8) What is a Root?**

A8) The segment at the top of the Hierarchy, which is not a child to a segment is called the Root.

**Q9) What are Twins?**

A9) Occurrences of all the segment types under a single parent segment occurrence is called a Twin.

**Q10) Define the terms Parent & Child.**

A10) Parent-Any segment that has one or more segments directly below it is a Parent. Child-Any segment that has segment directly above it is called the Child.

**Q11) What is the limitation on the no. of levels in a DL/I database?**

A11) You can have 15 levels in a DL/I database

**Q12) How many sgment types can u have in a DL/I database?**

A12) A DI/I database can have 255 segment types

**Q13) What is a Segment type?**

A13) Loosely speaking a segment type is a segment in a DI/I hierarchy chart.

**Q14) What is a segment?**

A14) A segment is the smallest unit of information that DI/I uses when working with information in the database

**Q15) What is Hierarchy Chart?**

A15) A Hierarchy chart is a pictorial representation of the total of a DL/I database starting from the root, giving all the parent child relationships that exist within the database

**Q16) what are the control blocks in IMS ?**

A16) There are two control block.1.dbd(database descriptor)2.psb (program specification block)

**Q17) which is the first statement in COBOL-IMS programs?**

A17) Entry statement is the first statement after procedure division i.e. ENTRY 'DLICBL' USING .....

**Q18) What is the return code you get after a successful IMS call?**

A18) Spaces.

**Q19) Define DBD?**

A19) DBD : Database Descriptor. IMS Controls the Structure of DB and access to the DB via DBD. The DBD contains information like, Segment types, their location in hierarchy and Sequence keys.

**Q20) How can we distinguish between an online and batch program in IMS environment?**

A20) By seeing the IO-PCB in the application program.

**Q21) Which is the DL/I function used in CICS-IMS program?**

A21) PCB(PROGRAM COMMUNICATION BLOCK)

**Q22) What is IMS?**

A22) INFORMATION MANAGEMENT SYSTEM

**Q23) How does one reorg an HDAM IMS database when changing RAPS (Root Anchor Points)?**

A23) Unload data using current DBD. 2. Delete/define the underlying VSAM dataset(s). 3. Re-load data using newly-defined DBD with new RAPS. 4. Re-build any secondary indexes.

**Q24) What do you know about DBD gen?**

A24) used to generate DBDs. The statements in DBDGEN process are PRINT NOGEN, DBD, DATASET, SEGM, FIELD, DBDGEN, FINISH, END

**Q25) What are common DLI functions?**

A25) GU,GN,GNP,GHU,GHN,REPL,ISRT,DLET,...

**Q26) What are common status codes that you come across?**

A26) GE,GB,GD,GK,GP,AI,AB,AC,AK,AJ,AM,AU,DJ,II,IX,QC,QD,H...

GE - segment not found

GB - end of database

**Q27) What are the command codes and their purposes?**

A27) Command codes extends the function of a SSA call. It simplifies programming and it improves performance.

\*C - Concatenated key, D-path call, F- first occurrence, L- last occurrence,

N- path call ignore , P-set parentage.

**Q28) What are the parameters used in CBLTDLI call?**

A28) Function code, PCB mask, Segment I/O Area & SSA(s).

**Q29) What are qualified and unqualified SSA's.**

A29) A Qualified SSA contains Key field as well as search field and parenthesis An unqualified SSA does not contain key field and parenthesis

**Q30) What do you know about MFS?**

A30) Message Format service , Used to format messages that will be transmitted to and from display screens.

**Q31) What for procopt is used? List some of them?**

A31) Procopt parameter specifies PROCESSING OPTIONS that define the type of processing that can be performed on a segment. ex: K, G, L, LS, A ,AS, I, IS.

procopt=k---means , the segment is key sensitive  
procopt=g- the segment is data sensitive (like read only)  
L- Load mode , means we can load data base from scratch  
A- Get, Insert, Delete, Replace- means it allows the program to issue all those calls  
I-insert mode. That means only insert calls with insert mode can be issued

**Q32) What is multi positioning ?**

A32) Multi positioning is an option where by IMS maintains a separate position on each hierarchical path. when more than one PCBs refer to the same DBD , it is called Multi positioning.

**Q33) What is secondary indexing?**

A33) Secondary indexing is a feature which allows the program to sequentially retrieve segments or search for segments in a sequence other than key sequence.

**Q34) How many PCB's can be coded within a PSB?**

A34) As many(more than one)

**Q35) What is PSB,PCB & ACB?**

A35) PSB(Program specification block): Informs about how a specific program is to be access one or more IMS DB. It

consists of PCB.

PCB (Prg Communication Block): Information to which segment in DB can be accessed, what the program

is allowed to do with those segment and how the DB is to be accessed.

ACB(Access Control Block): are generated by IMS as an expansion of information contained in the PSB in order

to speed up the access to the applicable DBD's.

What is check pointing, sync point?

How do you write a PSB code ?

# JOB CONTROL LANGUAGE(JCL)

The following are the most Frequently Asked Questions (FAQS) :

**Q1) What is a Generation Data Group (GDG)?**

A1) Generation Data Group is a group of chronologically or functionally related datasets. GDGs are processed periodically, often by adding a new generation, retaining previous generations, and sometimes discarding the oldest generation.

**Q2) How is a GDG base created?**

A2) A GDG base is created in the system catalog and keeps track of the generation numbers used for datasets in the group. IDCAMS utility is used to define the GDG base.

**Q3) What is model dataset label(Model DSCB)?**

A3) A model dataset label is a pattern for the dataset label created for any dataset named as a part of the GDG group. The system needs an existing dataset to serve as a model to supply the DCB parameters for the generation data group one wishes to create. The model dataset label must be cataloged. The model DSCB name is placed on the DCB parameter on the DD statement that creates the generation data group.

**Q4) How are GDGs concatenated?**

A4) Generation Data Groups are concatenated by specifying each dataset name and the generation number for all generations of the generation data group. Otherwise to have all generations of a generation data group, omit the generation number. The DD statement will refer to all generations. The result is the same as if all individual datasets were concatenated. If generations are not on the same volume, this will not work.

**Q5) How is a new GDG coded?**

A5) A new GDG is coded as (+1) after the dataset name as follows: DSN=JAN.DATA(+1). This will cause all generations to be pushed down one level at the end of the job.

**Q6) When should DISP=MOD is used?**

A6) DISP=MOD is used to either extend an existing sequential dataset or to create a dataset if it does not exist. If the dataset exists, then records are appended to the dataset at the end of the existing dataset. If the dataset does not exist, the system treats MOD as if it were NEW, provided that the volume parameter has not been used. If the volume parameter is used, the system terminates the job and does not create the new dataset. MOD can be used to add to a dataset that extends onto several volumes. Always specify a disposition of CATLG with MOD for cataloged datasets, even if they are already cataloged, so that any additional volume serial numbers will be recorded in the catalog.

**Q7) How is a dataset passed from one step to another?**

A7) A dataset is passed from one step to another based on what is coded on the DISP parameter. The dataset can only be passed to subsequent steps if PASS was used on the disposition parameter.

**Q8) How are datasets concatenated?**

A8) Datasets are concatenated by writing a normal DD statement for the first dataset and then adding a DD statement without a DDNAME for each dataset to be concatenated in the order they are to be read. The following is an example of three datasets concatenated:

```
//YEAR DAT DD DSN=JAN.DATA,DISP=SHR
//          DD DSN=FEB.DATA,DISP=SHR
//          DD DSN=MAR.DATA,DISP=SHR
```

**Q9) What is the difference between the JOBLIB and the STEPLIB statements?**

A9) The JOBLIB statement is placed after the JOB statement and is effective for all job steps. It cannot be placed in a cataloged procedure. The STEPLIB statement is placed after the EXEC statement and is effective for that job step only. Unlike the JOBLIB statement, the STEPLIB can be placed in a cataloged procedure.

**Q10) Name some of the JCL statements that are not allowed in procs.?**

A10) Some of the JCL statements which are not allowed in procedures are:

1. JOB, Delimiter(/\*), or Null statements
2. JOBLIB or JOBCAT DD statements
3. DD \* or DATA statements
4. Any JES2 or JES3 control statements

**Q11) What is primary allocation for a dataset?**

A11) The space allocated when the dataset is first created.

**Q12) What is the difference between primary and secondary allocations for a dataset?**

A12) Secondary allocation is done when more space is required than what has already been allocated.

**Q13) How many extents are possible for a sequential file ? For a VSAM file ?**

A13) 16 extents on a volume for a sequential file and 123 for a VSAM file.

**Q14) What does a disposition of (NEW,CATLG,DELETE) mean? - GS**

A14) That this is a new dataset and needs to be allocated, to CATLG the dataset if the step is successful and to delete the dataset if the step abends.

**Q15) What does a disposition of (NEW,CATLG,KEEP) mean? - GS**

A15) That this is a new dataset and needs to be allocated, to CATLG the dataset if the step is successful and to KEEP but not CATLG the dataset if the step abends. Thus if the step abends, the dataset would not be catalogued and we would need to supply the vol. ser the next time we refer to it.

**Q16) How do you access a file that had a disposition of KEEP? - GS**

A16) Need to supply Volume Serial Number VOL=SER=xxxx.

**Q17) MOD, DELETE; What does a disposition of (,DELETE) mean ?**

A17) The MOD will cause the dataset to be created (if it does not exist), and then the two DELETES will cause the dataset to be deleted whether the step abends or not. This disposition is used to clear out a dataset at the beginning of a job.

**Q18) What is the DD statement for an output file?**

A18) Unless allocated earlier, will have the following parameters: DISP=(NEW,CATLG,DELETE), UNIT, SPACE & DCB

**Q19) What do you do if you do not want to keep all the space allocated to a dataset? - GS**

A19) Specify the parameter RLSE ( release ) in the SPACE e.g. SPACE=(CYL,(50,50),RLSE)

**Q20) What is DISP= (NEW,PASS,DELETE)?**

A20) This is a new file and create it, if the step terminates normally, pass it to the subsequent steps and if step abends, delete it. This dataset will not exist beyond the JCL.

**Q21) How do you create a temporary dataset? Where will you use them?**

A21) Temporary datasets can be created either by not specifying any DSN or by specifying the temporary file indicator as in DSN=&&TEMP. We use them to carry the output of one step to another step in the same job. The dataset will not be retained once the job completes.

**Q22) How do you restart a PROC from a particular step? - GS**

A22) In job card, specify RESTART=PROCSTEP.STEPNAME where PROCSTEP = name of the JCL step that invoked the PROC and STEPNAME = name of the PROC step where you want execution to start

**Q23) How do you skip a particular step in a proc/JOB? - GS**

A23) Can use either condition codes or use the jcl control statement IF (only in ESA JCL)

**Q24) A PROC has five steps. Step 3 has a condition code. How can you override/nullify this condition code? - GS**

A24) Provide the override on the EXEC stmt in the JCL as follows:

```
//STEP001 EXEC procname, COND.stepname=value
```

All parameters on an EXEC stmt in the proc such as COND, PARM have to be overridden like this.

**Q25) How do you override a specific DDNAME/SYSIN in PROC from a JCL?**

A25) //<STEPNAME.DD> DSN=...

**Q26) What is NOTCAT 2 - GS**

A26) This is an MVS message indicating that a duplicate catalog entry exists. E.g., if you already have a dataset with dsn = 'xxxx.yyyy' and u try to create one with disp new, catlg, you would get this error. the program open and write would go through and at the end of the step the system would try to put it in the system catalog. at this point since an entry already exists the catlg would fail and give this message. you can fix the problem by deleting/uncataloging the first data set and going to the volume where the new dataset exists(this info is in the msglog of the job) and cataloging it.

**Q27) What is 'S0C7' abend? - GS**

A27) Caused by invalid data in a numeric field.

**Q28) What is a S0C4 error ? - GS**

A28) Storage violation error - can be due to various reasons. e.g.: READING a file that is not open, invalid address referenced due to subscript error.

**Q29) What are SD37, SB37, SE37 abends?**

A29) All indicate dataset out of space. SD37 - no secondary allocation was specified. SB37 - end of vol. and no further volumes specified. SE37 - Max. of 16 extents already allocated.

**Q30) What is S322 abend ?**

A30) Indicates a time out abend. Your program has taken more CPU time than the default limit for the job class. Could indicate an infinite loop.

**Q31) Why do you want to specify the REGION parameter in a JCL step? - GS**

A31) To override the REGION defined at the JOB card level. REGION specifies the max region size. REGION=0K or 0M or omitting REGION means no limit will be applied.

**Q32) What does the TIME parameter signify ? What does TIME=1440 mean ?**

A32) TIME parameter can be used to overcome S322 abends for programs that genuinely need more CPU time. TIME=1440 means no CPU time limit is to be applied to this step.

**Q33) What is COND=EVEN ?**

A33) Means execute this step even if any of the previous steps, terminated abnormally.

**Q34) What is COND=ONLY ?**

A34) Means execute this step only if any of the previous steps, terminated abnormally.

**Q35) How do you check the syntax of a JCL without running it?**

A35) TYPERUN=SCAN on the JOB card or use JSCAN.

**Q36) What does IEBGENER do?**

A36) Used to copy one QSAM file to another. Source dataset should be described using SYSUT1 ddname. Destination dataset should be described using SYSUT2. IEBGENR can also do some reformatting of data by supplying control cards via SYSIN.

**Q37) How do you send the output of a COBOL program to a member of a PDS?**

A37) Code the DSN as PDS (member) with a DISP = SHR. The DISP applies to the PDS and not to a specific member.

**Q38) I have multiple jobs ( JCLs with several JOB cards ) in a member. What happens if I submit it?**

A38) Multiple jobs are submitted (as many jobs as the number of JOB cards).

**Q39) I have a COBOL program that Accepts some input data. How do you code the JCL statement for this?**

( How do you code instream data in a JCL? )

A39) //SYSIN DD\*  
input data  
input data  
/\*

**Q40) Can you code instream data in a PROC ?**

A40) No.

**Q41) How do you overcome this limitation ?**

A41) One way is to code SYSIN DD DUMMY in the PROC, and then override this from the JCL with instream data.

**Q42) How do you run a COBOL batch program from a JCL? How do you run a COBOL/DB2 program?**

A42) To run a non DB2 program,  
//STEP001 EXEC PGM=MYPROG

To run a DB2 program,  
//STEP001 EXEC PGM=IKJEFT01  
//SYSTSIN DD \*  
DSN SYSTEM(...)  
RUN PROGRAM(MYPROG)  
PLAN(.....) LIB(....) PARMs(...)  
/\*

**Q43) What is STEPLIB, JOBLIB? What is it used for? - GS**

A43) Specifies that the private library (or libraries) specified should be searched before the default system libraries in order to locate a program to be executed. STEPLIB applies only to the particular step, JOBLIB to all steps in the job.

**Q44) What is order of searching of the libraries in a JCL? - GS**

A44) First any private libraries as specified in the STEPLIB or JOBLIB, then the system libraries such as SYS1.LINKLIB. The system libraries are specified in the link list.

**Q45) What happens if both JOBLIB and STEPLIB is specified ?**

A45) JOBLIB is ignored.

**Q46) When you specify multiple datasets in a JOBLIB or STEPLIB, what factor determines the order? - GS**

A46) The library with the largest block size should be the first one.

**Q47) How to change default PROCLIB?**

A47) //ABCD JCLLIB ORDER=(ME.MYPROCLIB,SYS1.PROCLIB)

**Q48) The disp in the JCL is MOD and the program opens the file in OUTPUT mode. What happens? The DISP in the JCL is SHR and the program opens the file in EXTEND mode. What happens?**

A48) Records will be written to end of file (append) when a WRITE is done in both cases.

**Q49) What are the valid DSORG values?**

A49) PS - QSAM, PO - Partitioned, IS - ISAM

**Q50) What are the differences between JES2 & JES3?**

A50) JES3 allocates datasets for all the steps before the job is scheduled. In JES2, allocation of datasets required by a step are done only just before the step executes.

**Q51) What are the causes for S0C1, S0C4, S0C5, S0C7, S0CB abends?**

A51) S0C1-May be due to 1.Missing or misspelled DD name 2.Read/Write to unopened dataset 3.Read to dataset opened

output 4.Write to dataset opened input 5.Called subprogram not found

S0C4-may be due to 1.Missing Select statement(during compile) 2.Bad Subscript/index 3.Protection Exception

4.Missing parameters on called subprogram 5.Read/Write to unopened file 6.Move data from/to unopened file

S0C5-May be due to 1.Bad Subscript/index 2.Closing an unopened dataset 3.Bad exit from a perform 4.Access to I/O

area(FD) before read

S0C7-may be due to 1.Numeric operation on non-numeric data 2.Un-initialize working-storage 3.Coding past the

maximum allowed sub script

S0CB-may be due to 1.Division by Zero

**Q52) What are the kinds of job control statements?**

A52) The JOB, EXEC and DD statement.

**Q53) What is the meaning of keyword in JCL? What is its opposite?**

A53) A keyword in a JCL statement may appear in different places and is recognized by its name, eg. MSGCLASS in the JOB statement. The opposite is positional words, where their meaning is based on their position in the statement, eg. in the DISP keyword the =(NEW,CATLG,DELETE) meanings are based on first, second and third position.

**Q54) Describe the JOB statement, its meaning, syntax and significant keywords?**

A54) The JOB statement is the first in a JCL stream. Its format is // jobname, keyword JOB, accounting information in brackets and keywords, MSGCLASS, MSGLEVEL, NOTIFY, CLASS, etc.

**Q55) Describe the EXEC statement, its meaning, syntax and keywords?**

A55) The EXEC statement identifies the program to be executed via a PGM= program name keyword. Its format is //jobname EXEC PGM= program name. The PARM= keyword can be used to pass external values to the executing program.

**Q56) Describe the DD statement, its meaning, syntax and keywords?**

A56) The DD statement links the external dataset name (DSN) to the DDNAME coded within the executing program. It links the file names within the program code to the file names known to the MVS operating system. The syntax is // ddname DD DSN=dataset name. Other keywords after DSN are DISP, DCB, SPACE, etc.

**Q57) What is a PROC? What is the difference between an instream and a catalogued PROC?**

A57) PROC stands for procedure. It is 'canned' JCL invoked by a PROC statement. An instream PROC is presented within the JCL; a catalogued PROC is referenced from a proclib partitioned dataset.

**Q58) What is the difference between a symbolic and an override in executing a PROC?**

A58) A symbolic is a PROC placeholder; the value for the symbolic is supplied when the PROC is invoked, eg. &symbol=value. An override replaces the PROC's statement with another one; it substitutes for the entire statement.

**Q59) What is RESTART? How is it invoked?**

A59) RESTART is a JOB statement keyword. It is used to restart the job at a specified step rather than at the beginning.

**Q60) What is a GDG? How is it referenced? How is it defined? What is a MODELDCB?**

A60) GDG stands for generation data group. It is a dataset with versions that can be referenced absolutely or relatively. It is defined by an IDCAMS define generation datagroup execution.

**Q61) Explain concatenating datasets?**

A61) Datasets can be grouped in a DD statement one after another, eg. in a JOBLIB statement where the load module can exist in one of many datasets.

**Q62) What is the difference between specifying DISP=OLD and DISP=SHR for a dataset?**

A62) DISP=OLD denotes exclusive control of the dataset; DISP=SHR means there is no exclusivity.

**Q63) What is MOD and when would you use it?**

A63) DISP=MOD is used when the dataset can be extended, ie, you can add records at the end of an existing dataset.

**Q64) What are the keywords associated with DCB? How can you specify DCB information? What is the OS precedence for obtaining that DCB information, ie. where does the system look for it first?**

A64) The keywords associated with the DCB parameter are LRECL, RECFM, BLKSIZE and DSORG. The DCB information can be supplied in the DD statement. The system looks for DCB information in the program code first.

**Q65) How do you designate a comment in JCL?**

A65) The comment statement is /\* followed by the comments.

**Q66) What is the meaning of the EXEC statement keyword, COND? What is its syntax?**

A66) COND specifies the conditions for executing the subsequent job step. The value after the COND= is compared to the return codes of the preceding steps and if the comparison is true, the step is bypassed. (If this answer confuses you, welcome to the club - memorize it and don't ask questions!)

**Q67) What is the improvement to COND= in the latest version of MVS?**

A67) MVS now allows for an IF bracketed by an END IF around any job step to replace the COND= syntax. Again, if the IF statement is true, the step is bypassed.

**Q68) What is the purpose of the PARM keyword in the EXEC statement?**

A68) The value after the PARM= specifies control information to be passed to the executing program of the job step.

**Q69) What is the purpose and meaning of the REGION keyword and what JCL statement is it associated with?**

A69) REGION specifies the maximum CPU memory allocated for a particular job or job step. If REGION is in the JOB card, it relates to the entire job; if in the EXEC statement, it relates to the job step.

**Q70) What is the purpose and meaning of the TIME keyword and what JCL statement is it associated with?**

A70) TIME specifies the maximum CPU time allocated for a particular job or job step. If TIME is in the JOB card, it relates to the entire job; if in the EXEC statement, it relates to the job step.

**Q71) What is the meaning of data definition name (ddname) and dataset name (dsname) in the DD statement?**

A71) Data definition name is the eight character designation after the // of the DD statement. It matches the internal name specified in the steps executing program. In COBOL that's the name specified after the ASSIGN in the SELECT ASSIGN statement. Dataset name is the operating system (MVS) name for the file.

**Q72) How is the keyword DUMMY used in JCL?**

A72) For an output file DUMMY specifies that the output is to be discarded. For input it specifies that the file is empty.

**Q73) What does the keyword DCB mean and what are some of the keywords associated with it?**

A73) DCB stands for data control block; it is a keyword for the DD statement used to describe datasets. Keywords associated with it are BLKSIZE, DEN, LRECL and RECFM.

**Q74) What is the difference between BLKSIZE and LRECL?**

A74) LRECL is the logical record length, where as BLKSIZE is multiples of LRECL

**Q75) Can you execute a PROC from another PROC?**

A75) I did not know the answer and my interviewer said NO. Later I tried and executed PROC from a PROC, three levels deep. Manuals do not state any limit on PROC calling PROC, or nesting.

**Q76) What will happen if you attempt to restart a job in the middle of a JCL // IF ... // ENDIF?**

A76) Job will fall through to the ENDIF (not executing any steps), then resume execution with the first step AFTER the // ENDIF.

**Q77) How many positional parameters are there in job statement?**

A77) There are two position parameters in job statement.

**Q78) What are three parameters you can specify on Job statement as well as on exec stmt ?**

A78) Time, Region and Cond parameters

**Q79) How can you trap abends in the JCL?**

A79) Use IF ABEND statement in the JCL.

**Q80) How do you restart a step in JCL?**

A80) Use RESTART=step name.

**Q81) How do you pass parameters to the program as the job is being executed ?**

A81) By using 'parm' parameter in exec statement. the value mentioned here should be declared in linkage section in the program and process thru procedure division. this technique is very useful when you do not know the parameters at the time of coding the programs.

**Q82) Why do you use a control card?**

A82) A control card can be a member of a pds or a sequential dataset and is used for storing the date fields, Definitions of VSAM files....etc. You use control card because you cannot use an in-stream procedure in a procedure. Generally you will be calling a Proc from your Jcl and you cannot code an in-stream procedure in the Proc and so you will point to the dataset which is called control card.

**Q83) How do you submit JCL via a Cobol program?**

A83) In your JCL define as //JOBA JOB 1111, JOB1 //STEP01 EXEC PGM=PROG1 //ddname DD SYSOUT=(\*,INTRDR)...and your COBOL(PROG1) should look like this SELECT JCL-FILE ASSIGN TO ddname. Open this file and write the JCL statements into this file. E.g. MOVE '//TESTJOB JOB 1111,VISVEISH' TO JCL-REC.MOVE '//STEP01 EXEC PGM=IEFBR14' TO JCL- REC and close this file. Then TESTJOB will be submitted.

**Q84) How do you submit a JCL under CICS environment ?**

A84) Pass all the jcl codes to a COBOL variable(should be declare using OCCURS clause) and then write the line one by one to the spool using CICS commands like SPOOLClose SPOOLOpen SPOOLWrite . For more help refer CECI of CICS or CICS manual

**Q85) What is the parameter to be passed in the job card for the unlimited time , irrespective of the job class ?**

A85) TIME=1440

**Q86) Definition of COND parameter in JCL**

A86) COND is a condition parameter, consists of 2 sub parameters, 1st - return code from the previous step, 2nd - condition. If COND is true, the step on which COND is coded will be BYPASSED.

**Q87) What is meant by S0C7 system abend code?**

A87) S0C7 - Data exception error - you will get it whenever you are trying to move the low values or spaces into the numeric field, or compare the numeric fields with low values, or try to do some arithmetic operations on the low values. To avoid this you have to always initialize the numeric fields otherwise they will contain the low values.

**Q88) How to pass the temp dataset from one JOB step to another?**

A88) By specifying the DISP as PASS for the temp dataset

**Q89) What is a COND parameter in JCL?**

A89) COND means condition parameter. It is compared with system return code of previous step.//step1 exec pgm=abcd//step2 exec pgm=xyz, cond=(4,lt)step2 will be executed when system return code of step1 is less than 4.

**Q90) Write a jcl to execute a job by 7 a.m on Jan 20,1986 ?**

A90) THE code IS : //\*MAIN DEADLINE=(0700,B,012086)

**Q91) How many types of libraries are there in JCL ?**

A91) Libraries are of three types.1.System Libraries: SUCH AS SYS1.LINKLIB2.Private Libraries: SPECIFIED IN A JOBLIB OR STEPLIB DD STATEMENTS.3.Temporary Libraries: CREATED IN A PREVIOUS STEP OF THE JOB.

**Q92) What u mean by include statement in JCL ?**

A92) An include statement identifies a member of a pds or pdse that contains. This set of JCL statements is called an include group. The system replaces the include statement with the statements in the include group.

**Q93) The maximum number of in-stream procedure you can code in any JCL is ?**

A93) Fifteen(15).

**Q94) What you mean by skeleton JCI?**

A94) Jcl which changes during run time i.e. the values for the jcl such as pgm name , dd name will change .ie same jcl can be used for various job, equivalent to dynamic sql...

**Q95) How do you submit a JCL under CICS environment ?**

A95) Edit the JCL in Extra partition TDQ and submit the same using some system command (not sure) under CICS subsystem. This is what i think, please clarify....

**Q96) What is JCL ?**

A96) JCL is Job Control Language and is used for Batch processing. The startup procedures of OS and standard products like CICS etc are written in JCL. It is interface between operating system(MVS) & application program. when 2 related programs are combined together on control statements is called job control language

**Q97) What is the max blocksize for a Tape file?**

A97) It is 32,760. Based on that we can calculate efficient number of Records in a Block

**Q98) What are the basic JCL Statements for a Job?**

A98) JOB : Identifies a job and supplies accounting info  
EXEC : Identifies a job step by indicating the name of the program to be executed.  
DD : Identifies a data set to be allocated for the job step  
Delimiter(/\*) : Marks the end of an in-stream dataset  
Null(//) : Marks the end of a job  
Comments(//\*) : Provides Comments  
PROC : Marks the beginning of a procedure  
PEND : Marks the end of a procedure  
OUTPUT : Supplies options for SYSOUT processing.

**Q99) What does the statements: typrun=scan and typrun=hold do in a JCL statement**

A99) typrun=scan checks the JCL for errors, typrun=hold holds the job until further notice.

**Q100) Which is the most widely used batch performance monitor for DB2?**

A100) DB2PM

**Q101) What is QSAM error usually when it is occurs?**

A101) Usually it is occurs at the time of job submission.

**Q102) What is the purpose of include statement in a JCL?**

A102) It is used as an alternative for STEPLIB. When we specify the dataset name in include ,it will search in all the datasets specified in the include dataset.

**Q103) What does S0C4 error mean?**

A103) This error is faced when we execute the COBOL program. The main reason for this error is that a variable is defined with less characters and we are trying to move data which is larger than the actual storage space.

**Q104) In which table PLAN is registered in ?**

A104) RCT

**Q105) What is GDG?**

A105) GDG - group of dataset that are logically or chronologically related, referred by name and a relative generation number - an integer which identifies the generation of a dataset and is coded in parentheses after dataset name. Absolute GDG name - GxxxxVyy, where xxxx-absolute gen. number, yy-version number. Can be sequential, direct, partitioned. (VSAM - no). Must always be

cataloged. Advantage - all datasets have the same name and system keeps track of adding new and retaining previous generations and deleting oldest successive generation. To create a GDG we create a GDG index in the system catalog with IDCAMS utility and then a model (prototype, DSCB) on the same volume to supply DCB information. Empty - when limit is reached all members are removed from the index, otherwise-only oldest. Scratch-removed members are uncataloged & deleted, otherwise - removed & uncataloged, but remain in the system (not members of GDG any more). GDG number is updated at the end of the job. If number is not specified all generations will be processed from the beginning

**Q106) what do you mean By spooling? Expand SPOOL?**

A106) This is managed by JES. This is used for Queuing the Outputs that are intended for Printing and are first stored in SPOOLDASD. This can be managed Using

**Q107) For how long a job can be executed continuously in a mainframe ?**

A107) 248 DAYS

**Q108) Max. No of DD statements in a job ?**

A108) 3273

**Q109) How much space OS allocates when you create a PS or PDS?**

A109) 56 KB

**Q110) Min no of member's (PDS) in one directory block?**

A110) SIX(6)

**Q111) The maximum number of steps in a job?**

A111) 255

**Q112) How much is memory space involved, when we code BLOCKSIZE,TRK & CYL ?**

A112) One block constitutes 32KB of formatted memory/ 42KB of Unformatted memory,6 blocks makes one Track & 15 Tracks makes one cylinder.

**Q113) What is DSNDB06 ?**

A113) This is the Place where DB2 Catalog resides

**Q114) What is the use of DSNDB07 ?**

A114) This is the area where sorting takes place in DB2

**Q115) What is DATACOM db?**

A115) It is a database used with VSE.

**Q116) What is a Dummy Utility and what it does ?**

A116) IEFBR14 is a Dummy utility and it is used for the sake of EXEC PGM= .... statement in JCL[when used it wouldn't perform any task]. e.g. While Allocating a dataset you don't have to run any utility [this could be done by giving disp=new inDD statement]. But for a PGM name must be given in EXEC statement, it is used.

**Q117) What 3 guidelines do we have to follow when concatenating DD statements?**

A117) Datasets must be of the same type (disk or tape), All datasets must have the same logical record length, The dataset with the largest blocksize must be listed first.

**Q118) On the DD statement, what is the main difference between creating a new sequential flat file and a partitioned dataset?**

A118) SPACE=(n,m) for a sequential file, SPACE=(n,m,p) for a PDS where n, m, and p are numbers. The p designates how many directory blocks to allocate.

- Q119) What is the difference between IEBGENER, IEBCOPY and REPRO in IDCAMS utility?**  
A119) **IEBGENER** -- This is a dataset utility for copying sequential datasets which produces a PDS or a member from a sequential dataset.  
**IEBCOPY** -- This is a dataset utility for copying one PDS to another or to merge PDSs.  
**REPRO** -- This is for copying sequential datasets. More or less same as the IEBGENER.
- Q120) How do you submit JCL via a Cobol program?**  
A120) Use a file //dd1 DD sysout=(\*,intrdr)write your JCL to this file. Pl some one try this out.
- Q121) How to execute a set of JCL statements from a COBOL program ?**  
A121) Using EXEC CICS SPOOL WRITE(var-name) END-EXEC command. var-name is a COBOL host structure containing JCL statements.
- Q122) What is the difference between static call & Dynamic call ?**  
A122) In the case of Static call, the called program is a stand along program, it is an executable program . During run time we can call it in our called program. As about Dynamic call, the called program is not an executable program it can executed thru the called program
- Q123) What is the difference between catalogue procedure and In-Stream procedure?**  
A123) In Stream procedures are set of JCL statements written between JOB and EXEC statements, start with PROC and end with PEND statement. Mainly used to test cataloged procedures. Cataloged procedure is cataloged on the procedure library and is called by specifying the procedure name on the EXEC statement.
- Q124) What do you feel makes a good program?**  
A124) A program that follows a top down approach. It is also one that other programmers or users can follow logically and is easy to read and understand.
- Q125) Can we browse or edit the GDG dataset if it is a tape entry?**  
A125) No, You can't edit or browse the GDG if it resides on tape.
- Q126) What are the maximum and minimum sizes of any CONTROL AREA (VSAM datasets) ?**  
A126) Minimum Size : 1 track Maximum size : 1 cylinder
- Q127) How to get cursor position from system in CICS environment ?**  
A127) Get it from EIBCURPOS !
- Q128) How many parameters are there to a DISP statement and what are their uses ?**  
A128) There are three(3) parameters. Parameter 1: current data set disposition(new, shr, old, mod)  
Parameter 2: normal close action for data set (catlg, keep, delete) Parameter 3:abend action for data set (catlg, keep, delete).
- Q129) What is the error code SOC01 indicate ?**  
A129) Operation exception error For e.g. a dataset open error
- Q130) What is a procedure?**  
A130) A set of precoded JCL that can be modified through the use of parameters or override cards. Note: Procedures can be catalogued or instream.
- Q131) What is the difference between specifying DISP=OLD and DISP=SHR for a dataset?**  
A131) OLD specifies exclusive use of a dataset, SHR allows multiple jobs to concurrently access the dataset Note: When updating a dataset, you would normally use OLD.

**Q132) What are the three basic types of statements in a jobstream?**

A132) JOB(one per jobstream)EXEC(one or more per job)DD(one or more per jobstep)

**Q133) What does SYSIN \* indicate?**

A133) Instream data follows this card and is terminated when followed by a card containing // or /\* in columns 1 and 2.

**Q134) What are three major types of JCL statements? What are their functions?**

A134) JOB - indicates start of jobstream to the operating system and through parms coded on it, certain details about the

job (time, region, message level, job accounting data).

EXEC - indicates the start of execution of a particular job step, be that step a program or a proc.

DD - is a data definition, which is used to describe the attributes of a data set (name, unit, type, space, disposition).

1. Distinguish between positional & keyword parameters
2. How can you omit positional parameters ?
3. How do u define the identifier field for a delimiter statement ?
4. List some valid operation codes .
5. What is the purpose of the MSGLEVEL parameter ?
6. What is the function of the following parameters :
  - I) MSGLEVEL=(0,0)
  - ii) MSGLEVEL=(2,1)
  - iii) MSGLEVEL=(1,1)
7. What is the purpose of the MSGCLASS parameter ?
8. What are the parameters used with COND ?
9. List down the different types of comparison operators & their meaning .
- 10.What is the function of the TYPRUN parameter ?
- 11.What are the subparameters that can be used with TYPRUN?
- 12.What is the function of the TIME parameter?
13. What is the purpose of the EXEC statement ?
14. What are the additional keyword parameters used on the EXEC statement?
15. What is the difference between the following statements :
  - I) step#1 exec PGM=accpay
  - ii) step#1 exec tbalance
16. What is the error in the following JCL statements :
  - I) //step#three exec pgm=hkbc762
  - ii) //step#3 exec pgm = hkbc762
  - iii) //step#3 exec pgr = hkbc672

17. Name the system library from which modules are retrieved at execution time .
18. What is the purpose of the JOBLIB statement ?
19. If JOBLIB & STEPLIB statements are both included in a job , then which statement would override .
20. What is the purpose of the PARM parameter ?
21. What is the purpose of the DD statement ?
22. How would you specify the device for a dataset in a DD statement ?
23. What is the function of the following DD statement `//ddname DD *`
24. What is the purpose of the SYSOUT Parameter in the DD statement ?
25. What are the two ways of specifying Temporary Data Sets ?
26. What are the advantages of coding the DISP parameter with MOD rather than NEW ?
27. Explain the function of the following Statement : `//ddname DD DISP=(NEW,CATLG,DELETE)`
28. What is the default value of the third DISP subparameter ?
29. What is Backward Referencing ?
30. What is the purpose of Concatenating Data Sets ?
31. What is the result of a READ operation on a Dummy Data set ?
32. What are the functions of the following ddnames : `SYSUDUMP , SYSABEND , SYSMDUMP`
33. What are GDGs ?

## Virtual Storage Access Method (VSAM)

**Q1) What are the types of VSAM datasets?**

A1) Entry sequenced datasets (ESDS), key sequenced datasets (KSDS) and relative record dataset (RRDS).

**Q2) How are records stored in an ESDS, entry sequenced dataset?**

A5) They are stored without respect to the contents of the records and in the order in which they are included in the file.

**Q3) What is a CI, control interval?**

A3) A control interval is the unit of information that VSAM transfers between virtual and auxiliary storage.

**Q4) What are the distinctive features of a ksds, key sequenced dataset?**

A4) The index and the distributed free space.

**Q5) What is a CA, control area?**

A5) A group of control intervals makes up a control area.

**Q6) What is a sequence set?**

A6) This is the part of the index that points to the CA and CI of the record being accessed.

**Q7) What is the index set?**

A7) This is the other part of the index. It has multiple levels with pointers that ultimately reach to the sequence set.

**Q8) What is a cluster?**

A8) A cluster is the combination of the index, sequence set and data portions of the dataset. The operating system gives program access to the cluster, ie. to all parts of the dataset simultaneously.

**Q9) What is the catalog?**

Q9) The catalog contains the names of all datasets, VSAM and non-VSAM. It is used to access these datasets.

**Q10) What is an alternate index?**

Q10) An AIX is a file that allows access to a VSAM dataset by a key other than the primary one.

**Q11) What is a path?**

Q11) A path is a file that allows you to access a file by alternate index - the path provides an association between the AIX and the base cluster.

**Q12) What is the upgrade set?**

Q12) The upgrade set is the list of all AIXes that VSAM must maintain for a specific base cluster, so that when data in the base cluster is updated, the AIX files are also updated.

**Q13) What is free space?**

Q13) Free space is reserved within the data component of a KSDS to accommodate inserting new records.

**Q14) What is a VSAM split?**

Q14) If there isn't enough space in the control interval VSAM performs a control interval split by moving some records to the free control intervals. If there isn't a free control interval VSAM performs a control area split by allocating a new control area and moving half of the control intervals to it.

**Q15) What is the base cluster?**

Q15) The base cluster consists of the data component and the index component for the primary index of a KSDS.

**Q16) Do primary key values have to be unique? Do alternate key values have to be unique?**

Q16) Primary key values must be unique; alternate key values need not be.

**Q17) In the COBOL SELECT statement what is the ORGANIZATION for a KSDS?**

Q17) The ORGANIZATION is INDEXED.

**Q18) In the COBOL SELECT statement for a KSDS what are the three possibilities for ACCESS?**

Q18) ACCESS can be SEQUENTIAL, RANDOM or DYNAMIC.

**Q19) What is the COBOL RECORD KEY clause?**

Q19) The RECORD KEY in the SELECT clause identifies the files primary key as it will be known to the program.

**Q20) What is the purpose of the FILE STATUS clause in the SELECT statement?**

Q20) The FILE STATUS field identifies the field that VSAM uses to provide information about each I/O operation for the file.

**Q21) If you wish to use the REWRITE command how must the VSAM file be opened?**

Q21) It must be opened as I/O.

**Q22) Explain the meaning and syntax for the START command.**

Q22) The START command is used read other than the next VSAM record. A value must be moved into the RECORD KEY. The KEY clause is optional, but it can be used to specify a relational (equal, less than, etc.) operator.

**Q23) What is the meaning of dynamic processing?**

Q23) It's rarely used. It means one program uses both sequential and random processing for a VSAM KSDS file.

**Q24) Name some common VSAM error conditions and codes.**

Q24) They are end of file (10), duplicate key (22), record not found (23), VSAM logic error (90), open problem (92) and space problem (93).

**Q25) What is the VSAM-code field?**

Q25) It is a COBOL II enhancement to VSAM batch processing expanding the FILE STATUS field. It is defined in WORKING-STORAGE as a six byte group item with three two byte elements, the normal return code, the function code and the feedback code.

**Q26) What is a VSAM slot?**

Q26) A relative record dataset (RRDS) consists of a specified number of areas called slots. Each slot is identified by a relative record number (RRN) which indicates its relative position in the file.

**Q27) What is the utility program closely associated with VSAM?**

Q27) IDCAMS, the access method services utility.

**Q28) There are at least seven IDCAMS commands; name and explain each of them ?.**

Q28) ALTER modifies information for a catalog, alternate index, cluster or path. BLDINDEX builds the alternate index, of course. DEFINE is used for ALTERNATEINDEX, CLUSTER or PATH. DELETE removes the catalog entry for a catalog, cluster, alternate index or path. LISTCAT lists information about the dataset. PRINT prints the dataset contents. REPRO copies records from one file to another.

**Q29) What are the three levels of definition for the VSAM DEFINE?**

Q29) They are DEFINE CLUSTER, DATA and INDEX.

**Q30) What is the significance of the SHAREOPTIONS parameter?**

Q30) It specifies how the file may be shared between jobs and between batch and CICS environments.

**Q31) What is the meaning of the DEFINE MODEL parameter?**

Q31) It specifies whether Daniela Pestova or Yamila - oops! Wrong models! The MODEL parameter allows you to model your cluster by modeling it after an existing cluster.

**Q32) What is File Status in VSAM?**

Q32) The FILE STATUS clause of the FILE-CONTROL paragraph allows for each file to be associated with a file status key (i.e., the 2-character data item specified in the FILE STATUS clause). If the FILE STATUS clause is specified for a given file, a value indicating the status of each I/O operation against that file is placed in the associated file status key. This value is stored in the file status key as soon as the I/O operation is completed (and before execution of any EXCEPTION/ERROR declarative or INVALIDKEY/AT END phrase associated with the I/O request).

Note: This element may behave differently when the CMPR2 compiler option is used. The file status key is divided

into two status keys: the first character is known as file status key 1; the second character is file status key 2.

**Q33) What's a LDS (Linear Data Set) and what's it used for?**

Q33) LDS is a VSAM dataset in name only. It has unstructured 4k (4096 bytes) fixed size CI's which do not contain control fields and therefore from VSAM's standpoint they do not contain any logical records. There is no free space, and no access from Cobol. Can be accessed by DB2 and IMS fast path datasets. LDS is essentially a table of data maintained on disk. The 'table entries' must be created via a user program and can only be logically accessed via a user program. When passed, the entire LDS must be mapped into storage, and then data is accessed via base and displacement type processing.

**Q34) What is IDCAMS ?**

Q34) IDCAMS is the Access Method Services program. You run the IDCAMS program and supply AMS commands thru SYSIN. (examples of AMS commands are DELETE, DEFINE, REPRO etc..).

**Q35) Can AMS commands be run from the TSO prompt ?**

Q35) Yes

**Q36) Syntax of AMS modal commands ?**

Q36) Note: these can be used only under IDCAMS and not from the TSO prompt.

IF LASTCC(or MAXCC) >(or <,<= etc..) value -

THEN -

DO -

command set (such as DELETE, DEFINE etc..)

ELSE -

DO -

command set

LASTCC - Condition code from the last function (such as delete) executed

MAXCC - Max condition code that was returned by any of the prev functions

SET is also a valid AMS command. SET LASTCC (or MAXCC) = value

The maximum condition code is 16. A cond code of 4 indicates a warning. A cond code of 8 is usually encountered on a DELETE of a dataset that is not present.

**Q37) Under IDCAMS , multiple functions can be executed, each of which returns a cond code. What will be the condition code returned to the operating system ?**

Q37) The maximum condition code generated is returned as the condition code of the IDCAMS step.

**Q38) What is Control Interval, Control Area?**

Q38) **Control Interval** is analogous to a physical block for QSAM files. It is the unit of I/O. Must be between 512 bytes to 32 k. Usually either 2K or 4K. A larger control interval increases performance for sequential processing while the reverse is true for random access. Under CICS when a record is locked, the entire CI gets locked.

**Control Area** is a group of control intervals. CA is used during allocation. CA size is calculated based on the allocation type (cyl, tracks or records) and can be max of 1 cylinder

**Q39) What is FREESPACE ?**

Q39) Coded in the DEFINE as FREESPACE(ci ca) where ci is the percentage of each control interval to be left free for insertions, ca is the percentage of control intervals in each control area to be left empty.

**Q40) How do you decide on optimum values for CI, FREESPACE etc...?**

Q40) CI size should be based on record length, type of processing. Usually CI is 4K. If record length is larger(>1K), chose 6K or 8K. FREESPACE should be large if more number of insertions are envisaged. Usual values are (20 20) when heavy updates are expected. CI size can be calculated.

**Q41) Would you specify FREESPACE for an ESDS?**

Q41) No. Because you cannot insert records in an ESDS, also when you rewrite a record, it must be of the same length. Thus putting any value for freespace does not make any sense.

**Q42) What is SHAREOPTS ?**

Q42) SHAREOPTS is a parameter in the DEFINE and specifies how an object can be shared among users. It is coded as SHAREOPTS(a b), where a is the cross region share option ie how two or more jobs on a single system can share the file, while b is the cross system share option ie how two or more jobs on different MVS's can share the file. Usual value is (2 3).

**Q43) What is the meaning of each of the values in SHAREOPTS(2 3)?**

Q43) Value of 2 for cross region means that the file can be processed simultaneously by multiple users provided only one of them is an updater. Value of 3 for cross system means that any number of jobs can process the file for input or output (VSAM does nothing to ensure integrity).

**Q44) How do you define a KSDS ?**

Q44) DEFINE CLUSTER(cluster name) with the INDEXED parameter. Also specify the ds name for the DATA component & the ds INDEX component. Other important parms are RECORDSIZE, KEYS, SHAREOPTIONS.

**Q45) How do you define an ALTINDX ? How do you use ALTINDXs in batch, CICS pgm's ?**

Q45) DEFINE ALTERNATEINDEX. Important paramters are RELATE where you specify the base cluster name, KEYS, RECORDSIZE,SHAREOPTIONS,UNIQUEKEY(or NONUNIQUEKEY), DATA(ds name for the data component), INDEX(ds name for the index component). Then DEFINE PATH. Important paramters are NAME (ds name for the path), PATHENTRY (ds name of the alternate index name), UPDATE(or NOUPDATE) which specifies whether an alt index is updated when a update to the base cluster takes place. Then BLDINDEX. Parameters are INDATASET(ds name of base cluster), OUTDATASET(ds name of AIX).

**Q46) Using Alternate Indexes in Batch pgms:**

Q46) In the JCL, you must have DD stmts for the cluster and for the path(s). In the COBOL Program, SELECT .. ASSIGN TO ddname for base cluster RECORD KEY IS... ALTERNATE RECORD KEY IS..

**Q47) Using Alternate Indexes in CICS pgms:**

Q47) FCT entries must be created for both base cluster & the path. To read using the alternate index, use the dd name of the path in CICS file control commands.

**Q48) What happens when you open an empty VSAM file in a COBOL program for input?**

Q48) A VSAM file that has never contained a record is treated as unavailable. Attempting to open for input will fail. An empty file can be opened for output only. When you open for output, COBOL will write a dummy record to the file & then delete it out.

**Q49) How do you initialize a VSAM file before any operation? a VSAM with alternate index?**

Q49) Can write a dummy program that just opens the file for output and then closes it.

**Q50) What does a file status of 02 on a VSAM indicate?**

Q50) Duplicate alternate key . Happens on both input and output operation

**Q51) How do you calculate record size of an alternate cluster? Give your values for both unique and nonunique.**

Q51) Unique Case:  $5 + (\text{alt-key-length} + \text{primary-key})$

Non unique Case:  $5 + (\text{alt-key-length} + n * \text{primary-key})$  where n = number of duplicate records for the alternate key

**Q52) What is the difference between sequential files and ESDS files?**

Q52) Sequential (QSAM) files can be created on tape while ESDS files cannot. Also, you can have ALTINDEX for an ESDS while no such facility exists for QSAM files.

**Q53) How do you load a VSAM data set with records ?**

Q53) Using the REPRO command.

**Q54) How do you define a GDG ?**

Q54) Use the DEFINE GENERATIONDATAGROUP command. In the same IDCAMS step, another dataset must be defined whose DCB parameters are used when new generations of the GDG are created. This dataset is known as the model dataset. The ds name of this model dataset must be the same as that of the GDG, so use a disp of keep rather than catlg and also specify space=(trk,0)

**Q55) Do all versions of the GDG have to be of the same record length ?**

Q55) No, the DCB of the model dataset can be overridden when you allocate new versions.

**Q56) How are different versions of GDG named ?**

Q56) base-file-name.GnnnnV00 where nnnn= generation number (upto 255). nnnn will be 0000 for the 1st generation.

**Q57) Suppose 3 generations of a GDG exist. How would you reference the 1st generation in the JCL? - GS**

Q57) Use GDG name(-2).

**Q58) Suppose a generation of GDG gets created in a particular step of a proc. How would you refer the current generation in a subsequent step? What would be the disposition of this generation now? - GS**

Q58) Relative generation numbers are updated only at the end of the job, not at the end of a step. To allocate a new generation, we would be using (+1) with a DISP of (NEW,CATLG,DELETE). To

refer to this in a subsequent step in the same job, we would again use (+1) but with a DISP of SHR or OLD.

**Q59) What more info you should give in the DD statement while defining the next generation of a GDG? - GS**

Q59) Give (+1) as the generation number, give (new,catlg) for disp, give space parameter, can give the DCB parameter if you want to override the dcb of the model dataset.

**Q60) Assuming that the DEFINE JCL is not available, how do you get info about a VSAM file's organisation?**

Q60) Use the LISTCAT command.

**Q61) During processing of a VSAM file, some system error occurs and it is subsequently unusable . What do you do ?**

Q61) Run VERIFY.

**Q62) How do you fix the problem associated with VSAM out of space condition?**

Q62) Define new VSAM dataset allocated with more space.

Use IDCAMS to REPRO the old VSAM file to new VSAM dataset.

Use IDCAMS to ALTER / rename the old VSAM dataset or se IDCAMS to DELETE the old VSAM dataset.

Use IDCAMS to ALTER / rename the new VSAM dataset to the name of the original VSAM dataset.

**Q63) What is the meaning of VSAM RETURN-CODE 28?**

Q63) Out of space condition is raised.

**Q64) On which datasets You can have ALT INDEX?.**

Q64) only on KSDS and ESDS - not RRDS

**Q65) How many Alternate Indexes you can have on a dataset?**

Q65) 255 - but you must be a nut to have so many ALT Indexes on a dataset!

**Q66) Is it slower if you access a record through ALT INDEX as compared to Primary INDEX?**

Q66) Yes. Why? Because the alternate key would first locate the primary key, which in turn locates the actual record. Needs twice the number of I/Os.

**Q67) What is RECOVERY and SPEED parameters in DEFINE CLUSTER command?**

Q67) RECOVERY (default) and SPEED are mutually exclusive. Recovery preformats the control areas during the initial dataset load, if the job fails, you can restart but you must have a recovery routine already written to restart the job. SPEED does not preformat the CAs. It is recommended that you specify SPEED to speed up your initial data load.

**Q68) Describe SHAREOPTIONS parameter (SHR) in Define Cluster command.**

Q68) It defines the cross-region and cross-system sharing capabilities of the dataset. Syntax is SHR(Crvalue, CSvalue) value 1 means multiple read OR single write (read integrity) 2 means multiple read AND single write (Write integrity) 3 means Multiple read AND multiple write 4 is same as 3, which refreshes the buffer with every random access. default is SHR(1 3).

**Q69) What does the KEYRANGES parameter in Define Cluster command do?**

A69) It divides a large dataset into several volumes according to the Key ranges specified. e.g., KEYRANGES ((0000001 2999999) (3000000 5999999)). if the activity on the key ranges are evenly distributed, concurrent access is possible, which is a performance improvement.

**Q70) What are the optional parameters to the input dataset While loading the empty cluster with the data records?**

A70) 1)FROMADDRESS(address) 2)TOADDRESS(address) where 'address' specifies the RBA value of the key of the input record. 3)FROMNUMBER(rrn) 4)TONUMBER(rrn) where 'rrn' specifies the relative record number of the RRDS record 5)FROMKEY(key) 6)TOKEY(key) where 'key' specifies the key of the input record 7)SKIP(number) 8)COUNT(number) where 'number' specifies the number of records to skip or copy Ex: REPRO INFILE(DD1) OUTFILE(DD2) SKIP(9000) COUNT(700) - Skips the first 9000 records and begins copying at 9001 and copies 700 records from DD1 to DD2.

**Q71) What is IDCAMS? and what is the purpose of it?.**

A71) IDCAMS is an access method services utility used for creating, deleting, altering VSAM files and copying sequential file to a VSAM file, etc.

**Q72) How to delete a member using JCL.**

A72) Using IDCAMS a member can be deleted. DELETE 'XXX.YYY(member)

**Q73) What is the Difference between LDS & ESDS ?**

A73) These two datasets are VSAM datasets. ESDS maintains control information. But LDS does not maintains the control information.

**Q74) Is a delete operation possible in an ESDS?B. Is rewrite operation possible in ESDS ?**

A74) No delete operation is not possible in VSAM ESDS.B. Yes rewrite operation is possible in an ESDS.

**Q75) What is an alternate index and path ?**

A75) An alternate index is an another way of accessing key sequenced data record stored in a base cluster and path is the linkage which connect alternate index to its base cluster.

**Q76) How many buffers are allotted to VSAM KSDS and ESDS?**

A76) 2 data buffers by default for ESDS. For KSDS it allots 2 data buffers and 1 index buffers. each buffer is about 4k.

**Q77) what's the biggest disadvantage of using a VSAM dataset?**

A77) FREE SPACE(FPSC)

**Q78) what's the device independent method to indicate where a Record is Stored?**

A78) By USING RBA(Relative Byte Address).

**Q79) How many times secondary space allocated?**

A79) 122 TIMES

**Q80) what is the RRN for the first record in RRDS?**

A80) The answer is : 1

**Q81) what is a Base Cluster?**

A81) The Index and data components of a KSDS

**Q82) If FSPC(100 100) is specified does it mean that both the control interval and control area will be left empty because 100 % of both CI and ca are specified to be empty?**

A82) No, they would not be left empty. one record will be written in each CI and 1 CI will be written for each ca.

## **SECTION 1**

**Fill in the blanks:**

1. A **logical record** is a unit of information used to store data in a VSAM data set.
2. A **CI** is a unit of information that VSAM transfers between virtual storage and disk storage.
3. The minimum size of a CI is **512 bytes**.
4. 512 bytes is the **minimum** size of a CI.
5. The maximum size of a CI is **32K**.
6. A CI consists of **Logical Records**, **Free Space** and **Control Information**.
7. A Control Interval Definition Field (CIDF) is of **4 Bytes** long.
8. A Record Definition Field (RDF) is of **3 Bytes** long.
9. In a CI if two or more adjacent records have the same length, only **two RDF's** are used.
10. The minimum size of a CA is **1 track**.
11. 1 track is the **minimum** size of a CA.
12. The maximum size of a CA is **1 cylinder**.
13. 1 cylinder is the **maximum** size of a CA.
14. LDS is VSAM data set with a CI size of **4096Bytes**.
15. **LDS** has no imbedded control information in its CI.
16. LDS has only a **data component**.
17. **LDS** cannot have an alternate index.
18. **RRDS** consists of a number of preformatted fixed-length slots.
19. RRDS has only a **data component**.
20. For an RRDS the **relative record number** is used as a search argument.
21. **RRDS** supports only fixed length records.
22. ESDS has only a **data component**.
23. Spanned records must be accessed in **MOVE** mode.
24. **Alternate Index** is a special type of KSDS.
25. The Master Catalog (MCAT) is identified at **IPL**.
26. The **Master Catalog (MCAT)** contains pointers to system data sets and user catalogs.
27. **VTOC (Volume Table Of Contents)** describes the type and location of data sets on the volume.
28. VTOC (Volume Table Of Contents) is a **data set** created at volume initialization.
29. **JOBCAT** identifies a default catalog for an entire job.
30. **STPCAT** identifies a default catalog for a single job step.
31. The two types of AMS commands are **functional commands** and **modal commands**.
32. **INDEXED** is the default cluster type.
33. **4089** is the default maximum record length.
34. One cluster can have a maximum of **123** extents for all volumes together.
35. **Record Size** cannot be coded for LDS.
36. **INDEX** information appears on a LISTCAT listing for KSDS.
37. A **Data Class** is a description of data set characteristics under control of SMS.
38. **JCL parameters** override the specifications from a Data Class.
39. The names and contents of the Data Classes can be displayed through **ISMF**.
40. **REPRO** provides an easy to use copy utility.
41. **REPRO** copies or merges an alternate index as a KSDS.
42. **REPRO** converts a sequential or indexed-sequential data set into a VSAM data set.
43. The PRINT command prints **VSAM data sets**, **non-VSAM data sets** and **catalogs**.
44. The default print format for output is **DUMP**.
45. If a KSDS cluster with name BMDUSER.KSDS1 is created, the default data component name would be **BMDUSER.KSDS1.DATA**.
46. **ALTER** modifies the cataloged attributes of a VSAM data set.
47. ALTER can be used to change an ESDS into an **LDS**.
48. An **LDS** cannot be changed to any other VSAM data set format.
49. IMBED and REPLICATE options are applicable to **KSDS** cluster.
50. Parameters specified in the **JCL** override the appropriate parameters specified in the Data Class.
51. VSAM clusters can be accessed in **Sequential**, **Direct** and **Skip sequential**.
52. VSAM data can be processed by **Logical Record** or by **Control Interval** access.

53. After software-end-of-file is written, the file is in **Recovery** mode.
54. VERIFY cannot be used for an **Empty Dataset** or an **LDS** .
55. Password verification is done during **OPEN** processing.
56. **Strings** allow concurrent positioning within a data set. ()
57. The minimum buffer space for a cluster is **STRNO** index buffers and **STRNO+1** data buffers.
58. The default buffer space for a cluster is **STRNO** index buffers and **STRNO+1** data buffers.
59. Sequential processing is overlapped when at least **STRNO+3** data buffers are allocated.
60. For **Sequential** processing, larger data CI sizes are desirable.
61. For **Random** or **Direct** processing, smaller data CIs are desirable.
62. **Free Space** is used to reduce the number of CI and CA splits.
63. ICI access cannot be used to **Load** or **Extend** a data set.
64. Space allocations made in RECORDs are converted to **TRKS** by VSAM. ()
65. Key compression applies to the **Index** component.
66. An alternate index cannot be defined for an **RRDS** or **LDS** .
67. Each AIX data record contains **System Header Information**, the **Alternate Key**, and **Pointer** to the data set.
68. A Path **Path** provides a way to gain access to the base data through its AIX.
69. **Base Cluster** must not be empty for BLDINDEX.
70. Length of the alternate keys must not exceed **255** .
71. Records larger than **32760** cause REPRO to terminate.
72. When exporting a data set, we specify **TEMPORARY** to preserve the original data set.

## SECTION 2

### State whether True or False:

1. All VSAM data sets reside on DASD devices. (T)
2. Whenever a record is retrieved from DASD, the entire CA containing it is read into VSAM buffer. (F)
3. A LDS has no control information embedded in its CIs. (T)
4. In an RRDS, the position of a data record can be changed. (F)
5. Records from an ESDS can either be accessed sequentially or by RBA. (T)
6. Deletions and updating of records is possible in ESDS. (F)
7. Spanned records can only be used in ESDS or KSDS. (T)
8. Spanned records are records larger than CA size. (F)
9. A CI that contains the record segment of a spanned record contains no other data. (T)
10. Spanned records must be accessed in LOCATE mode. (F)
11. A KSDS has both data and index components. (T)
12. A newly inserted record is always added at the end of a KSDS. (F)
13. A new index entry is inserted in the sequence set record corresponding to a CI split. (T)
14. IMBED places the sequence set CI for a data control area within the control area. (T)
15. VSAM control intervals containing data records have at least one RDF and one CIDF. (T)
16. Control area sizes vary by device type. (F)
17. Control interval sizes vary by device type. (T)
18. For a KSDS, the larger the data CA size, the smaller the number of index CIs. (F)
19. We cannot access variable-length blocked records in VSAM. (F)
20. MCAT contains pointers to system data sets and user catalogs. (T)
21. While creating VSAM data sets, provision of component names is a must. (F)
22. JOBCAT identifies a default catalog for a single job step. (F)
23. There is a one-to-one correspondence between BCSs and VVDSs. (F)
24. The need for JOBCAT/STPCAT statements has been replaced by the ALIAS. (T)
25. Aliases are limited to the first segment of the component name. (F)
26. The cluster name is required when defining VSAM cluster using DEFINE CLUSTER command. (T)

27. Any parameters in coded for the cluster in DEFINE CLUSTER will also apply to the data and index components. (T)
28. If the space allocation is coded at cluster level in DEFINE CLUSTER, the space is divided between data and index. (T)
29. If the specified CISZ is not valid in DEFINE CLUSTER, VSAM increases the number to the next valid CISZ. (T)
30. All the parameters for LISTCAT command are required. (F)
31. A data component name will be generated by AMS if it is not explicitly coded. (T)
32. DEFINE CLUSTER for a KSDS will generate cluster, data and index information even if only cluster information is specified. (T)
33. The candidate volume is not used when data set is initially loaded. (T)
34. Suppose TEST.DATASET is a KSDS. The following statement will print cluster information only:
35. LISTCAT ENTRIES (TEST.DATASET) ALL (F)
36. REPRO copies or merges an alternate index as an ESDS. (F)
37. A PRINT command prints only VSAM data sets. (F)
38. A KSDS can be printed only in key order. (F)
39. A RRDS is printed in relative record number sequence. (T)
40. The default print format is CHARACTER. (F)
41. Generic keys can be specified in PRINT FROMKEY and TOKEY. (T)
42. REPRO will stop processing records when a total of four physical I/O errors occur while writing to the output data set. (F)
43. REPRO REUSE against a non-empty target data set defined with NOREUSE will reset the target data set. (F)
44. In altering a KSDS, BUFND and BUFNI can be specified instead of BUFFERSPACE.(F)
45. ALTER REMOVEVOLUMES will not remove the volume if the data set currently has data on the volume. (T)
46. ALTER can be used to change ESDS to LDS. (T)
47. ALTER NULLIFY can be used to nullify all passwords, except the master. (F)
48. ALTER modifies the cataloged attributes of a VSAM data set. (T)
49. Generic names can be used to rename a group of objects or to alter an attribute of a group of objects. (T)
50. Data Class specifications override the appropriate JCL parameters. (F)
51. Not all attributes can be specified through JCL. (T)
52. VSAM data can be read by logical record or by control interval access. (T)
53. OPEN causes VSAM to verify that the processing options match the cluster type. (T)
54. COBOL does not support skip-sequential processing. (T)
55. COBOL supports RBA addressing and backward processing. (F)
56. VS COBOL II supports skip-processing. (F)
57. Non-spanned records may be accessed in either MOVE or LOCATE mode. (T)
58. The ISAM interface program allows VSAM programs to access ISAM data sets. (F)
59. Cross system sharing is either between multiple systems or multiple virtual machines.(T)
60. Software end-of-file is a CI containing all zeroes excluding CIDF. (F)
61. VERIFY can be used for empty data sets. (F)
62. Catalog password protection is required for data set password checking. (T)
63. To ensure read integrity the application program must code ENQ/DEQ. (T)
64. For a data set with SHAREOPTIONS(4 3), CA splits are not allowed. (F)
65. The default for DELETE CLUSTER is NOERASE. (T)
66. If a cluster has VSAM password protection, the cluster MUST have a master password. (T)
67. The high-level index set record is maintained in the buffer if more than one index buffer (per string ) is provided. (T)
68. VSAM allocates index buffers for all cluster types, even if the buffers are never used.(T)
69. BUFND and BUFNI are preferable to BUFFERSPACE. (T)
70. STRNO is used for sharing data sets across regions. (T)
71. Data buffers and control blocks are allocated below 16M by default. (T)

72. Large control intervals decrease virtual storage requirement for buffers. (F)
73. Buffer space specified at ACB overrides the defined value, if the ACB value is more. (F)
74. The default for DEFINE CLUSTER is ERASE. (F)
75. A large percentage of unused CI free space causes additional I/Os when accessing the data set sequentially. (T) Sequential processing does not use CI free space beyond the free space threshold. (T)
76. The larger the free space, the more are the levels of index. (T)
77. Improved CI (ICI) access is available for logical record processing as well as CNV processing. (F)
78. Processing a large data set with multiple extents in DIR mode performs approximately as well as processing a large single extent data set in DIR mode. (F)
79. IMBED replicates the sequence set CI associated with a data CA on the first track of data CA.
80. REPLICATE imbeds the index set within the data component. (F)
81. In a multiple volume data set the first allocation of space on a volume is always a primary allocation. (T)
82. Index key compression can be suppressed with the NOCOMPRESS parameter. (F)
83. For sequential processing larger data CIs are desirable. (T)
84. Key compression applies to the keys of both index and data components. (F)
85. Multiple alternate indexes may be defined over a base cluster. (T)
86. Alternate indexes are spanned record data sets. (T)
87. The size of an alternate index is about the same size of its base cluster. (F)
88. AIX records may be longer than specified in the DEFINE AIX maximum record size. (T)
89. A path is required so that an application program can specify base cluster keys and retrieve alternate index records. (T)
90. Base cluster must be empty for BLDINDEX. (F)
91. Upgrade is done only for non-empty alternate indexes. (T)
92. After reorganizing a KSDS, the physical sequence of data is same as the logical sequence of data. (T)
93. Index component is however not reconstructed, after the reorganization of a KSDS. (F)
94. EXPORT extracts catalog information and creates a copy of the data records. (T)
95. Records larger than 32760 cause EXPORT in CIMODE to terminate with an error. (F)
96. CIMODE is the default for EXPORT of an LDS. (T)
97. The base cluster must be imported before the alternate indexes. (T)
98. The base cluster must be exported before the alternate indexes (F)
99. DFDSS can be used to reorganize a KSDS. (T)
100. If the HIGH-USED-RBA of the IMPORT OUTDATASET parameter is zero, then VSAM deletes and redefines the OUTDATASET before the IMPORT operation. (F)
101. ISMF can be used to create a DFHSM batch job stream. (T)
102. Data Set List line operator commands may effect more than one data set. (T)

### **SECTION 3**

**Choose the correct answer:**

- 1) Which VSAM clusters support only fixed length records? (b)
- LDS
  - RRDS
  - ESDS
  - KSDS
- 2) FREESPACE can be specified for which type of cluster? (d)
- LDS
  - RRDS

- c) ESDS  
d) KSDS
- 3) In which cluster type are records added at the end of the data set? (c)  
a) LDS  
b) RRDS  
c) ESDS  
d) KSDS
- 4) The types of processing supported by RRDS are (e)  
a) sequential  
b) skip-sequential  
c) direct  
d) a and b  
e) a, b and c
- 5) The types of processing supported by ESDS are (d)  
a) sequential  
b) skip-sequential  
c) direct  
d) a and b  
e) a and c
- 6) Spanned records can be found in (d)  
a) ESDS  
b) KSDS  
c) RRDS  
d) a or b  
e) a or c
- 7) Spanned records can be accessed in (a)  
a) MOVE  
b) LOCATE  
c) a and b  
d) None
- 8) Alternate Index is a special type of (a)  
a) KSDS  
b) ESDS  
c) RRDS  
d) None
- 9) Specifying CISZ(4096) at the cluster level for a KSDS results in (c)  
a) VSAM ignoring the specification  
b) Data and index CISZ 4k each  
c) Data CISZ 4k; index CISZ selected by VSAM  
d) Index CISZ 4K; data CISZ selected by VSAM
- 10) When defining a KSDS, which of the following parameters is not required? (b)  
a) Space allocation (either CYL, REC or TRK)  
b) VOLUMES  
c) KEYS  
d) NAME
- 11) Default RECORD SIZE for a NONSPANNED data set is (d)

- a) (80 80)
  - b) (4086 32600)
  - c) (100 32600)
  - d) (4089 4089)
- 12) If the key of a KSDS record begins in the second field (first field is 25 bytes long), the offset in the KEYS parameter is (a)
- a) 24
  - b) 25
  - c) 26
  - d) None
- 13) Data organization in KSDS is (a)
- a) INDEXED
  - b) NUMBERED
  - c) LINEAR
  - d) NONINDEXED
- 14) The default cluster type is (d)
- a) ESDS
  - b) RRDS
  - c) LDS
  - d) KSDS
- 15) VOLUMES parameter can be specified at (c)
- a) cluster level
  - b) data level and index level
  - c) All the above
  - d) None
- 16) The RECORDSIZE parameter cannot be coded for (c)
- a) ESDS
  - b) RRDS
  - c) LDS
  - d) KSDS
- 17) The default PRINT format is (b)
- a) Character
  - b) Dump
  - c) Hexadecimal
  - d) None
- 18) Which of the following REPRO selection parameters can be specified for an LDS? (e)
- a) FROMKEY
  - b) FROMADDRESS
  - c) FROMNUMBER
  - d) SKIP
  - e) None
- 19) The REPLACE parameter causes (c)
- a) KSDS records to be replaced by an input record with the same key
  - b) ESDS records to be replaced by an input record with the same RBA
  - c) RRDS records to be replaced by an input record with the same RRN
  - d) a and c
  - e) All the above

- 20) Which of the following is not a modal command? (e)
- a) IF
  - b) THEN
  - c) ELSE
  - d) DO
  - e) GOTO
- 21) Using REPRO to reorganize a KSDS, which of the following is true? (e)
- a) Input must be ascending key sequence.
  - b) No duplicate keys are allowed.
  - c) Non-unique keys are allowed.
  - d) a and c
  - e) a and b
- 22) Which of the following entry names are valid for ALTER FREESPACE? (b)
- a) Cluster name
  - b) Data component name
  - c) Index component name
  - d) b and c
  - e) a, b and c
- 23) Which of the following is a correct generic name specification for TEST.USER.DATA.A? (a)
- a) TEST.USER.\*
  - b) TEST.\*.\*.A
  - c) \*.USER.DATA.A
  - d) TEST.USER.\*.A
- 24) To alter a cluster to an LDS, the cluster must (e)
- a) be an ESDS
  - b) be NONSPANNED
  - c) have a CISZ of 4K
  - d) not have an alternate index associated with it
  - e) all the above
- 25) For which access mode below must the application program interpret RDFs?(b)
- a) KEY
  - b) ADR
  - c) ADR(for a KSDS)
  - d) CNV
  - e) None
- 26) At OPEN, VSAM determines processing options in the following order (d)
- a) JCL, program, catalog
  - b) program, JCL, catalog
  - c) JCL, catalog, program
  - d) catalog, program, JCL
  - e) None
- 27) VSAM request macros (e.g., GET, PUT) point to which other macros? (c)
- a) OPEN
  - b) ACB
  - c) RPL
  - d) CLOSE
  - e) b and c

- f) None
- 28) If a program uses direct processing exclusively, DIR is specified in which macros? (c)
- a) OPEN
  - b) ACB
  - c) RPL
  - d) CLOSE
  - e) b and c
  - f) None
- 29) VSAM processing options could be specified in (e)
- a) Catalog
  - b) Program control blocks
  - c) JCL
  - d) None
  - e) All the above
- 30) Which of the following is not a COBOL verb? (d)
- a) START
  - b) READ
  - c) DELETE
  - d) UPDATE
  - e) REWRITE
- 31) Which of the following is/are not supported by COBOL? (d)
- a) Skip-sequential processing
  - b) RBA addressing
  - c) Replacing existing record
  - d) a and b
  - e) a, b and c
  - f) a and c
- 32) Which is a valid SHAREOPTIONS specification? (b)
- a) SHR(2 2)
  - b) SHR(2 3)
  - c) SHR(4 1)
  - d) SHR(1 2)
  - e) None
- 33) For a data set defined with SPEED, which of the following is true? (a)
- a) SPEED is effective for the initial load only.
  - b) SPEED is effective for all additions to the data set after initial load.
  - c) If the load program ABENDS, VERIFY can determine the HIGH-USED-RBA of the data set.
  - d) If the load program ABENDS, only those records remaining in buffers need to be added to the data set.
  - e) None
- 34) VERIFY cannot be used for (c)
- a) Empty data set
  - b) LDS
  - c) a and b
  - d) None
- 35) For a data set defined with NOERASE, which of the following is not true? (a)
- a) Desirable for sensitive data

- b) Removes catalog entries
  - c) All the above
  - d) None
- 36) Buffer space cannot be specified in which of the following? (d)
- a) DD statement
  - b) Assembler program
  - c) AMS DEFINE
  - d) COBOL program
- 37) How many data buffers are required for sequential processing to overlap I/O processing? (c)
- a) 2
  - b) 3
  - c) 4
  - d) 5
- 38) When defining a KSDS, the best place to specify CISZ is generally (b)
- a) At the cluster level
  - b) At the data level only
  - c) At the index level only
  - d) At both data and index levels
- 39) For direct processing the recommended number of data buffers is (b)
- a) STRNO
  - b) STRNO+1
  - c) STRNO+2
  - d) STRNO+3
  - e) None
- 40) For 3380 DASD, TRK(50 5) results in which CA size for a KSDS defined with NOIMBED? (b)
- a) 1 TRK
  - b) 5 TRKS
  - c) 15 TRKS
  - d) 50 TRKS
  - e) None
- 41) Suppose you are defining a multi-volume data set with VOL(A B) and five key ranges specified. Which of the following correctly indicates where each key range will be located? (c)
- a) First key range on VOL A; second on B; third on A; etc.
  - b) First key range on VOL B; second on A; third on B; etc.
  - c) First key range on VOL A; remaining key ranges on B.
  - d) All key ranges on VOL A; B is used for overflow only.
  - e) All key ranges on VOL B; A is used for overflow only.
- 42) An alternate index can be defined for which cluster type? (b)
- a) KSDS and RRDS
  - b) KSDS and ESDS
  - c) KSDS and LDS
  - d) KSDS only
  - e) KSDS, ESDS and RRDS

- 43) If an application program accesses a base cluster in alternate key sequence, then DD statements are needed for which data sets?  
(f)
- a) Base cluster
  - b) Alternate index
  - c) Path
  - d) a and b
  - e) a and c
  - f) a, b and c
- 44) An alternate index itself is which cluster type?  
(d)
- a) LDS
  - b) RRDS
  - c) ESDS
  - d) KSDS
  - e) None
- 45) Which of the following backs up data in CI mode?  
(b)
- a) REPRO only
  - b) EXPORT only
  - c) Both REPRO and EXPORT
  - d) Neither REPRO nor EXPORT
- 46) Which of the following writes catalog information into the backup data set?  
(b)
- a) REPRO only
  - b) EXPORT only
  - c) Both REPRO and EXPORT
  - d) Neither REPRO nor EXPORT
- 47) Which of the following requires a DELETE/DEFINE before the command can be used to restore an existing data set?  
(a)
- a) REPRO only
  - b) IMPORT only
  - c) Both REPRO and IMPORT
  - d) Neither REPRO nor IMPORT
- 48) With HBACKDS the use of apostrophes to enclose the dsname is  
(b)
- a) Required
  - b) Used to exclude the TSO id as the high level qualifier
  - c) Required only if one or more segments are specified generically
  - d) Not allowed if the data set is password protected

## **SECTION 4**

**Answer the following briefly:**

1. Differentiate between Control Interval and Control Area.
2. How many bytes of control information are there if all records are of the same length? Specify the number of bytes used by RDFs and CIDs.
3. Differentiate between Direct and Sequential processing.
4. What types of data sets are supported by VSAM?
5. What is a cluster?
6. Specify the default action of VSAM if the specified CISZ is not valid in defining the cluster.
7. How are records stored in each type of VSAM data set?
8. What is the function performed by VSAM ALTER?
9. What is the difference between a user catalog and a master catalog?
10. How do you specify the amount of CI to be used?
11. How do you specify the amount of CA available to a file?
12. Explain the need for free space.
13. What does it imply, if FSPC(100 100) is specified in DEFINE CLUSTER command?
14. What is AMS? How are its services invoked?
15. Describe the various levels of password protection.
16. What is the format of SHAREOPTIONS and why is it used?
17. In what manner the VSAM data sets can be shared with SHAREOPTION(2 3)?
18. Mention some of the important types of information that can be obtained from LISTCAT.
19. How can you check the amount of free space available for a data set?
20. How can we obtain the status of a master catalog or a user catalog?
21. What is a VSAM model?
22. What is a reusable data set?
23. What is the function performed by VSAM REPRO?
24. What is the effect of REUSE with REPRO?
25. What is the effect of REPLACE with REPRO?
26. What is the function performed by PRINT?
27. What is a data class?
28. Mention some of the JCL parameters used for VSAM.
29. How can you view the contents of a Data Class?
30. Differentiate between logical record access and control interval access.
31. Differentiate between MOVE mode and LOCATE mode.
32. What happens when a VSAM data set is requested for OPEN?
33. What is AMP and when would you use it?
34. What is IIP and when is it used?
35. Mention some of the COBOL procedure division verbs used for processing a VSAM data set.
36. What are the limitations of COBOL in processing a VSAM data set?
37. How can a VSAM data set be shared within a region?
38. What is the effect of SPEED/RECOVERY with DEFINE CLUSTER?
39. What is the purpose of VERIFY command?
40. What is the effect of ERASE/NOERASE with DELETE CLUSTER?
41. What is an USVR? What are its functions?
42. What is the purpose of free space?
43. What function is performed by IMBED parameter?
44. What function is performed by REPLICATE parameter?
45. What is the purpose of buffer space?
46. Explain the terms front and rear key compressions.
47. Explain the need for an alternate index.
48. What is a PATH?
49. What functions does the UPGRADE option do?

50. What is the function of BLDINDEX?
51. What are the various utilities available for backing up of data and restoring it?
52. Why do we go for reorganizing a KSDS?
53. What are the effects of reorganization of a KSDS?
54. What is control interval ?
55. What is KSDS, ESDS,RRDS ?
56. What is VERIFY on VSAM file ?

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## CICS QA

1. Explain the differences between a Transaction and a Task.

A. Under CICS, a user can't directly invoke a program. Instead, the user invokes a transaction, which in turn specifies the program to be run. When a user invokes a transaction, CICS locates the associated program with the transaction, loads it into storage (if it is not there), and starts a task. Where Task is a unit of work which is scheduled by CICS. The difference between transaction and task is that while several users may invoke the same transaction, each initiates a separate task.

2. Describe the basic differences between batch and online systems.

A. In a Batch processing system, transactions are accumulated into groups, or batches, before they are processed. For example the processing of the Orders collected for the whole day. In an Online processing system the transactions are processed by the system as soon as the transaction is entered on to the system. Ex. Airplane Reservation system. In a batch system the turnaround time is measured in hours and days, while for the On-line system it is measured in micro-seconds and seconds. On an Online system, if there is an error in data, the system indicates it immediately, and can be corrected and reprocessed. Allstate Insurance Co., uses CICS V4.1. on their system.

3. What are the four major types of Online Programs?

A. The menu program. The inquiry program. The file maintenance program. The Data Entry program.

4. Describe the different considerations for the Online programs (CICS).

A. Ease of use. IBM promotes a user interface standard called CUA (common user Access). CUA provides Entry model, Graphical model, and Intermediate model - the text subset of graphical model.

Performance. Performance is a critical consideration for online programs. Performance for online systems is measured in terms of response time. Many factors affect response time. The most critical factors are the total number of programs running within the CICS system, the Disk I/O, the terminal and host computers and network.

File Integrity. A batch program typically has complete control of the files it uses, so there's no chance of another interfering with its processing. In an online system however many terminal users use the system simultaneously, and all must have access to the files they require at the same time.

Security. On batch systems Security implementation is simple as the access to the computer system can be controlled. However in an online system terminals are located at several locations. Logon procedure being used can ensure security to a great extent. Using of multi-level security to allow only certain users to access files and programs based on the logon id helps to secure the system.

5. Describe the most common way a task is started under CICS.

A. By entering the Transaction Identifier on the terminal and pressing Enter Key. When the Trans-id is entered on the CICS screen, it locates the program associated with the trans-id from the PCT. Then the location of the program is determined by CICS by reading the entries in PPT. After the load module is located, it loads it onto the CICS main memory, then task workspace is assigned for CICS own use to execute the task.

The other different ways are by a transaction identifier associated with a terminal for pseudo-conversation, By RETURN command, By START command (Time-driven Automatic Task Initiation), By a DCT entry and TDQ write (Data-driven ATI), and by using 3270 attention identifier key.

6. Distinguish between Multitasking and Multi-threading.

A. Multi-tasking means that the OS allows more than one task to run (be executed) concurrently, regardless of whether the task use the same program or different programs. Multi-threading is the system

environment, where multiple tasks share the same program under the multi-tasking environment. Programs are shared by several tasks, and for each task the program work as if it executes the instructions only for that task.

7. Briefly describe the function of each of the various CICS modules.

A. Terminal Control. It is the interface between the CICS application program and the Operating System's Tele-Communication Access Method (VTAM, TCAM or BTAM). Terminal control lets you send text to and receive text from the terminal that initiated the task. An application program that uses terminal control directly must process complicated strings of control characters and data sent to and received from the terminal.

Basic Mapping Support. To relieve the programmer from building complicated strings of control characters to send data to and receive data from terminals, BMS is used that acts as interface between the program and terminal control. BMS lets you create a map that specifies the format of data as it appears on the terminal display.

File Control. File control acts an interface between the Application program interface and the VSAM files. The application program interface acts as the interface between the file control and application program. When a File control receives a request, it passes on to the appropriate VSAM File, which in turn would manage the data storage.

Program Control. This service manages programs executing within a task as an execution of an application for a particular user. API acts as the interface between the application program and the individual CICS services.

Transient Data Control. It provides the convenient way to use simple sequential files called destinations. Whenever a record is written to a destination it is added to the end. A task reads the first from destination, which gets deleted.

Temporary Storage Control. It provides the simplest method for storing data outside your CICS program's working storage area. Data is stored on TSQ's. If the amount of storage is small it can be stored on main memory else a disk.

Interval Control. This service lets you implement time dependent applications. It provides a method of starting a task that's an alternative to trans-id. It can be used to specify a task to start at a specific time. Storage Control. It allocates storage space to application programs. Since most programs keep all their data in working storage, which is allocated automatically, you will not use storage control commands frequently.

Task Control. It lets you control the execution of tasks. You can use it to suspend your task temporarily to prevent it from taking exclusive control and monopolizing the CICS resources and also take control over TSQ's.

Dump control service provides the transaction dump that shows the content of main storage used by the program. You can also use dump control to create dump at specific points without terminating the program for analysis.

Trace control. It maintains the Trace table that indicates the sequence of CICS operations performed within a task.

Journal Control module provides a standardized method of creating Output files called Journals, which are used to restore files in the event of a system failure.

The different table used by the above mentioned modules are TCT (term\_id), FCT (specify which operations are allowed on the file), PCT(trans-id, programs), DCT, TST, ... PPT, ... JCT, and others are SNT, SRT(sys. recovery).

8. Describe the differences between operation of Pseudo-Conversational and a conversational program.

A. In a conversational mode, the program accomplishes the conversation by simply sending a message to the terminal, and waiting for the user to

respond, and receiving the response from the terminal. The system that sits idle without allowing an other operation while waiting for the data is called a conversational program.

In a Pseudo-Conversational program, a program attempts a conversation with a terminal user, it terminates the task after sending a message with a linkage for the next task. When the user completes the response the next task is automatically initiated. Pseudo-conversational program's uses the CICS resources such as control tables efficiently.

9. Briefly describe the functions of each of the following tables - PCT, PPT, FCT.

A. CICS creates internal control tables mentioned below based on the Resource definitions created by the system programmers. There are two ways a programmer can create a resource definition. By using special assembler macro instruction or by using the Resource definition online (RDO). RDO is even called as CEDA as it is the transaction used to initiate RDO. RDO is used to define the resources needed such as program name, BMS, Trans-id, file info...

Program Control Table - The primary function of the PCT is to register the control information of all CICS transactions. PCT contains a list of valid Trans-id paired with the name of a program CICS will load when the transaction is initiated with that transaction identifier. It identifies priority and security level (RSLC) of transaction.

Processing Program table - The Primary function of PPT is to register all CICS application programs and BMS mapsets. The PPT keeps track of which applications are loaded on the CICS address Space (storage). CICS uses this information to determine whether new copy of the program need to be loaded from Disk or it exists on storage. It contains information such as Location in memory, Library address of the disk and language being used.

File Control Table - The Primary function of FCT is to register the control information of all files, which are used under CICS. FCT contains the name and type of each file and in addition lists the file control operations that are valid for each file. It lists whether the existing records can be read sequentially or randomly, deleted or modified. Others control tables used are TCT to register terminals, DCT, TST, RCT, SIT, SRT and SNT.

10. Describe the basic eight steps of a CICS program development according to Doug Lowe.

Step1: Develop a complete set of program specifications. The minimum the specifications should include program overview, a screen layout for each map being used, a listing of copy members of each file used by the program. Others that are needed are include decision tables, editing rules, ...

Step2: Design the program. Most standard COBOL programs are designed around a basic looping structure that controls the overall program execution. In a pseudo-conversational CICS program there is no basic looping structure, Instead CICS invokes your program whenever there is an interaction with a user. CICS program is to be designed to respond appropriately for each type of user action. Step3: Create the necessary CICS table entries. Before you can test a CICS program, you need to make sure that all of the CICS table entries required to support the program are in place. For most programs the entries need to be added to PPT, PCT and FCT tables.

Step4: Prepare the BMS mapset by coding the assembler language BMS macros. Incidentally many shops use mapset generator.

Step5: Code the program. Coding the CICS programs involves writing of standard COBOL code with special CICS commands to invoke CICS services.

Step6: Compile the program. By either using the Foreground command level translator or a JCL, compile the CICS application program. Under which the CICS commands are commented out and replaced by appropriate calls and move statements during the pre-compile / Translation step. In

addition to translation the CICS commands the translator also inserts other code needed to process the CICS instructions. Now the Cobol Source is compiled and link-edited similar to a standard Cobol program. Under Microfocus Checker is used.

Step7: Test the program under CICS test region. Load and run the program under the test environment and check for the functionality. You can use CEMT, CEDF and CECI transactions during the test cycle.

Step8: Document the Program. After the test runs fine and everything look's Ok create the necessary documentation for the program. Use built-in helps in the program along with necessary comments wherever needed in it.

2 CICS Programming Concepts.

1. Explain the COBOL code used in a CICS program in general. (11)

A. There is no difference between the COBOL and CICS Identification Division, in which Program-Id is mandatory. The Environment division of the CICS-COBOL program needs to be empty, as the Environmental information is controlled by the CICS tables such as FCT. Beginning with VS COBOL II Release3 compiler, one can omit coding of the header also. In the Data Division, File Section is not to be defined. It contains the working storage Section and Linkage Section for all the programs. A field called COMMAREA is defined in Working-Storage Section and DFHCOMMAREA in Linkage section for all the programs. Compiler adds Execute Interface Block (DFHEIB) in Linkage section. The Procedure division is used to code the Program logic, to perform the necessary functionality.

2. Explain the COBOL code used to detect the first execution of a program in a pseudo-conversational session. How do you pass information from one task to other? How do you test the response codes?

A. Evaluate EIBCALEN variable to determine the first execution of a program in a pseudo-conversational session. If it's value is zero then it's the 1st execution of the program. The communication area is a special field, which must be at least of one byte long and is used to pass data from one program execution to the next. The next field defined after the communication area in the working-storage section is the Response field, a full-word binary item (S9(8) comp). This field is used to test the completion status of CICS (READ) command with the option RESP(Response field).

3. What COBOL feature's are not allowed under any compiler version, while coding CICS programs?

A. ACCEPT, DISPLAY, OPEN, CLOSE, READ, WRITE, REWRITE, DELETE, START, SORT, RELEASE, RETURN, EXHIBIT, TRACE, Segmentation features, and Report writer features. The CICS using COBOL II features that are not allowed under the OS/VS COBOL environment are GOBACK, STOP RUN, EXAMINE, STRING, UNSTRING and INSPECT.

4. Explain the purpose of each of the CICS transactions - CESN, CESF, CEMT, CECI and CEDF.

A. CESN - CICS Execution Sign On. Ex. CESN. Ex2. CESN USER=N6SSAGI,PW=SUNIL1.It's used for logging into the CICS System.

CESF - CICS Execution Sign Off. Ex. CESF. EX2. CESF LOGOFF .It's used for Signing off.

CEMT - C E Master Terminal. Ex. CEMT SET PROGRAM=(pgmname),NEWCOPY .It's used for variety of supervisory CICS functions. CEMT transaction can be used to force a new program copy as above. To open or close a dataset as Ex2. CEMT SET DATASET(dataset) {OPEN/CLOSED}.(TSQ).To disable a program or transaction or a program as Ex3. CEMT S PR/TRANSACTION(name) {DISABLED/ENABLED}. And even to cancel a task that is running on another terminal. Ex1 tells CICS that you have updated an application program, so it should read a fresh copy of the program from disk. You should issue this command whenever you recompile a program while CICS is running. Otherwise CICS will continue to use the older version. The two CEMT commands in Ex3. Are very useful when a program error forces a

pseudo-conversational program into a loop. The only catch is you might have to run the CEMT command from another terminal as this terminal gets locked due to the loop.

CECI - C E Command-level Interpreter. You invoke this transaction by typing the trans-id, optionally followed by the CICS command. CECI checks the syntax of the command and displays a panel telling you it is about to execute the command. When you press Enter, CECI executes the command and displays the result. CECI can be used to update the contents of the files. You use CECI often to display maps, read or write VSAM file records and so on. CECI can use its five predefined variables namely &DFHC, &DFHW, &DFHR, &LEN and &DATA. To the right of each variable name is the variable length. The various keys used under CECI transaction are F1-HELP, F2-HEX, F3-END, F4-EIB, F5-VAR, F6-User, F9-Message.

CEDF - CE Diagnostic Facility. It invokes a debugging aid called EDF. When EDF is activated, you can run a program step by step, checking the completion of each CICS command and examine the content of WS as needed. Other CICS supplied transactions used are MAPS,

5. Define Event-Driven Design that is frequently used in CICS to follow pseudo-conversational approach.

Event-driven design forces you to think in terms of events that can trigger the execution of a pseudo-conversational program and the program's Response to each Event. The various steps include Identifying the user input events and then Designing the program's response to each event, and by designing a Structure charts with alternative designs by moving the generalized process into a separate module (para) and numbering the modules.

Basic Mapping Support.

1. What is the importance of MDT in maps? (16)

A. An MDT on, which is a part of the attribute byte, causes data on the screen to be returned to the program when a map is received. MDT's can be turned on by Specifying FSET as part of the attribute of the BMS map, then issuing a SEND which includes the physical map. Do not overlay the BMS map's attributes with the symbolic map attributes on a SEND of map and data. Symbolic map's attributes equal to low values will not overlay the BMS attributes. Ex. ATTRB=(ASKIP,FSET).

Moving a standard attribute, which contains FSET to the Symbolic map's attribute before issuing the SEND which includes the symbolic map, such as MOVE UNPROT-FSET TO MAPFLDA.

Keying data into Unprotected field on the screen. Entering data into a field will turn its MDT On.

2. Describe how to code a Mapset with a sample of BMS Macro instructions.

A.1 (label)12 (opcode)17 (parameters)72PRINTNOGENINQSET1DFHMSDTYPE=&SYSPARM, \*LANG=COBOL, \*MODE=INOUT, \*TERM=3270-

2, \*CTRL=FREEKB, \*STORAGE=AUTO, \*TIOAPEX=YESINQMAP1DFHMDISIZE=(24,80), \*LINE=1, \*COLUMN=1DFHMDFPOS=(1,20), \*LENGTH=16, \*ATTRB=(NORM,PROT), \*COLOR=BLUE, \*INITIAL='CUSTOMER INQUIRY'DFHMDFPOS=(5,1), LENGTH=24, ATTRB=(NORM,PROT), \*COLOR=GREEN, \*INITIAL='Customer Number ... ..'CUSTNODFHMDFPOS=(5,26), \*LENGTH=6, \*ATTRB=(NORM,UNPROT,IC), \*COLOR=TORQUOISE, \*INITIAL='\_\_\_\_\_ 'DFHMDFPOS=(5,33), LENGTH=1, ATTRB=ASKIPDFHMDFPOS=(7,1), LENGTH=24, ATTRB=(NORM,PROT), \*COLOR=GREEN, INITIAL='Name And Address ... ..'NAMEDFHMDFPOS=(7,26), LENGTH=40, COLOR=TORQUOISE, \*ATTRB=(NORM,PROT)ADDRDFHMDFPOS=(9,26), LENGTH=40, COLOR=TORQUOISE, \*ATTRB=(NORM,PROT)MESSAGEDFHMDFPOS=(23,1), LENGTH=79, ATTRB=(BRT,PROT), COLOR=YELLOW\*DFHMDFPOS=(24,1), LENGTH=20, ATTRB=(NORM,PROT), \*COLOR=BLUE, INITIAL='F3=EXIT F12=CANCEL'DFHMDFPOS=(24,79), LENGTH=1, ATTRB=(DRK,PROT,FSET), INITIALIZE=' 'DFHMSDTYPE=FINALENDOther Attributes used with the ATTRB field on the BMS Macro are NUM instead of PROT. The above Macro defines a constant field, an alphanumeric data entry field with ATTRB=UNPROT, An

Alphanumeric Display only field, User message area. A numeric data entry field QTY should have ATTRB=NUM, for a numeric display only field has the ATTRB=(NORM,PROT) with PICOUT='zz,zzz,zz9.99'.

3. Explain the function of Modified Data tag. List the Extended attributes with stress on highlighting.

A. Last bit of the attribute byte indicates MDT. If the user keys in any data into the field, it turns the MDT ON indicating that the data is modified. To save transmission time, 3270 terminal sends a field over the TC line only if the MDT is on. Otherwise, the field value is not transmitted. The extended attributes of a field include extended Color (Red, blue, pink, green, turquoise, yellow, white), extended highlighting (Blinking, Reverse Video, Underline), Validation (Must fill, Must enter, Trigger), and Programmed symbols (Up to six alternative user defined char-sets).

4. What is the special byte described at the end of the Unprotected fields in BMS maps called?

A. The Special byte unnamed fields on a Map are called stopper fields. The others are Unnamed fields (Literal's) are used for Titles, Field identifiers and messages and the Named (variables) Output fields and Named Input fields. There's a stopper field at the end of every named field.

5. Define BMS Map, Mapset, Physical Map, Symbolic map and Map definition macros.

A. BMS Map. The primary objective of Basic Mapping Support system is to free the Application Program from device dependent codes and Format. A screen defined through BMS is called a Map. There are two type of maps. Physical Map: It is the assembly language program, which are created and placed in a load (program) library. It controls the screen alignment plus sending and receiving of constants and data from and to the terminal, and has the terminal information. Symbolic Map: It defines the map fields used to store variable data referenced in a COBOL program. They may be placed by BMS into a Copy library and be added to the Cobol program at the compile time.

Representation of one screen format is called Map. A group of maps, which are link-edited together is called a Mapset. BMS maps are generated by using the following, BMS Macros: DFHMSD - To define the Mapset, DFHMDI - To define a map in a mapset, and DFHMDF - To define a field in map.

6. Describe the Two primary functions of attribute bytes in a 3270 display. What are the three standard attributes?

A. The IBM3270 screen is a field-oriented display. In other words the screen is logically divided into a number of user defined fields. The location and characteristics of the screen fields are determined by special characters called the attribute bytes. The attribute byte takes one position on the screen immediately to the left of the field. The standard attributes used in general are Protection, Intensity and Shift. The Attribute byte Bit positions - 0th-1st bits indicate none. 2nd-3rd bits indicates the protection and shift (If 00-Unprotected Alphanumeric, 01-Unprotected Numeric, 10-Protected Stop and 11-Protected Skip). 4th-5th bits indicate the intensity (00-Normal, 01-Normal, 10-bright, 11-No-display). 6th must always be '0'. 7th bit indicates MDT (0-field has not been modified, 1-field is modified).

7. Describe the DFHMSD, DFHMDI and DFHMDF Macros briefly along with it's options.

A. DFHMSD Macro is used to define the Mapset. The name of the Mapset is the label typed before the macro name. The various parameters used to define the DFHMSD Macro are. TYPE specifies whether a Physical map (=MAP), or Symbolic map (=DSECT), or both (=SYSPARM) need to be generated. TYPE=FINAL indicates the end. LANG specifies the programming language in use (=ASM),(=COBOL),(=PLI). MODE specifies whether the Mapset is for input (=IN), output (=OUT), or both (INOUT). TERM

specifies the terminal type, (=ALL), (=3270), (=3270-1) indicates 3270 model 1 terminal with 40 char lines, (=3270-2) indicates 3270 model 2 terminal with 80. CTRL specifies the control options, the common ones in use are (=FREEKB), (=ALARM). STORAGE=AUTO specifies the symbolic maps will occupy separate storage locations, Otherwise they will overlay the same storage locations, i.e. a redefines clause will be used for symbolic map items. MAPATTS specifies the Physical map extended attributes, COLOR and HILITE are the most common. DSATTS specifies which extended attributes need to be supported by Symbolic maps. EXTATT specifies whether extended attributes are allowed to be specified. =YES indicates that support for all extended attributes should be provided in both physical and symbolic maps, =MAPONLY generate support only for physical maps. TIOAPFX=YES should be specified for all COBOL maps, it generates a 12 byte filler item at the beginning of the symbolic map. DFHMDI Macro is used to define Map's within a Mapset. The label on the DFHMDI macro is the Map's name. The various parameters used with DFHMDI are SIZE=(lines,columns) (usually 24,80) specifies the map size. LINE specifies the starting Line number. COLUMN specifies, starting column number (usually it's 1 as Line). JUSTIFY (left,right,last,first). CTRL specifies the control options to be used similar to DFHMSD as (FREEKB or ALARM).

DFHMDI Macro is used to define Field's within a Map. It may or may not be preceded by a label name to indicate the field name. The various parameters used are POS=(line,column) specifying the position of the field. ATTRB=(BRT/NORM/DRK,PROT/ASKIP/UNPROT,NUM,IC,FSET) specifies the attribute fields, NUM is used to specify the field as numeric and is right justified filled with zeroes, IC specifies the cursor to be located at the start of the data field, while FSET specifies the MDT bit On in the attribute byte of data field. COLOR specifies the color of the field (=Color (Red, blue, pink, green, turquoise, yellow, white)). INITIAL specifies the initial value of the field, during the MAP SEND (= 'literal'). PICIN specifies the input format while PICOUT specifies the output format, usually used with numeric strings (= 'picture-string') ex. (= 'ZZ,ZZZ,Z99.99').

8. Describe the function of each of the Fields generated in the Symbolic map.

A. The Symbolic map is used to send and receive data to and from the screen. When you assemble a Mapset the symbolic maps are created and placed in a COBOL Copy library. Every Symbolic map consists of two 01 levels generated with labels FieldnameI and FieldnameO. These items overlay each other as the FieldnameO redefines FieldnameI. Variables under FieldnameI are used for Input while the other are used for output. The first variable is a filler of 12 bytes long generated because of TIOAPFX=YES parameter of the Mapset. In the 1st 01 level of the symbolic map, for each field macro coded with a label, five data-name's would be created with one-char suffix to the label in addition to the Input field. And Output field in 2nd 01 level. A sample Symbolic map, with a single field is.

```
01 INQMAPI.
02 FILLER PIC X(12). ----- > 1ST Field of the Symbolic map.
02 NAMEI PIC S9(4) COMP.
02 NAMEF PIC X(01).
02 FILLER REDEFINES NAMEF.
03 NAMEA PIC X(01).
02 FILLER PIC X(02) (if ext. Attrib. allowed)
02 NAMEI PIC X(25). ----- > RECEIVE INTO I
01 INQMAPO REDEFINES INQMAPI.
02 FILLER PIC X(12). ----- > 1ST Field of the Symbolic map.
02 FILLER PIC X(03). ----- > SEND FROM O
02 NAMEC X(1). 02 NAMEH X(1)
02 NAMEO PIC X(25). ( || if ext. Attributes. allowed)
```

The variable with suffix 'L' is a binary half word field that contains the length of the data sent to program. Variable with suffix 'F' is a single char field that contains X'80', if the user made a change to the field, but no data was transmitted; otherwise it contains low values. 'F' indicates whether <ERASE EOF> Key is used. Variable with suffix 'A' is a single char field containing the attribute byte of the field for the output operations. Occupies the same storage location as the 'F' field. Variable with suffix 'C' is a single character field that contains the attribute for extended color, generated only if DSATTS=COLOR is specified in DFHMSED Macro. Variable with suffix 'H' is a single character field that contains the attribute for extending highlighting, generated only if DSATTS=HIGHLIGHT is specified in DFHMSED Macro. Variable with Suffix of 'I' indicates the input field while the variable with suffix 'O' indicates the Output field.

9. How do you use extended attributes ?

A. Define EXTATT=YES and the correct terminal type. For CICS V1.7 or later use MAPATT and DSATTS.

10. What are the 3 working storage fields used for every field on the map? What other fields are generated?

A. Length field, Flag Field and Attribute field. In addition Input & Output field are also created. Others are extended Color & Extended Highlighting attributes created only if MAPATT and DSATTS are specified.

11. What are the two outputs created as a result of generation of a Map?

A. The map copybook (symbolic map) saved in copy lib and the load module (making the physical map).

12. How do you protect a field from being overlaid? What is an attribute Byte?

A. Using Protected attribute. The Attribute byte defines the display/transmission of field.

13. Name the Copybook supplied by IBM, with all modifiable attribute bytes that can be used with symbolic maps.  
DFHBMSCA.

14. Describe the Basic function of the following CICS commands. RETURN, XCTL, SEND MAP, RECEIVE MAP, READ and ABEND.

A. RETURN command is used to pass control from program to other or to program being executed to the higher level (CICS to end the session). The Options of RETURN command are TRANSID(name), COMMAREA(data-area), and LENGTH(length of Commarea).

XCTL command is used to transfer control from the current to the program specified through the PROGRAM(program-name) option, Other options that can be specified are COMMAREA and LENGTH. The SEND MAP command is used to send data from the program to the terminal screen by using the various options such as MAP to specify the physical map name, MAPSET for Physical Mapset name, FROM(data-area) for symbolic map definition, MAPONLY/DATAONLY to specify if only Physical or Symbolic maps are to be sent, The ERASE/ERASEAUP to specify if the all data or only the unprotected field data on the screen need to be erased before the map is sent, and finally the CURSOR is used to specify the cursor position.

The RECEIVE MAP command receives input data from the terminal, the options MAP, MAPSET and INTO are used similar to the SEND MAP options, INTO is used instead of from.

The READ command is used to read data from files. The DATASET option is used to specify the filename that needs to be defined in FCT, INTO(data-area) field specifies the data area to be used, RIDFLD(data-area) for a keyed field specifies the key of a record to be read, RRN or RBA when specified, this field is interpreted as Relative Record Number or R Byte Address, the UPDATE option specifies that the program intends to update the file with a subsequent REWRITE or DELETE command.

The ABEND command is used to terminate the program abnormally, If you specify ABCODE(name) the system will generate a storage dump with the

abcode-name to identify it.

15. How do you place the cursor on the particular position on the screen (map)?

A. Define the field with IC in the BMS map. Move -1 to the length attribute of the field and use the CURSOR option without displacement value. (symbolic positioning). Use the CURSOR(nnn) option with SEND MAP, where nnn = (row-1)\*80+(col-1) (physical positioning).

16. What is MDT? What are FSET, FRSET?

A. Modified Data Tag - Bit in the attribute byte indicating modification of field on screen. Changes on Input operation. FSET - is an attribute that sets the MDT On to ensure that the field is transmitted. Happens on an Output operation. FRSET. Resets MDT. Until this happens, field continues to be sent.

17. Do you receive the attribute byte in the symbolic map? When?

A. Yes, On EOF.

18. How do you make your BMS maps case sensitive?

A. Use ASIS option on RECEIVE MAP command ???

19. What is effect on RECEIVE MAP when a PF Key is pressed and when a PA Key s pressed.

A. PF keys wake up (Initiate) the task and transmit modified data, PA keys only wake up (initiate) the task.

Can you use Occurs in a BMS map? If you do, what are the issues related to it's use?

A. Yes. But cannot use group by clause???

How is the storage determined in the symbolic map, If you have multiple maps in a Mapset?

Storage for maps redefine the first. This means largest map has to be the first.

22. What is the meaning of the BMS length of the field = 0 ?

A. Data was not entered in the field

23. Can you simply check length=0 for checking, if a field was modified?

A. No, Not if ERASE EOF was used.

24. What does the BUFFER option in RECEIVE mean?

A. It brings the entire data-stream from the terminal buffer.

What are the different steps you go through too create a BMS executable?  
Assemble to create CSECT and Link

Command Level CICS

1. When you compile a CICS program the (pre-)compiler puts an extra chunk of code. Where does it get included and that is it called? What is its length? (41)

A. DFHEIBLK, DFHCOMMAREA are added in the Linkage section of the program.

2. What is the content of the PPT entry?

A. Length, Source, Use count, Lang, Res count DFHRPL number. With entries of Mapset's and Programs.

3. Explain Handle AID command. What are it's disadvantages over using of EIBAID?

A. HANDLE AID command is used to pass control to various parts of the program based on the Attention Key (pressed by user). It does not detect the AID key by itself, but uses the RECEIVE MAP command, so it is always coded alongside (before) the RECEIVE MAP command. This is a disadvantage, as Receive Map that increase the traffic over the network may not be needed during various situations such as termination of program.

4. How is the Error Processing done in CICS system application programs?

A. Check RESP or EIBRESP after the call or use the HANDLE CONDITION (unstructured) command. The Handle Condition command is to be coded prior to the CICS command used for I/O handling such as RECEIVE MAP (map fail), LINK, XCTL (pgmiderr), READ, WRITE, REWRITE, DELETE, UNLOCK (notopen/duprec/ notfnd).

5. Explain the usage of DFHCOMMAREA in a CICS program.

A. DFHCOMMAREA in the Linkage section is used to pass the data in working storage commarea from one to program to another program. It should be defined with as at least one byte long. As the working storage section is freshly allocated for every execution.

6. Explain Execution Interface Block.

A. EIB is a CICS area that contains information related to the current task, which can be used for debugging the program. The most widely used variables are EIBDATE, EIBTIME, EIBAID, EIBCALEN, EIBCPOSN, EIBRESP, EIBRSRCE (resource), EIBFN (recent CICS command code), EIBTRMID and EIBTRNID.

7. Give a Sample FCT, PPT and PCT entries using the assembler code Macro (not RDO - 'CEDA').

A. DFHFCT TYPE=DATASET, DATASET=CUSTOMAS, ACCMETH=(VSAM, KSDS), \*  
SERVREQ=(ADD, DELETE, UPDATE, BROWSE), RECFORM=(FIXED, BLOCKED)

DFHPPT TYPE=ENTRY, PROGRAM=CUSTINQ1, PGMLANG=COBOL

DFHPPT TYPE=ENTRY, PROGRAM=INQMENU

DFHPCT TYPE=ENTRY, TRANSID=CUST, PROGRAM=CUSTINQ1

8. Explain the notion of Logical levels and Describe the effects of RETURN, XCTL and LINK commands.

A. The CICS Terminal control is at the highest level and is considered to be running at logical level 0. The first Task initiated by entering a Trans-id is considered to be logical level 1, as this is first program stored in the main storage. If a ProgramA from level one calls another ProgramB using a LINK command, the ProgramB is said to be in logical level 2 as both ProgramA and ProgramB are stored in main storage. However if ProgramC is called by using the XCTL command from ProgramA, then ProgramC is said to be logical level 1, as the ProgramA is removed from the main storage after loading ProgramC. The options used with LINK and XCTL commands are PROGRAM, COMMAREA and LENGTH. RETURN command is used to pass control from one logical level to the one above it. A RETURN command at level 1 can have the options TRANSID, COMMAREA, and LENGTH, to initiate a new transaction, once the control is passed to the CICS. The RETURN command at all the other logical levels should be issued with no options.

9. How do you handle the '\_' usually set by Initialize option of field macro, after the Receive Map command.

A. By the COBOL II Inspect verb as: INSPECT <FieldI> REPLACING ALL '\_' BY SPACE.

10. What is purpose of ASSIGN command, explain in brief.

A. ASSIGN command can be used to determine which extended attributes are supported by the terminal. IBM manual documents more than 60 options. The most commonly used options are COLOR(data-area), HIGHLIGHT(data-area), SCRNHHT(data-area) for screen height, and SCRNRWD(data-area) for screen width. The system returns the one-byte field(data-area), set to High-Value (X'FF') if the terminal supports and a low-value, if not or else the length indicating the screen height or width, based on the option used.

5. CICS and Data Base Handling (DB2 / IMS / VSAM Datasets)

1. What are the important tables used in the CICS-DB2 environment. (51)

A. CICS manages it's communication with DB2 with special interface modules called CICS/DB2 Attachment Facility. When a CICS program issues a SQL statement, CICS requests the attachment facility to establish a connection with DB2 called a thread. The information about the CICS transaction and DB2 is entered in Resource Control Table (RCT). The plan information is referenced through the RCT Entries.

2. Explain Deadlock.

A. A Dead lock is a situation that occurs when two tasks are waiting for a resource that the other is holding. UNLOCK can be used to release the lock created by using the UPDATE option, when it is no more needed to be updated.

3. Can you access a QSAM file on CICS? Describe the various CICS

commands used for VSAM handling.

A. No, QSAM files can not be accessed by CICS. The various CICS commands used for file handling are READ, WRITE, REWRITE and DELETE. The various options of READ command are DATASET, INTO, RIDFLD, RRN RBA, LENGTH, UPDATE. The Options of WRITE command are DATASET, FROM, RIDFLD, RRN, RBA, and LENGTH. The options of a REWRITE command are DATASET, FROM, and LENGTH. The options of DELETE command are DATASET, RIDFLD and RRN / RBA. UNLOCK command uses DATASET as the only option. RESP option can be used with all the commands to check the system response, similar to HANDLE CONDITION.

4. What types of Files can be used by CICS. Why?

A. VSAM, ISAM, and BDAM files on disk can be accessed by CICS, as they are all of random access type.

5. What are the various commands used to browse through a dataset?

A. STARTBR, READNEXT, READPREV and RESETBR. The options used are DATASET, RIDFLD, RRN/RBA, GENERIC, and KEYLENGTH for the 3 commands, and INTO, LENGTH for READNEXT and READPREV command, and EQUAL/GTEQ for STARTBR only. RESP can be used with any. ENDBR is used to end the browse operation.

6. Do you have to Handle condition every time to check the status during file handling.

A. No. HANDLE CONDITION is to be coded only at the beginning of the program before the first read command. If you need to change the Handle condition after a few reads or write, use PUSH and POP commands accordingly. If needed a few conditions also can be ignored by using the IGNORE CONDITION command coded before the File handling commands. If Ignore Condition is used, EIBRCODE can be used to check the return condition if needed.

7. What are the possible exceptions occurs during the file browsing process.

A. DSIDERR, ENDFILE, ILLOGIC, INVREQ, IOERR, LENGERR, NOTFND and NOTOPEN.

8. Explain Path related to Alternative index.

CICS allows users to handle VSAM KSDS files with an Alternative Index. A VSAM catalog entry needs called Path, which establishes relationship between the alternate index and it's base cluster, needs to be defined, before one can process the base cluster using an alternative Index. You specify the path name rather than the file name in the Dataset option of the file control commands, when you wish to access the files through Alternative Index.

Explain DB2 Translation process under CICS - COBOL.

During the translation process, the DB2 SQL statements are translated into a form called a Plan, which DB2 can understand immediately. This plan is stored in the DB2 system, with a simple call to the plan left in the COBOL code, during the BIND process. To create a load module with CICS and DB2, the DB2 pre-compilation and translation need to be done, before the CICS translator is run on the CICS-DB2-COBOL program.

COBOL-CICS-DB2 Source Program ---> DB2 Pre-Compiler ---> EXEC SQL statements are commented and replaced by appropriate CALL and MOVE instructions (DB2 Pre-compiled source program) + Database Request Module (DBRM).

The DBRM is used by BIND process to create the PLAN. The DB2 Pre-compiled source listing is processed by CICS translator, which comments the EXEC CICS commands with appropriate CALL and MOVE instructions. The translated source is then Compiled and finally Link-Edited, with other load-modules by including DSNCLI module that provides the interface to CICS-DB2 attachment facility.

Explain the differences in coding a COBOL-DL/I program and a COBOL-CICS-DL/I program.

A. DLIUIB is copied immediately after DFHCOMMAREA in Linkage Section. A PCB pointer need to be declared immediately, followed by the structure

of the PCB. In the Procedure Division, the first reference to the DL/I, should be to Schedule the PSB with a DL/I Call using 'PSB' as the function code, and the last DL/I call is run with 'TERM' as the function code. After the 'PSB ' schedule call, SET ADDRESS of PCB-POINTERS to UIBPCBAL, and SET ADDRESS OF PCB declared in the linkage section to the PCB\_POINTER declared in the Linkage section.

11. Explain CICS Run.

A. CICS is to be initiated as a high priority batch job to be run on the OS. During the Initialization process VSAM or sequential files are opened according to entries in FCT, Terminal environment is established based on TCT entries, Resident programs are loaded into memory, if the programs have resident=yes option set, in PCT. A sample CICS initial batch job is

```
//CICSA JOB 1234,XYZ,CLASS=2 //PROC1 EXEC DFHOLPRD //.
```

12. Explain Mass insert and GENERIC keywords.

A. The MASSINSERT option is used along with the WRITE command, to inform the system to write a bunch of inter-related records at a time. In order to decrease the I/O s with a better utilization of the VSAM CI 's. The GENERIC option is used on file handling commands, when the length of key field is a subset of the whole key along with the LENGTHKEY option.

13. Can you issue SQL COMMIT from a CICS program?

A. Yes.

14. What is the other way of terminating a transaction?

A. EXEC CICS SYNCPOINT. Assuming it is a LUW. This will not end the transaction.

15. What is an ASRA abend ?

A. Any data exception problem SOC7, SOC4 etc.

16. What is an AEY9 abend ?

A. DB2/IDMS Database is not up.

17. What are the situations under which NEWCOPY is required ?

A. When a program has been used in CICS atleast once and then changed and recompiled.

18. What is 2 phase commit? Confirm the answer.

A. It occurs when a programmer Issue's an Exec CICS Syncpoint command. This is called a two phase Commit because CICS will first commit changes to the resources under its control like VSAM files, before DB2 changes are committed. Usually CICS signals DB2 to complete the next phase and release all the locks.

19. What is an AICA abend?

A. Runaway Task.

20. How would you resolve an ASRA abend?

A. In COBOL II start with CEBR, and get the offset/instruction.

21. How do you rollback data written to an ESDS file?

A. Define the file as recoverable. in cases where records have been inserted into the file, you may need to run a batch program to logically delete the inserted records.

22. I have done a STARTBR on a VSAM dataset. Can I do another START BR without doing an ENDBR ?

A. No.

23. When an XCTL is done, does the trans-id change? Is a new task created? Does it cause implicit SYNCPOINT to be issued ?

A. No. No. Yes.

24. What is the DSNCR transaction used for ?

DSNCR is a CICS Abend Code, which specifies that there is a problem in the CICS/DB2 attachment facility. The CLOTCLFG field in the LOT control block contains a hexadecimal describing the abend code, such as no threads...

Temporary Storage and Transient Data Queue's

1. What are the differences between TSQ and a TDQ? (75)

A. (1) In Temporary Storage Queues Data is read randomly, While in Transient Data Queues data must be read sequentially. (2) In a TSQ data

can be read any number of times as it remains in the queue until the entire Queue is deleted. In TDQ data item can be read once only. To reuse the TDQ it must be closed and reopened. (3) Data can be changed in TSQ, but not in TDQ. (4) TSQ can be written to Auxiliary or Main Storage, while TDQ is written to Disk. Temporary storage is a holding place, while Transient data is always associated with destination. The (5) TSQ name is defined dynamically, while a TDQ name need to be defined in the DCT. Note: An application uses TSQ 's to pass info' from task to task, while a TDQ to accumulate records before processing or send data for external use, such as a print operation or other.

2. Explain the commands used for handling Temporary Storage queues under CICS, with their options.

A. The WRITEQ TS command is used to Write data into a TSQ. The Options used are QUEUE(name), FROM(d-area) , LENGTH(value), ITEM(item-value), REWRITE and Main/Auxiliary. The last three are optional. The Item value field is to be defined as S9(4) comp. The READQ TS is used to read the TSQ, its options are QUEUE(name), INTO(data area) ,Length(value), ITEM(item-value)/ NEXT. The Item-value is the number of the TS Record in Q'.

3. If I create a TSQ from one transaction, can I read it from another transaction?

A Yes. As long as they run in the same region.

4. Do you require a table entry for a TSQ? Is there any entry for TSQs in CICS tables?

A. If recovery for the TSQ, is needed. It's entered in TST (Temporary Storage table). Yes in the DFHTST.

5. I have TSQ with 15 items. I want to delete the 10th item. How do I do that?

A. By using the ITEM(10) option with DELETE TS command.

6. What is meant by an Indirect destination?

A. An indirect Destination lets a single TDQ be identified by more than one destination Id. The DCT entry for an indirect destination simply specifies the name of the destination defined elsewhere in it. TYPE=INDIRECT option is used during the DCT entry. Ex. DFHDCT TYPE=INTRA, DESTID=L86P, TRANSID=PRTA, TRIGLVL=1 (results in initiating the PRTA transaction after every single entry into TDQ). Ex2. DFHDCT TYPE=INDIRECT, DESTID=PRT1,INDDEST=L86P. The advantage of indirect destinations is to use them when you have to change the destination Id frequently, there is no need for change and compilation of every program associated with it.

7. Why do use DELETEQ TD command, even though the TDQ is read destructive?

A. Depending on the DCT entry for the destination, the disk space occupied by that record may still be reserved, even though the records are not available. So in order to reclaim this space DELETQ TD command is used.

8. How do you reserve Destinations for Exclusive use under the CICS?

A. CICS does not automatically ensure that only one task writes records to a destination at one time. To control this, CICS provides ENQ and DEQ Task control commands used to make resources serially reusable. ENQ command is specified with RESOURCE (data-area/ DESTID) and LENGTH options to reserve the resource. DEQ is used to release the resource. Even, If the DEQ command is not issued, at the End of the task, the resources are released.

9. What are extra partition & intra partition TDQs?

A. Extra-partition TDQ's are datasets used for communication between CICS and other CICS/Batch regions. Intra-partition TDQ's are queues for communication within CICS region. CICS stores the Intra-partition TDQ in a dataset 'DFHNTRA' on the Disk. Extra-partition TDQ doesn't have to be a disk file, it can reside on any device that's a valid QSAM/VSAM. The DCT entry contains the destination-Id, type of TDQ, Destination, Trigger

level if needed

10. How do you fire a batch job from a CICS transaction ?

A. Define an extra-partition TDQ as an internal reader and write the JCL to it. Terminate the JCL with /\*EOF.

11. What is ATI? What kind of TDQ can be used? What is trigger level in the context of TDQs?

A. ATI is an acronym for Automatic Task Initiation. It's used only with Intra partition TDQ 's by specifying the number of records at which ATI occurs is called the trigger level. Not applicable for extra partition TDQ's.

Storage Control

1. How do you access Linkage areas in CICS. (Especially while using the OS/VS COBOL.) (86)

A. The CWA, CSA, TWA, TCTUA are accessed by using the BLL-Cells defined in Linkage area and the ADDRESS command. Ex. EXEC CICS ADDRESS CWA(BLL-CWA) END-EXEC. SERVICE RELOAD BLL-CWA. Under COBOL II BLL Cells needn't be used. Ex. Exec CICS ADDRESS CWA (Address of Comm-area) End-exec.

2. Where Does CICS receive information to store the values of Execution Interface Block (DFHEIBLK)?

A. EIB is a selection of information found in various CICS control Blocks. These control blocks are small areas of main memory that CICS/VS uses to control it's own operations. Some control blocks stand by themselves (CSA, CWA), Some are associated with terminals (TCTUA), Some are associated with Tasks (PROGA - TCA, TWA).

3. Explain the Various control blocks used by CICS in general.

CSA - Common System Area. There is exactly one CSA in memory at any given time, It records which task it is executing and generally, the state of the system as a whole. CWA - Common Work Area, is an extension of CSA, individual installations define it's own way to use CSA, normally it contains security tables and other global data. TCTUA - Terminal Control Table User Area is created for each terminal. This installation defined control block contains the user's security level as user-id, and other info to keep running one task to the next. TCA - Task control Area. For every task running in the system, there is one TCA with information, such as running a Program and whether or not a terminal is connected to the program, i.e. about the execution environment. TWA - Task work area is an extension to TCA, used by program to record data associated with the task. TWA is used by System utilities for inter-program communication with-in a task.

4. Where do you code the CICS Control blocks in VS/CBL programs? How are control blocks accessed?

A. The Control blocks which are to be accessed are to be defined in the Linkage section of the COBOL program. To access the control blocks, their addresses are to be established, which involves two steps: Find out where the block of storage is located in memory (as CICS knows but not your program) and associate it with control block item defined in the linkage section. The CICS command to initiate the loading of the address of control block is ADDRESS. Ex. EXEC CICS ADDRESS TCTUA(Terminal-BLL-Pointer) END-EXEC. The Terminal-BLL-pointer needs to be defined as S9(8) COMP field, after DFHEIBLK, & DFHCOMMAREA and just before the Block Item definition in the Linkage section. The order of Address-list should match the order of Block definitions.

5. How is dynamic memory allocated within a CICS application program?

A. Use GETMAIN command. Define a BLL-pointer and define a data block in Linkage section (as for control block). However if the Address space needed for dynamic allocation is more than 4 KB, a second Address locator (BLL) is to be defined, and is assigned the value based on the first address received by using the GETMAIN command. EXEC CICS GETMAIN SET(ADDRESS OF ls-area) LENGTH(nnn) INITIMG(HEX-00) END-EXEC. Where ls-area is product recordname, and HEX-00 is 1-byte init value.

6. What command is used to release the memory allocated for the program

by the GETMAIN command?

A. FREEMAIN command with the name of the block.

7. How do the COBOL program knows, when any entries are changed in the address list?

A. Whenever a entry is changed in the address list, you need to inform the program by using the SERVICE RELOAD statement, so that it can update its internal registry pointers, if not informed unpredictable results arise. The Service Reload statement immediately follows the statement that changes an address list item. Many programmers code the first line as the SERVICE RELOAD ADDRESS-LIST end-exec.

8. How do you handle the Addressing of the Control blocks in CICS by using COBOL II? Compare to VS/COBOL.

A. There is no longer a need to define the Address list before the Control Block definitions in Linkage section, The addressing is entirely handled by CICS. The Length command need not be defined, as CICS checks the data item defined for it. The SERVICE RELOAD statement is no longer required as each time the address variables change the internal register automatically get updated.

9. Explain the Purpose of the CICS Transactions in addition to the information for earlier Q.

A. CEMT is used by operator to control CICS by Open or Close files, Control tuning parameters, Diagnose terminal problems (is it available for use), disable or enable transactions, Shut the CICS down.

10. What is the transaction used to Print.

A. PRNT. It's usually used to print contents of the TDQ's.

11. How many type of Destinations can be defined in the DCT? What are they?

A. Four. They are Intra-partition (I/O within CICS system), Extra-partition (for I/O outside CICS region), Indirect, and Remote. The external dataset defined through DCT can not be a VSAM file as TD can only use sequential files. Note that only Intra-partition TDQ 's can be deleted.

12. Write about CSPG. Give a List of Transactions ID 's provided by IBM for CICS system.

A. CSPG is an IBM supplied transaction code used to browse, delete and manipulate pages built by PAGING operand. CEMT, CECI, CEBR, CECA, CECS, CEDA, CEDB, CEDC and CEDF, PRNT, MAPS.

13. Can you use DYNAMIC calls in CICS ?

A. Yes, the called routine must be defined in PPT and the calling program must use CALL identifier...

14. Suppose program A passes 30 bytes to program B through commarea and program B has defined its DFHCOMMAREA to be 50 bytes. Is there a problem?

A. Yes, if B tries to access bytes 31-50.

15. What is the difference between START and XCTL ?

A. START is used to start a new task. It is a interval control command. XCTL is used to pass control to a program within the same task. It is a program control command.

16. What is the usage of language in the PPT entry?

A. Language interface and call parameters???

17. Can you have CICS code in a copybook? If yes, what happens during compilation?

A. Yes. Needs to be preprocessed.

18. I invoke a transaction from CICS. The program has a code: MOVE DFHCOMMAREA TO WS-AREA. What happens to this transaction? What happens to the other transactions?

Junk may get moved in. Will cause Storage violation. ????

19. How do you handle errors in CICS programs ?

A. Check EIBRESP after the call or use the HANDLE condition.

20. What are the 3 common ways to create maps?

A. The first way is to code a physical map and then code a matching

symbolic map in your COBOL program. The second way to create a physical map along with a matching symbolic map is to code only the physical map using the &SYSPARM option, CICS will automatically create a member in a COPY library. And the third way is to use a map generator such as SDF (Screen Definition Facility).

21. What is Quasi-reentrancy?

There are times when many users are concurrently using the same program, this is what we call Multi-Threading. For example, 50 users are using program A, CICS will provide 50 Working storage for that program but one Procedure Division. And this technique is known as quasi-reentrancy.

How do you remove the unwanted characters as input under the CICS environment?

A. The CICS Built-in function BIF DEEDIT is used. It is most often used for numeric editing. It can be used to remove the special characters as commas, minus... Ex. for the resulting field to be right justified, and high order positions to be filled with '0' use EXEC CICS BIF DEEDIT FIELD(ws-data) LENGTH(nnn)

END-EXEC.

23. How do I find the name of the CICS region inside my COBOL program?

A.

24. What are the restrictions while using GETMAIN and FREEMAIN?

A.

Terminal Control, Interval Control and Task Control

1. Can you send a Simple message on to the terminal without defining / using any Maps? (110)

A. Yes, By using the SEND TEXT command with FROM(data-area), LENGTH(value), ERASE and FREEKB options, as needed. FREEKB option specifies the keyboard to be unlocked, If not specified press the RESET key.

2. What is the purpose of ACCUM option in the Send Map command. Explain in detail.

A. If say three maps have to be sent to the terminal (1st with title common to all, Last with messages common to all and the middle one, the map with info' pertaining to the program.) The if we use the ACCUM option with the SEND MAP, the system accumulate the maps into a Page Buffer. By using SEND PAGE, all the maps can be sent together as a single map, which decrease the I/O time between the system terminal and the CICS system.

3. How are the HEADER and TRAILER options of DFHMDI are used?

A. When a MAP is sent with HEADER=YES as an operand, previous pages are erased. A page always "reserves" enough space to hold the largest TRAILER=YES map. Define the 1st map with header=yes with Justify=First and last map with trailer=yes with justify=last and the all the other's in between with justify=next. This type of Map Definition Initial will helps to control overflow by using the HANDLE CONDITION OVERFLOW command.

4. Write about Paging.

A. PAGING operand is used with SEND MAP to accumulated pages and send them to temporary storage for later use.

5. What are the basic Terminal control commands under CICS?

EXEC CICS SEND FROM(data) ERASE END-EXEC, and EXEC CICS RECEIVE INTO(data) LENGTH(length) RESP(data) END-EXEC.

6. What is the use of the RETRIEVE command in CICS?

RETRIEVE is used to retrieve data passed to a transaction by using the START command. It has the options as INTO, LENGTH, RTRANSID, RTERMIN and QUEUE, which are used to receive respective data sent by START.

The CANCEL command can be used to Cancel a START request by using the REQID option.

7. When you do a START, what will the value of EIBCALEN?

A. Zero.

8. What are various Interval Control Commands used under CICS?

A. ASKTIME, FORMATTIME with the ABSTIME (data-area. S9(15)) option are the two widely used CICS commands to determine the system data and time in various formats.

9. Explain the Interval control Command START.

A. The Automatic Time Ordered Transaction Initiation (ATI) is done by using the START command. Similar to Automatic Data-Driven Transaction Initiation done by using the DCT entries. The START command has various options as TRANSID('name'), INTERVAL(hhmmss, S9(7)comp3), TIME(hhmmss, S9(7)comp3), AFTER, AT, HOURS(nnn,s9(8)comp), MINUTES(nnn,s9(8)comp), SECONDS(nnn,s9(8)comp), TERMID('tttt'), FROM(data-value), LENGTH(s9(4)comp), RTERMID(yyyy), RTRANSID(yyyy), QUEUE(yyyyyyyy) (x-are passed to task), REQID(a 8 byte value to cancel). Frequently the TRANSID, TERMID and a Interval option as time are used.

10. What is the use of the Task Control command, SUSPEND in CICS?

A. The SUSPEND command is used with no options to suspend the current task, by sending it to the end of the Task queue, controlled by the Dispatcher. Normally an application gives up control whenever it issues a CICS command. In the mean time before the task is re-initiated the Dispatcher gives control to another task and so on. This allows many tasks to be operating at once, though only one of them only is really being executed by the system. For most CICS application programs needs very short CPU time utilization requirement before it executes the CICS command. However for very few of them needs a long stretch of CPU time, which could be suspended when it is taking long CPU time, to give control to dispatcher, which prioritizes and executes other tasks of high priority.

11. Explain the LOAD command.

A. It's used to retrieve and load an object program from Disk into Memory. It's used to handle large static tables. It could use a number of pointers for each 4096K size of data. It's a storage control command such as GETMAIN.

12. What are the Recovery Processing Commands used in CICS?

A. SYNCPOINT and ROLLBACK, which are used to commit or back out all the changes made during the Current LUW.

13. Identify the use of ABEND. List a few common abend codes.

A. When CICS is unable to execute a command, it generates an AB-normal task ENDing. When an Abend occurs, CICS issues a 4-char Abend code. This Abend code is sent to terminal running the task and is attached to the Abend dump created by using the Contents in Memory for that task by CICS. The common CICS Abend codes are ASRA- System runtime error(Division by 0, subscript over run ...), ABMO-BMS map not in Mapset, APCT-Call for nonexistent pgm, AExx-Exceptional conditions encountered during the run (AEIN-Duplicate records, AEIT-eof).

14. Explain, How the Abends can be handled from a CICS program.

A. The HANDLE ABEND command is used to trap and Handle errors. It has 4 possible options and only one of them can be used with this command at a time. The options are Program(...) to transfer control to the program, Label(...) to transfer control to the specified paragraph, Cancel option keeps the earlier Handle Abends from being executed. Reset option will reactivate the Handle Abend commands, which were previously cancelled.

15. Explain ABEND command and it's use. How do you read a dump?

A. Abends can also be caused by ABEND commands in addition to the programs, used to get the system Memory Dumped. The system memory contains the address of the command, which caused the dump, the contents of program variables, and list of other processes being executed by the system. The CICS Dump dataset, created during the Abend could be printed by using the DFHDUP utility.

1st step while reading a dump is to find out the program that caused the Abend. The Relative Address of a command equals to Absolute address - Load address of the module. Actually the Abend Dump will not tell the command which caused the Abend, but the absolute address of the next

command which would have been executed, if there is no abend. As your program contains CICS commands, the Link Editor adds an extra control section or CSECT to the front of the program. The Load address given is for CSECT and not the program itself. So Actual program load address = program load address from dump + length of DFHECI.

The beginning of the CICS Dump for a task is identified by Abend Code and task name. You can find the PSW, and the register content immediately after the task name. Now search for 'Program Storage', and make a note of the Program Load address.

Now search for 'Control Section' under this task, to determine the (CSECT) DFHECI length. Add the last two addresses to determine the actual load module address. The Second word of the PSW always contains the next instruction to be executed, so a make a note of it.

Now calculate the Relative address of the Next instruction to be executed before abend by subtraction. Now exit the dump and view the condensed compiler listing of the program, which shows the addresses and line numbers of all Cobol commands, which can be executed. Use this information to determine the command that caused the Abend.

Explain Dynamic Transaction Backout and Emergency Restart? (125)

When a Transaction terminates abnormally, CICS invoke DTB program that processes the before-images stored in Dynamic Log of the transaction to reverse any changes made to the protected resources. After DTB come to end, it is as if the transaction was never started. Emergency Restart is a procedure used to restart the CICS when it terminates abnormally. First, recovery control processes the system log, which contains a record of every update made during the previous CICS execution. Recovery control reads the system log backwards, determining which updates were made by in-flight tasks (- tasks that were active when the uncontrolled shutdown occurred). Each updated that was made by an in-flight task is copied to the restart dataset, which is then processed by the Transaction Backout program similar to DTB, for restoring the protected resources. The difference is that the transaction backout program updates made by many tasks, while DTB restores updates made by only one task.

Question: What is the difference between Structured Cobol Programming and Object Oriented COBOL programming ?

Answer: Structured programming is a Logical way of programming, you divide the functionalities into modules and code logically. OOP is a Natural way of programming, you identify the objects first, then write functions, procedures around the objects. Sorry, this may not be an adequate answer, but they are two different programming paradigms which is difficult to put in a sentence or two.

Question: what is difference between next sentence and continue

Answer: They appear to be similar, that is, the control goes to the next sentence in the paragraph. But, Next Sentence would take the control to the sentence after it finds a fullstop (.). Check out by writing the following code example, one if sentence followed by 3 display statements (sorry they appear one line here because of formatting restrictions) If 1 > 0 then next sentence end if display 'line 1' display 'line 2'. display 'line 3'. \*\*\* Note- there is a dot (.) only at the end of the last 2 statements, see the effect by replacing Next Sentence with Continue \*\*\* Hope this helps!

Question: what is difference between next sentence and continue

Answer: i don't know

Question: I understand the possible causes for SOC1 & SOC4 abends, but what are they really?

Answer: A SOC1 occurs if the CPU attempts to execute binary code that isn't a valid machine instruction; e.g. if you attempt to execute data. A SOC4 is a memory protection violation. This occurs if a program attempts to access storage beyond the areas assigned to it.

Question: PIC S9(4)COMP IS USED INSPITE OF COMP-3 WHICH OCCUPIES LESS

SPACE.WHY?

Answer: The Q&A submitted by sivakumar on March 24,1998 is absolutely wrong. Dear Sivakumar, for your kind information: 9(4) COMP uses only 2 bytes and 2 bytes is not = 4 words. 9(4) COMP-3 uses 3 bytes. 3 bytes is more than 2 bytes. Hence COMP is preferred over COMP-3 in this case.

Question: What divisions,sections and paragraphs are mandatory for a COBOL program?

Answer: IDENTIFICATION DIVISION and PROGRAM-ID paragraph are mandataory for a compilation error free COBOL program.

Question: Can JUSTIFIED be used for all the data types?

Answer: No,it can be used only with alphabetic and alphanumeric data types.

Question: Ans we to bala s bandlas question what happens when we move a comp-3 field to an edited ( say z(9).zz-)

Answer: the edititing characters r to be used with data items with usage clause as display which is the default.when u try displaying a data item with usage as computational it does not give the desired display format becoz the data item is stored as packed decimal.So if u want this particular data item to be edited u have to move it into a data item whose usage is diplay and then have that particular data item edited in the format desired.

Question: What are the causes for SOC1, SOC4, SOC5, SOC7, SOCB abends

Answer: SOC1 - May be due to 1.Missing or misspelled DD name  
2.Read/Write to unopened dataset 3.Read to dataset opened output 4.Write to dataset opened input 5.Called subprogram not foundSOC4 may be due to 1.Missing Select statement(during compile) 2.Bad Subscript/index  
3.Protection Exception 4.Missing parameters on called subprogram 5.Read/Write to unopened file 6.Move data from/to unopened fileSOC5 May be due to 1.Bad Subscript/index 2.Close an unopen dataset 3.Bad exit from a perform 4.Access to I/O area(FD) before readSOC7 may be due to 1.Numeric operation on non-numeric data 2.Un-initialize working-storage 3.Coding past the maximum allowed sub scriptSOCB may be due to 1.Division by Zero

Question: Question: What will happen if you code GO BACK instead of STOP RUN in a stand alone COBOL program i.e. a program which is not calling any other program.

Answer: Both give the same results when a program is not calling any other program. The answer given by Mr.Krishnan that when go back is coded the program goes into infinite loop is not correct. Goback will give the control to the system even though it is a single program.

Question: WHAT IS THE DIFFERENCE BETWEEN EXTERNAL AND GLOBAL VARIABLES?

Answer: Global variables are accessible only to the batch program whereas external variables can be referenced from any batch program residing in the same system library.

Question: you ARE WRITING REPORT PROGRAM WITH 4 LEVELS OF TOTALS:CITY,STATE,REGION AND COUNTRY. the CODES BEING USED CAN BE THE SAME OVER THE DIFFERENT LEVELS, MEANING A CITY CODE OF 01 CAN BE IN ANE NUMBER OF STATES, AND THE SAME APPLIES TO STATE AND REGION CODESHOW DO YOU DO YOUR CHEKING FOR BREAKS AND HOW DO YOU DO ADD TO EACH LEVEL?

Answer: ALWAYS COMPARE ON THE HIGHEST LEVEL FIRST, BECAUSE IF YOU HAVE A BREAK AT A HIGHEST LEVEL, EACH LEVEL BENEATH IT MUST ALSO BREAK. ADD TO THE LOWEST LEVEL FOR EACH REC BUT ADD TO THE HIGHER LEVEL ONLY ON A BREAK.

Question: What is difference between COBOL and VS COBOL II?.

Answer: In using COBOL on PC we have only flat files and the programs can access only limited storage, whereas in VS COBOL II on M/F the programs can access upto 16MB or 2GB depending on the addressing and can use VSAM files to make I/O operations faster.

Question: Why occurs can not be used in 01 level ?

Answer: because, Occurs clause is there to repeat fields with same format, not the records.

Question: WHAT IS REPORT-ITEM?

Answer: A REPORT-ITEM IS A FIELD TO BE PRINTED THAT CONTAINS EDIT SYMBOLS

Question: What is PSB & ACB?

Answer: PSB : Program specification block. Infor about how a specific program is to be access one or more IMS DB. It consist of PCB(Prg Communication Block). Information to which which segment in DB can be accessed, what the program is allowed to do with those segment and how the DB is to be accessed. ACB : Access Control Blocks are generated by IMS as an expansion of information contained in the PSB in order to speed up the access to the applicable DBD's.

Question: Question: What's a LDS(Linear Data Set) and what's it used for ?

Answer: LDS is a VSAM dataset in name only. It has unstructured 4k (4096 bytes) fixed size CIs which do not contain control fields and therefore from VSAM's standpoint they do not contain any logical records. There is no freespace, and no access from Cobol. Can be accessed by DB2 and IMS fast path datasets. LDS is essentially a table of data maintained on disk. The 'table entries' must be created via a user program and can only be logically accessed via a user program. When passed, the entire LDS must be mapped into storage, then data is accessed via base and displacement type processing.

Question: answer to anon question for difference between next and continue clause

Answer: FOR ANON , Dear friend the difference between the next and continue verb is that in the continue verb it is used for a situation where there in no eof condition that is the records are to be accessed again and again in an file , whereas in the next verb the indexed file is accessed sequentially ,hence when index clause is accessed sequentially read next record command is used,i hope that is satisfactory

Question: What is the Importance of GLOBAL clause According to new standards of COBOL

Answer: When any data name, file-name , Record-name, condition name or Index defined in an Including Program can be referenced by a directly or indirectly in an included program, Provided the said name has been declared to be a global name by GLOBALFormat of Global Clause is01 data-1 pic 9(5) IS GLOBAL.

Question: What is the Purpose of POINTER Phrase in STRING command

Answer: The Purpose of POINTER phrase is to specify the leftmost position whithin Receiving field where the first transfered character will be stored

Question: How do we get currentdate from system with century?

Answer: By using Intrinsic function, FUNCTION CURRENT-DATE

Question: what is the difference between search and search all in the table handling?

Answer: search is a linear search and search all is a binary search.

Question: What is the maximum length of a field you can define using COMP-3?

Answer: 10 Bytes (S9(18) COMP-3).

Question: What will happen if you code GO BACK instead of STOP RUN in a stand alone COBOL program i.e. a program which is not calling any other program.

Answer: The program will go in an infinite loop.

Question: Q.HOW MANY SECTIONS ARE THERE IN DATA DIVISION?.

Answer: SIX SECTIONS1.FILE SECTION2.WORKING-STORAGE SECTION3.LOCAL-STORAGE SECTION4.SCREEN SECTION5.REPORT SECTION6.LINKAGE SECTION

Question: How can I tell if a module is being called DYNAMICALLY or STATICALLY?

Answer: The ONLY way is to look at the output of the linkage editor (IEWL)or the load module itself. If the module is being called

DYNAMICALLY then it will not exist in the main module, if it is being called STATICALLY then it will be seen in the load module. Calling a working storage variable, containing a program name, does not make a DYNAMIC call. This type of calling is known as IMPLICITE calling as the name of the module is implied by the contents of the working storage variable. Calling a program name literal (CALL

Question: What is the difference between a DYNAMIC and STATIC call in COBOL.

Answer: To correct an earlier answer: All called modules cannot run standalone if they require program variables passed to them via the LINKAGE section. DYNAMICALLY called modules are those that are not bound with the calling program at link edit time (IEWL for IBM) and so are loaded from the program library (joblib or steplib) associated with the job. For DYNAMIC calling of a module the DYNAM compiler option must be chosen, else the linkage editor will not generate an executable as it will expect full address resolution of all called modules. A STATICALLY called module is one that is bound with the calling module at link edit, and therefore becomes part of the executable load module.

Question: What is the difference between PIC 9.99 and 9v99?

Answer: PIC 9.99 is a FOUR-POSITION field that actually contains a decimal point where as PIC 9v99 is THREE-POSITION numeric field with implied or assumed decimal position.

Question: How is PIC 9.99 is different from PIC 9v99?

Answer: PIC 9.99 is a four position field that actually contains a decimal point where as 9v99 is a three position numeric field with an implied or assumed decimal point.

Question: what is Pic 9v99 Indicates?

Answer: PICTURE 9v99 is a three position Numeric field with an implied or assumed decimal point after the first position; the v means an implied decimal point.

Question: WHAT GUIDELINES SHOULD BE FOLLOWED TO WRITE A STRUCTURED COBOL PRG'M?

Answer: 1) USE 'EVALUATE' STMT FOR CONSTRUCTING CASES. 2) USE SCOPE TERMINATORS FOR NESTING. 3) USE IN LINE PERFORM STMT FOR WRITING 'DO ' CONSTRUCTIONS. 4) USE TEST BEFORE AND TEST AFTER IN THE PERFORM STMT FOR WRITING DO-WHILE CONSTRUCTIONS.

Question: read the following code. 01 ws-n pic 9(2) value zero. a-para move 5 to ws-n. perform b-para ws-n times. b-para. move 10 to ws-n. how many times will b-para be executed ?

Answer: 5 times only. it will not take the value 10 that is initialized in the loop.

Question: What is the difference between SEARCH and SEARCH ALL? What is more efficient?

Answer: SEARCH is a sequential search from the beginning of the table. SEARCH ALL is a binary search, continually dividing the table in two halves until a match is found. SEARCH ALL is more efficient for tables larger than 70 items.

Question: What are some examples of command terminators?

Answer: END-IF, END-EVALUATE

Question: What care has to be taken to force program to execute above 16 Meg line?

Answer: Make sure that link option is AMODE=31 and RMODE=ANY. Compile option should never have SIZE(MAX). BUFSIZE can be 2K, efficient enough.

Question: Give some advantages of REDEFINES clause.

Answer: 1. You can REDEFINE a Variable from one PICTURE class to another PICTURE class by using the same memory location. 2. By REDEFINES we can INITIALISE the variable in WORKING-STORAGE Section itself. 3. We can REDEFINE a Single Variable into so many subvariables. (This facility is very useful in solving Y2000 Problem.)

Question: Why do we code s9(4) comp. In spite of knowing comp-3 will occupy less space.

Answer: Here s9(4)comp is small integer ,so two words equal to i bytes totally it will occupy 2 bytes(4 words).here in s9(4) comp-3 as one word is equal to 1/2 byte.4 words equal to 2 bytes and sign will occupy 1/2 bytes totally it will occupy 3 bytes.

Question: The maximum number of dimensions that an array can have in COBOL-85 is \_\_\_\_\_.

Answer: SEVEN in COBOL - 85 and THREE in COBOL - 84

Question: What is the LINKAGE SECTION used for?

Answer: The linkage section is used to pass data from one program to another program or to pass data from a PROC to a program.

Question: Describe the difference between subscripting and indexing

Answer: Indexing uses binary displacement. Subscripts use the value of the occurrence.

undefined <>

undefined <>More... <>

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<http://rd.yahoo.com/M=2.yahoo.com/M=212804.2271040.3703584.456650/D=geocities/S=76001084:NE/A=1171388/R=0/\*http://geocities.yahoo.com/ps/info?.refer=bsm>1. What is a reentrant program? How will you make a program Reentrant?

A. A reentrant program, while being executed resides in the common virtual area so that one copy of it may be shared among all callers. Use RENT compiler option.

2. What is the difference between a 01 level and 77 level?

A. 01 level can have sublevels from 02 to 49. 77 cannot have sublevel.

3. What are the few advantages of VS COBOL II over OS/VS COBOL?

A. The working storage and linkage section limit has been increased. They are 128 megabytes as supposed to 1 megabytes in OS/VS COBOL. Introduction of ADDRESS special register.

31-bit addressing. In using COBOL on PC we have only flat files and the programs can access only limited storage, whereas in VS COBOL II on M/F the programs can access up to 16MB or 2GB depending on the addressing and can use VSAM files to make I/O operations faster.

4. What are the steps you go through while creating a COBOL program executable?

A. DB2 pre-compiler (if embedded SQL is used), CICS translator (if CICS program), Cobol compiler, Link editor. If DB2 program, create plan by binding the DBRMs.

5. What are the minimum requirements to compile a program without errors?

A. Identification Division.

Program-ID. Program-name.

A) Is compute w=u a valid statement?

Yes, it is. It is equivalent to move u to w.

B) In the above example, when will you prefer compute statement over the move statement?

When significant left-order digits would be lost in execution, the COMPUTE statement can detect the condition and allow you to handle it. The MOVE statement carries out the assignment with destructive truncation. Therefore, if the size error is needs to be detected, COMPUTE will be preferred over MOVE. The ON SIZE ERROR phrase of COMPUTE statement, compiler generates code to detect size-overflow.

6. What happens when the ON SIZE ERROR phrase is specified on a COMPUTE statement?

A. If the condition occurs, the code in the ON SIZE ERROR phrase is performed, and the content of the destination field remains unchanged. If the ON SIZE ERROR phrase is not specified, the assignment is carried out with truncation. There is no ON SIZE ERROR support for the MOVE statement.

7. How will you associate your files with external data sets where they physically reside?

A. Using SELECT clause, the files can be associated with external data sets. The SELECT clause is defined in the FILE-CONTROL paragraph of Input-Output Section that is coded Environment Division. The File structure is defined by FD entry under File-Section of Data Division for the OS.

8. How will you define your file to the operating system?

A. Associate the file with the external data set using SELECT clause of INPUT-OUTPUT SECTION. INPUT-OUTPUT SECTION appears inside the ENVIRONMENT DIVISION.

Define your file structure in the FILE SECTION of DATA DIVISION.

9. Explain the use of Declaratives in COBOL?

Declaratives provide special section that are executed when an exceptional condition occurs. They must be grouped together and coded at the beginning of procedure division and the entire procedure division must be divided into sections. The Declaratives start with a USE statement. The entire group of declaratives is preceded by DECLARIVES and followed by END DECLARITIVES in area A. The three types of declaratives are Exception (when error occurs during file handling), Debugging (to debug lines with 'D' coded in w-s section) and Label (for EOF or beginning...) declaratives.

10. A statically bound subprogram is called twice. What happens to working-storage variables?

A. The working-storage section is allocated at the start of the run-unit and any data items with VALUE clauses are initialized to the appropriate value at the time. When the subprogram is called the second time, a working-storage items persist in their last used state. However, if the program is specified with INITIAL on the PROGRAM-ID, working-storage section is reinitialized each time the program is entered.

PROGRAM-ID. <Pgmname> is INITIAL PROGRAM. Other verbs used with PROGRAM-ID are RECURSIVE and COMMON.

11. When is COMMON attribute used?

A. COMMON attribute is used with nested COBOL programs. If it is not specified, other nested programs will not be able to access the program. PROGRAM-ID. Pgmname is COMMON PROGRAM.

12. In which division and section, the Special-names paragraph appears?

A. Environment division and Configuration Section.

13. What is the LOCAL-STORAGE SECTION?

A. Local-Storage is allocated each time the program is called and is de-allocated when the program returns via an EXIT PROGRAM, GOBACK, or STOP RUN. Any data items with a VALUE clauses are initialized to the appropriate value each time the program is called. The value in the data items is lost when the program returns. It is defined in the DATA DIVISION after WORKING-STORAGE SECTION

14. What does passing BY REFERENCE mean?

A. When the data is passed between programs, the subprogram refers to and processes the data items in the calling program's storage, rather than working on a copy of the data. When

CALL . . . BY REFERENCE identifier. In this case, the caller and the called share the same memory.

15. What does passing BY CONTENT mean?

A. The calling program passes only the contents of the literal, or identifier. With a CALL . . . BY CONTENT, the called program cannot change the value of the literal or identifier in the calling program, even if it modifies the variable in which it received the literal or identifier.

16. What does passing BY VALUE mean?

A. The calling program or method is passing the value of the literal, or identifier, not a reference to the sending data item. The called program or invoked method can change the parameter in the called program or

invoked method. However, because the subprogram or method has access only to a temporary copy of the sending data item, those changes do not affect the argument in the calling program. Use By value, If you want to pass data to C program. Parameters must be of certain data type.

17. What is the default, passing BY REFERENCE or passing BY CONTENT or passing BY VALUE?

A. Passing by reference (the caller and the called share the same memory).

18. Where do you define your data in a program if the data is passed to the program from a Caller program?

A. Linkage Section

19. Define the structure of a COBOL subroutine.

A. The PROCEDURE DIVISION header must have a using a phrase, if the data needs to be passed to the program. The operands of the USING phrase must be defined in the LINKAGE SECTION as 01-level or 77-level entries. No VALUE clause is allowed unless the data defined is a condition name.

If the program needs to be returned to the CALLER, use EXIT PROGRAM statement at the end of the program. GOBACK is an alternative, but is nonstandard.

20. What is difference between next sentence and continue

A. NEXT SENTENCE gives control to the verb following the next period. CONTINUE gives control to the next verb after the explicit scope terminator. (This is not one of COBOL II's finer implementations). It's safest to use CONTINUE rather than NEXT SENTENCE in COBOL II. CONTINUE is like a null statement (do nothing) , while NEXT SENTENCE transfers control to the next sentence (!) (A sentence is terminated by a period). Check out by writing the following code example, one if sentence followed by 3 display statements: If 1 > 0 then next sentence end if display 'line 1' display 'line 2'. display 'line 3'. \*\*\* Note- there is a dot (.) only at the end of the last 2 statements, see the effect by replacing Next Sentence with Continue \*\*\*

21. What is the difference between Structured Cobol Programming and Object Oriented COBOL programming?

A. Structured programming is a Logical way of programming using which you divide the functionality's into modules and code logically. OOP is a Natural way of programming in which you identify the objects, first then write functions and procedures around the objects. Sorry, this may not be an adequate answer, but they are two different programming paradigms, which is difficult to put in a sentence or two.

22. PIC S9(4)COMP IS USED INSPITE OF COMP-3 WHICH OCCUPIES LESS SPACE.WHY?

A. S9(4) COMP uses only 2 bytes. 9(4) COMP-3 uses 3 bytes. 3 bytes are more than 2 bytes. Hence COMP is preferred over COMP-3 in this case.

23. How many number of bytes and digits are involved in S9(10) COMP?

8 bytes (double word) and 10 digits. Up to 9(9) comp use full word, up to 9(18) comp needs double word.

24. Which picture clause will you use to define a hexadecimal item in a VALUE clause?

A. 01 ws-hexitem PIC X(2) value X'020C'.

01 ws-hex redefines PIC S9(3) comp-3.

25. How many numbers of decimal digits are possible, when the amount of storage allocated for a USAGE COMP item is a) half word b) full word c) double word?

A. 2 bytes (halfword) for 1-4 Digits 4 bytes (fullword) for 5-9 8 bytes (doubleword) for 10-18

26. What is a scope terminator? Give examples.

Scope terminator is used to mark the end of a verb e.g. EVALUATE, END-EVALUATE; IF, END-IF.

27. How many dimensions are allowed for a table?

A. 7

28. How many subscripts or indexes are allowed for an OCCURS clause?

A. 7

29. Why cannot Occurs be used in 01 level?  
A. Because, Occurs clause is there to repeat fields with the same format, but not the records.

30. Can a REDEFINES clause be used along with an OCCURS clause?  
A. Yes, if the REDEFINES clause is subordinate to OCCURS clause.

31. Can you specify PIC clause and a VALUE with an OCCURS clause? Will the following code compile without errors?  
01 WS-TABLE.  
03 WS-TABLE-EL OCCURS 5 TIMES PIC X(1) VALUE SPACES.  
A. Yes, the code will compile without any errors.

32. What would be the output, when the following code is executed?  
01 WS-TABLE.  
03 WS-TABLE-EL OCCURS 5 TIMES PIC X(1) VALUE 'AAAAA'.  
A. It cannot be executed because the code will compile with error ' "VALUE" literal "AAAA" exceeded the length specified in the "PICTURE" definition'.

33. 01 WS-TABLE.  
03 WS-TABLE-EL OCCURS 5 TIMES PIC X(1) VALUE 'A'.  
03 WS-EX REDEFINES WS-TABLE-EL PIC X(5). What can you expect?  
A. Compile error. Direct Redefinition of OCCURS clause is not allowed.

34. 01 WS-TABLE.  
03 WS-TABLE-EL OCCURS 5 TIMES.  
04 FILLER-X PIC X(1) VALUE 'A'. 04 WS-EX REDEFINES FILLER-X PIC X(1).  
What would be the output of DISPLAY WS-TABLE?  
A. 'AAAAA'. The code will compile and execute as Redefinition of an item subordinate to OCCURS clause.

35. Is this allowed?  
01 WS-TABLE.  
03 FILLER-X PIC X(5) VALUE 'AAAAA'.  
03 WS-EX REDEFINES FILLER-X.  
04 WS-TABLE-EL OCCURS 5 TIMES PIC X(1).  
A. Yes

35. Is this allowed?  
01 WS-TABLE.  
03 FILLER-X PIC X(5) VALUE 'AAAAA'.  
03 WS-EX REDEFINES FILLER-X OCCURS 5 TIMES PIC X(1).  
A. Yes

36. Which SEARCH verb is equivalent to PERFORM...VARYING?  
The serial SEARCH verb (SEARCH without ALL)

37. What would be the output, when the following code is executed?  
01 WS-TABLE.  
03 WS-TABLE-EL OCCURS 5 TIMES PIC X(1) VALUE 'A'.  
:::  
DISPLAY WS-TABLE.  
A. The output will display 'AAAAA'

38. Can a SEARCH be applied to a table which does not have an INDEX defined?  
A. No, the table must be indexed.

39. What are the different rules applicable to perform a serial SEARCH?  
A. The SEARCH can be applied to only a table which has the OCCURS clause and INDEXED BY phrase,  
Before the use of the SEARCH the index must have some initial value. To search from beginning, set the index value to 1. Use the SEARCH verb without ALL phrase

40. A table has two indexes defined. Which one will be used by the SEARCH verb?  
A. The index named first will be used, by Search.

41. What are the different rules applicable to perform a binary SEARCH?  
A. The table must be sorted in ascending or descending order before the beginning of the SEARCH. Use OCCURS clause with ASC/DESC KEY IS

dataname1 option

The table must be indexed. There is no need to set the index value. Use SEARCH ALL verb

42. How does the binary search work?

A. First the table is split into two halves and in which half, the item need to be searched is determined. The half to which the desired item may belong is again divided into two halves and the previous procedure is followed. This continues until the item is found. SEARCH ALL is efficient for tables larger than 70 items.

43. What is the difference between a binary search and a sequential search? What are the pertinent COBOL commands?

A. In a binary search the table element key values must be in ascending or descending sequence. The table is 'halved' to search for equal to, greater than or less than conditions until the element is found. In a sequential search the table is searched from top to bottom, so (ironically) the elements do not have to be in a specific sequence. The binary search is much faster for larger tables, While sequential Search works well with smaller ones. SEARCH ALL is used for binary searches; SEARCH for sequential.

44. Explain the difference between an internal and an external sort. The pros & cons & internal sort syntax ...

A. An external sort is not coded as a COBOL program; it is performed through JCL and PGM=SORT. One can use IBM utility SYNCSORT for external sort process. It is understandable without any code reference. An internal sort can use two different syntaxes: 1.) USING, GIVING sorts are comparable to external sorts with no extra file processing; 2) INPUT PROCEDURE, OUTPUT PROCEDURE sorts allow for data manipulation before and/or after the sort. Syntax:

```
SORT file-1 ON ASCENDING/DESCENDING KEY key...USING file-2 GIVING file-3.
```

USING can be substituted by INPUT PROCEDURE IS para-1 THRU para-2

GIVING can be substituted by OUTPUT PROCEDURE IS para-1 THRU para-2.

file-1 is the sort workfile and must be described using SD entry in FILE SECTION.

file-2 is the input file for the SORT and must be described using an FD entry in FILE SECTION and SELECT clause in FILE CONTROL.

file-3 is the outfile from the SORT and must be described using an FD entry in FILE SECTION and SELECT clause in FILE CONTROL.

file-1, file-2 & file-3 should not be opened explicitly.

INPUT PROCEDURE is executed before the sort and records must be RELEASED to the sort work file from the input procedure.

OUTPUT PROCEDURE is executed after all records have been sorted. Records from the sort work file must be RETURNed one at a time to the output procedure.

.How do you define a sort file in JCL that runs the COBOL program?

Use the SORTWK01, SORTWK02,..... dd names in the step. Number of sort datasets depends on the volume of data being sorted, but a minimum of 3 is required.

45. Which is the default, TEST BEFORE or TEST AFTER for a PERFORM statement?

TEST BEFORE. By default the condition is checked before executing the instructions under Perform.

46. What is the difference between PERFORM ... WITH TEST AFTER and PERFORM ... WITH TEST BEFORE?

A. If TEST BEFORE is specified, the condition is tested at the beginning of each repeated execution of the specified PERFORM range. If TEST AFTER is specified, the condition is tested at the end of the each repeated execution of the PERFORM range. With TEST AFTER, the range is executed at least once.

47. How do you code an in-line PERFORM?

A. PERFORM ... <UNTIL> ... <statements> END-PERFORM.

48. In an EVALUTE statement is the order of the WHEN clauses significant?

Yes. Evaluation of the WHEN clauses proceeds from top to bottom and their sequence can determine results.

49. What is the default value(s) for an INITIALIZE and what keyword allows for an override of the default.

A. INITIALIZE sets spaces to alphabetic and alphanumeric fields. Initialize sets Zeroes to numeric fields. FILLER, OCCURS DEPENDING ON items are left untouched. The REPLACING option can be used to override these defaults.

50. What is SET <condition-name> TO TRUE all about, anyway?

A. In COBOL II the 88 levels can be set rather than moving their associated values to the related data item. (Web note: This change is not one of COBOL II's better specifications.)

51. What is LENGTH in COBOL II?

A. LENGTH acts like a special register to tell the length of a group or an elementary item.

52. What is the function of a delimiter in STRING?

A. A delimiter in STRING causes a sending field to be ended and another to be started.

53. What is the function of a delimiter in UNSTRING?

A. A delimiter when encountered in the sending field causes the current receiving field to be switched to the next one indicated.

54. How will you count the number of characters in a null-terminated string?

A. MOVE 0 TO char-count

```
INSPECT null-terminated-string TALLYING char-count FOR CHARACTERS BEFORE X"00"
```

55. Which statement will you use to move non-null characters from a null-terminated String?

A. UNSTRING null-terminated-string DELIMITED BY X"00" INTO target-area COUNT IN char-count. (There are other methods, such as 1) using PERFORM 2) using SEARCH 3) using INSPECT and MOVE etc...)

56. 77 COUNTR PIC 9 VALUE ZERO.

```
01 DATA-2 PIC X(11). . .
```

```
INSPECT DATA-2
```

```
TALLYING COUNTR FOR LEADING "0"
```

```
REPLACING FIRST "A" BY "2" AFTER INITIAL "C"
```

If DATA-2 is 0000ALABAMA, what will DATA-2 and COUNTER be after the execution of INSPECT verb?

A. Counter=4. Data-2 will not change as the Initial 'C' is not found.

```
57. 01 DATA-4 PIC X(11).
```

```
:::
```

```
INSPECT DATA-4 CONVERTING
```

```
"abcdefghijklmnopqrstuvwxyz" TO "ABCDEFGHIJKLMNOPQRSTUVWXYZ"
```

```
AFTER INITIAL "/" BEFORE INITIAL"?"
```

What will the contents of DATA-4 be after the conversion statement is performed, if before conversion

a) DATA-4 = a/five/?six b) DATA-4 = r/Rexx/RRRr c) DATA-4 = zfour?inspe

A. a) a/FIVE/?six b) r/REXX/RRRR c) zfour?inspe (no change at all)

58. What kind of error is trapped by ON SIZE ERROR option?

A. Fixed-point overflow. Zero raised to the zero power.

Division by 0. Zero raised to a negative number.

A negative number raised to a fractional power.

59. What is the point of the REPLACING option of a copy statement?

A. REPLACING allows for the same copy to be used more than once in the same code by changing the replace value. COPY xxx REPLACING <psuedotext1> BY <psuedotext2>.

60. When is a scope terminator mandatory?

A. Scope terminators are mandatory for in-line PERFORMS and EVALUATE

statements. For readability, it's recommended coding practice to always make scope terminators explicit.

61. Can you use REDEFINES clause in the FILE SECTION?

A. No

62. How will you define your record descriptions in the FILE SECTION if you want to use three different record descriptions for the same file?

A. FD filename

DATA RECORDS ARE rd01, rd02, rd03.

01 rd01 PIC X(n).

01 rd02 PIC X(n).

01 rd03 PIC X(n).

63. When will you open a file in the EXTEND mode?

A. When an existing file should be appended by adding new records at its end. EXTEND mode opens the file for output, but the file is positioned following the last record on the existing file.

64. What does a CLOSE WITH LOCK statement do?

A. The statement closes an opened file and it prevents the file from further being opened by the same program.

65. Which mode of opening is required when REWRITE is used?

A. I-O mode

66. Why is it necessary that the file be opened in I-O mode for REWRITE? A. Before the REWRITE is performed, the record must be read from the file. Hence REWRITE includes an input operation and an output operation. Therefore, the file must be opened in I-O mode.

67. Which clause can be used instead of checking for FILE STATUS = 10?

A. FILE STATUS 10 is the end of file condition. Hence AT END clause can be used.

68. What is the format of a simple SORT verb? What kinds of files can be sorted using SORT?

A. SORT workfile ON ASC/DESC KEY key1, ASC/DESC KEY key2 ...

USING inputfile GIVING outputfile

Only sequential files can be sorted in this way.

69. What are the different rules of SORT that needs to be considered?

The input and output files must remain closed because SORT opens them and closes during the operation, The work file must have a SELECT clause. The work file must have sort description SD entry in the FILE SECTION. Input and Output files must have FD entries

70. What are INPUT PROCEDURE and OUTPUT PROCEDURE?

A. Sometimes, it is necessary that the records must be edited before or after the sorting. In such cases,

SORT workfile ASC/DESC KEY key1, ...

INPUT PROCEDURE IS ipproc

OUTPUT PROCEDURE is outproc

Is used. In the INPUT PROCEDURE the input file is opened, records are read and edited and then are released to the sorting operation. Finally the file is closed. RELEASE sortrecname FROM inp-rec.

In the OUTPUT PROCEDURE, output file is opened, the sorted record is returned to the Output record area and then the record is written. Finally the file is closed. RETURN workfile RECORD into out-rec.

71. What is the format of a simple MERGE verb? Can INPUT PROCEDURE and OUTPUT PROCEDURE can be specified for MERGE verb?

A. MERGE work file ON ASC/DESC KEY key1...

USING inputfile1, inputfile2...

GIVING outputfile

INPUT PROCEDURE cannot be specified. Only OUTPUT PROCEDURE can be specified

72. How will you position an indexed file at a specific point so that the subsequent sequential operations on the file can start from this point?

A. Use START

START filename KEY IS EQ/GT/LT.. dataname

INVALID KEY ...

73. What are the access mode requirements of START statement?

A. Access mode must be SEQUENTIAL or DYNAMIC

74. What are the opening mode requirements of START statement?

Files must be opened in the INPUT or I-O mode.

75. What is the LINKAGE SECTION used for?

A. The linkage section is used to pass data from one program to another program or to pass data from a PROC to a program. It is part of a called program that 'links' or maps to data items in the calling program's working storage. It is the part of the called program where these share items are defined.

76. If you were passing a table via linkage, which is preferable - a subscript or an index?

A. Wake up - you haven't been paying attention! It's not possible to pass an index via linkage. The index is not part of the calling programs working storage. Indexing uses binary displacement. Subscripts use the value of the occurrence.

77. What is the difference between a subscript and an index in a table definition?

A subscript is a working storage data definition item, typically a PIC (999) where a value must be moved to the subscript and then increment or decrement it by ADD TO and SUBTRACT FROM statements. An index is a register item that exists outside the program's working storage. You SET an index to a value and SET it UP BY value and DOWN BY value.

Subscript refers to the array occurrence while index is the displacement (in no of bytes) from the beginning of the array. An index can only be modified using PERFORM, SEARCH & SET. Need to have index for a table in order to use SEARCH, SEARCH ALL Cobol statements.

78. What is an in line PERFORM? When would you use it? Anything else to say about it?

The PERFORM and END-PERFORM statements bracket all COBOL II statements between them. The COBOL equivalent is to PERFORM or PERFORM THRU a paragraph. In line PERFORMs work as long as there are no internal GO TOs, not even to an exit. The in line PERFORM for readability should not exceed a page length - often it will reference other PERFORM paragraphs. When the body of the Perform will not be used in other paragraphs. If the body of the Perform is a generic type of code (used from various other places in the program), it would be better to put the code in a separate para and use PERFORM paraname rather than in-line perform.

79. What is the use of EVALUATE statement? How do you come out of an EVALUATE statement?

A. Evaluate is like a case statement and can be used to replace nested ifs. The difference between EVALUATE and case is that no 'break' is required for EVALUATE i.e. control comes out of the EVALUATE as soon as one match is made, There is no need of any extra code. EVALUATE can be used in place of the nested IF THEN ELSE statements.

80. What are the different forms of EVALUATE statement?

A. EVALUATE EVALUATE SQLCODE ALSO FILE-STATUS

```
WHEN A=B AND C=D WHEN 100 ALSO '00'
```

```
imperative stmt imperative stmt
```

```
WHEN (D+X)/Y = 4 WHEN -305 ALSO '32'
```

```
imperative stmt imperative stmt
```

```
WHEN OTHER WHEN OTHER
```

```
imperative stmt imperative stmt
```

```
END-EVALUATE END-EVALUATE
```

```
EVALUATE SQLCODE ALSO A=B EVALUATE SQLCODE ALSO TRUE
```

```
WHEN 100 ALSO TRUE WHEN 100 ALSO A=B
```

```
imperative stmt imperative stmt
```

```
WHEN -305 ALSO FALSE WHEN -305 ALSO (A/C=4)
```

```
imperative stmt imperative stmt
```

```
END-EVALUATE END-EVALUATE
```

81. Can you use the INSPECT (with TALLYING option) Cobol verb in a CICS COBOL program?

A. Yes, under COBOL II environment, but not OS/VS COBOL.

82. What is an explicit scope terminator?

A scope terminator brackets its preceding verb, eg. IF .. END-IF, so that all statements between the verb and its scope terminator are grouped together. Other common COBOL II verbs are READ, PERFORM, EVALUATE, SEARCH and STRING.

83. What is the significance of 'above the line' and 'below the line'?

A. Before IBM introduced MVS/XA architecture in the 1980's a program's virtual storage was limited to 16 megs. Programs compiled with a 24-bit mode can only address 16 MB of space, as though they were kept under an imaginary storage line. With COBOL II a program compiled with a 31 bit mode can be 'above the 16 Mb line. (This 'below the line', 'above the line' imagery confuses most mainframe programmers, who tend to be a literal minded group.)

84. What was removed from COBOL in the COBOL II implementation?

A. Partial list: REMARKS, NOMINAL KEY, PAGE-COUNTER, CURRENT-DAY, TIME-OF-DAY, STATE, FLOW, COUNT, EXAMINE, EXHIBIT, READY TRACE and RESET TRACE.

85. Explain call by context by comparing it to other calls.

A. The parameters passed in a call by context are protected from modification by the called program. In a normal call they are able to be modified.

86. What is the difference between comp and comp-3 usage? Explain other COBOL usages.

Comp is a binary usage, while comp-3 indicates packed decimal. The other common usages are binary and display. Display is the default. Comp is defined as the fastest/preferred numeric data type for the machine it runs on. IBM Mainframes are typically binary and AS400's are packed.'

87. I understand the possible causes for S0C1 & S0C4 abends, but what are they really?

A. A S0C1 occurs if the CPU attempts to execute binary code that isn't a valid machine instruction; e.g. if you attempt to execute data. A S0C4 is a memory protection violation. This occurs if a program attempts to access storage beyond the areas assigned to it.

88. What happens when we move a comp-3 field to an edited ( say z(9).zz- )

A. The editing characters are to be used with data items with usage clause as display, which is the default. When you try displaying a data item with usage as computational it does not give the desired display format because the data item is stored as packed decimal. So if u want this particular data item to be edited u have to move it into a data item whose usage is display and then have that particular data item edited in the format desired.

89. What are the causes for S0C1, S0C4, S0C5, S0C7, S0CB abends

S0C1 - May be due to 1.Missing or misspelled DD name 2.Read/Write to unopened dataset 3.Read to dataset opened output 4.Write to dataset opened input 5.Called subprogram not found.

S0C4 may be due to 1.Missing Select statement(during compile) 2.Bad Subscript/index 3.Protection Exception 4.Missing parameters on called subprogram 5.Read/Write to unopened file 6.Move data from/to unopened file.

S0C5 May be due to 1.Bad Subscript/index 2.Close an unopen dataset 3.Bad exit from a perform 4.Access to I/O area(FD) before read.

S0C7 may be due to 1.Numeric operation on non-numeric data 2.Un-initialize working-storage 3.Coding past the maximum allowed sub script.

S0CB may be due to 1.Division by Zero

90. What will happen if you code GO BACK instead of STOP RUN in a stand-alone COBOL program i.e. a program which is not calling any other program.

Both give the same results when a program is not calling any other program.

91. What is the difference between an External and a Global Variable 's?  
A. Global variables are accessible only to the batch program whereas external variables can be referenced from any batch program residing in the same system library.

92. WHAT IS REPORT-ITEM?

A. A REPORT-item is a field to be printed that contains EDIT SYMBOLS

93. You are writing report program with 4 levels of totals:city,state,region and country. The codes being used can be the same over the different levels, meaning a city code of 01 can be in any number of states, and the same applies to state and region code show. Do you do your checking for breaks and how do you do add to each level? Always compare on the highest-level first, because if you have a break at a highest level, each level beneath it must also break. Add to the lowest level for each rec but add to the higher level only on break.

94. What is PSB & ACB?

A. PSB : Program specification block. Inform about how a specific program is to be access one or more IMS DB. It consists of PCB(Prg Communication Block). Information to which segment in DB can be accessed, what the program is allowed to do with those segment and how the DB is to be accessed. ACB : Access Control Blocks are generated by IMS as an expansion of information contained in the PSB in order to speed up the access to the applicable DBD's.

95. What's a LDS(Linear Data Set) and what's it used for ?

A. LDS is a VSAM dataset in name only. It has unstructured 4k (4096 bytes) fixed size CIs which do not contain control fields and therefore from VSAM's standpoint they do not contain any logical records. There is no freespace, and no access from Cobol. Can be accessed by DB2 and IMS fast path datasets. LDS is essentially a table of data maintained on disk. The 'table entries' must be created via a user program and can only be logically accessed via a user program. When passed, the entire LDS must be mapped into storage, then data is accessed via base and displacement type processing.

96. What is the Importance of GLOBAL clause According to new standards of COBOL

A. When any data name, file-name , Record-name, condition name or Index defined in an Including Program can be referenced by a directly or indirectly in an included program, Provided the said name has been declared to be a global name by GLOBAL Format of Global Clause is01 data-1 PIC 9(5) IS GLOBAL.

97. What is the Purpose of POINTER Phrase in STRING command

A. The Purpose of POINTER phrase is to specify the leftmost position within receiving field where the first transferred character will be stored

98.How do we get currentdate from system with century?

A. By using Intrinsic function, FUNCTION CURRENT-DATE

99.what is the difference between search and search all in the table handling?

A. Search is a linear search and search all is a binary search.

100.What is the maximum length of a field you can define using COMP-3?

A. 10 Bytes (S9(18) COMP-3).

101.How many Sections are there in Data Division?.

A. SIX SECTIONS 1.'FILE SECTION' 2.'WORKING-STORAGE SECTION' 3.'LOCAL-STORAGE SECTION' 4.'SCREEN SECTION' 5.'REPORT SECTION' 6.'LINKAGE SECTION'

In COBOL II, there are only 4 sections. 1.'FILE SECTION' 2.'WORKING-STORAGE SECTION' 3.'LOCAL-STORAGE SECTION' 4.'LINKAGE SECTION'.

102.How can I tell if a module is being called DYNAMICALLY or STATICALLY?

A. The ONLY way is to look at the output of the linkage editor (IEWL) or the load module itself. If the module is being called DYNAMICALLY then it will not exist in the main module, if it is being called STATICALLY then it will be seen in the load module. Calling a working storage variable, containing a program name, does not make a DYNAMIC call. This type of calling is known as IMPLICIT calling as the name of the module is implied by the contents of the working storage variable. Calling a program name literal (CALL).

103. What is the difference between a DYNAMIC and STATIC call in COBOL.

A. To correct an earlier answer: All called modules cannot run standalone if they require program variables passed to them via the LINKAGE section. DYNAMICALLY called modules are those that are not bound with the calling program at link edit time (IEWL for IBM) and so are loaded from the program library (joblib or steplib) associated with the job. For DYNAMIC calling of a module the DYNAM compiler option must be chosen, else the linkage editor will not generate an executable as it will expect null address resolution of all called modules. A STATICALLY called module is one that is bound with the calling module at link edit, and therefore becomes part of the executable load module.

104. What is the difference between PIC 9.99 and 9v99?

A. PIC 9.99 is a FOUR-POSITION field that actually contains a decimal point where as PIC 9v99 is THREE-POSITION numeric field with implied or assumed decimal position.

105. How is PIC 9.99 is different from PIC 9v99?

A. PIC 9.99 is a four position field that actually contains a decimal point where as 9v99 is a three position numeric field with an implied or assumed decimal point.

106. What is Pic 9v99 Indicates?

A. PICTURE 9v99 is a three position Numeric field with an implied or assumed decimal point after the first position; the v means an implied decimal point.

107. What guidelines should be followed to write a structured COBOL program?

1) Use 'EVALUATE' stmt for constructing cases. 2) Use scope terminators for nesting. 3) Use in-line Perform stmt for writing 'do' constructions. 4) Use Test Before and test after in the Perform stmt for writing Do-While constructions.

108. Read the following code.

```
01 ws-n PIC 9(2) value zero.
```

```
a-para.
```

```
move 5 to ws-n.
```

```
perform b-para ws-n times.
```

```
b-para.
```

```
move 10 to ws-n.
```

How many times will b-para be executed ?

A. 5 Times only. it will not take the value 10 that is initialized in the loop.

109. What are some examples of command terminators?

A. END-IF, END-EVALUATE

110. What care has to be taken to force program to execute above 16 Meg line?

A. Make sure that link option is AMODE=31 and RMODE=ANY. Compile option should never have SIZE(MAX).BUFSIZE can be 2K, efficient enough.

111. Give some advantages of REDEFINES clause.

A. You can REDEFINE a Variable from one PICTURE class to another PICTURE class by using the same memory location. By REDEFINES we can INITIALISE the variable in WORKING-STORAGE Section itself. 3. We can REDEFINE a Single Variable into so many sub-variables. (This facility is very useful in solving Y2000 Problem.)

112. Why do we code s9(4)comp. In spite of knowing comp-3 will occupy less space.

A. Here s9(4)comp is small integer, so two words equal to 8 bytes. Totally it will occupy 2 bytes (4 words). Here in s9(4) comp-3 as one word is equal to 1/2 byte. 4 words equal to 2 bytes and sign will occupy 1/2 bytes totally it will occupy 3 bytes.

113. The maximum number of dimensions that an array can have in COBOL-85 is \_\_\_\_\_.

Answer: SEVEN in COBOL - 85 and THREE in COBOL - 84

114. Name the divisions in a COBOL program.

A. IDENTIFICATION DIVISION, ENVIRONMENT DIVISION, DATA DIVISION, PROCEDURE DIVISION.

115. What are the different data types available in COBOL?

A. Alpha-numeric (X), alphabetic (A) and numeric (9).

116. What is 77 level used for?

A. Elementary level item. Cannot be subdivisions of other items (cannot be qualified), nor can they be subdivided themselves.

117. What is 88 level used for?

A. For defining condition names.

118. What is level 66 used for?

A. For RENAMES clause.

119. What does the IS NUMERIC clause establish?

A. IS NUMERIC can be used on alphanumeric items, signed numeric & packed decimal items and unsigned numeric & packed decimal items. IS NUMERIC returns TRUE if the item only consists of 0-9. However, if the item being tested is a signed item, then it may contain 0-9, + and -.

120. My program has an array defined to have 10 items. Due to a bug, I find that even if the program access the 11th item in this array, the program does not abend. What is wrong with it?

A. Must use compiler option SSRANGE if you want array bounds checking. Default is NOSSRANGE.

121. What is the difference between performing a SECTION and a PARAGRAPH?

A. Performing a SECTION will cause all the paragraphs that are part of the section, to be performed.

Performing a PARAGRAPH will cause only that paragraph to be performed.

122. Can I redefine an X(200) field with a field of X(100)?

Yes.

123. What does EXIT do?

A. Does nothing! If used, must be the only sentence within a paragraph.

124. Can I redefine an X(100) field with a field of X(200)?

A. Yes. Redefines just causes both fields to start at the same location.

For example:

```
01 WS-TOP PIC X(1)
```

```
01 WS-TOP-RED REDEFINES WS-TOP PIC X(2).
```

If you MOVE '12' to WS-TOP-RED,  
DISPLAY WS-TOP will show 1 while  
DISPLAY WS-TOP-RED will show 12.

125. Can I redefine an X(200) field with a field of X(100)?

A. Yes.

126. What do you do to resolve SOC-7 error?

A. Basically you need to correct the offending data. Many times the reason for SOC7 is an un-initialized numeric item. Examine that possibility first. Many installations provide you a dump for run time abends (it can be generated also by calling some subroutines or OS services thru assembly language). These dumps provide the offset of the last instruction at which the abend occurred. Examine the compilation output XREF listing to get the verb and the line number of the source code at this offset. Then you can look at the source code to find the bug. To get capture the runtime dumps, you will have to define some

datasets (SYSABOUT etc ) in the JCL. If none of these are helpful, use judgement and DISPLAY to localize the source of error. You may even use batch program debugging tools.

127.How is sign stored in Packed Decimal fields and Zoned Decimal fields?

A. Packed Decimal fields: Sign is stored as a hex value in the last nibble (4 bits ) of the storage. Zoned Decimal fields: As a default, sign is over punched with the numeric value stored in the last bite.

128.How is sign stored in a comp-3 field?

A. It is stored in the last nibble. For example if your number is +100, it stores hex 0C in the last byte, hex 1C if your number is 101, hex 1D if the number is -101, hex 2D if the number is -102 etc...

129.How is sign stored in a COMP field ?

A. In the most significant bit. Bit is on if -ve, off if +ve.

130.What is the difference between COMP & COMP-3 ?

A. COMP is a binary storage format while COMP-3 is packed decimal format.

131.What is COMP-1? COMP-2?

COMP-1 - Single precision floating point. Uses 4 bytes.

COMP-2 - Double precision floating point. Uses 8 bytes.

132.How do you define a variable of COMP-1? COMP-2?

A. No picture clause to be given. Example 01 WS-VAR USAGE COMP-1.

133.How many bytes does a S9(7) COMP-3 field occupy ?

A. Will take 4 bytes. Sign is stored as hex value in the last nibble. General formula is  $\text{INT}((n/2) + 1)$ , where  $n=7$  in this example.

134.How many bytes does a S9(7) SIGN TRAILING SEPARATE field occupy ?

A. Will occupy 8 bytes (one extra byte for sign).

135.What is the maximum size of a 01 level item in COBOL I? in COBOL II?  
In COBOL II: 16777215

136.What is COMP SYNC?

A. Causes the item to be aligned on natural boundaries. Can be SYNCHRONIZED LEFT or RIGHT.

For binary data items, the address resolution is faster if they are located at word boundaries in the memory. For example, on main frame the memory word size is 4 bytes. This means that each word will start from an address divisible by 4. If my first variable is x(3) and next one is s9(4) comp, then if you do not specify the SYNC clause, S9(4) COMP will start from byte 3 ( assuming that it starts from 0 ). If you specify SYNC, then the binary data item will start from address 4. You might see some wastage of memory, but the access to this comp field is faster.

137.How do you reference the following file formats from COBOL programs?  
Fixed Block File - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS F, BLOCK CONTAINS 0.

Fixed Unblocked - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS F, do not use BLOCK CONTAINS.

Variable Block File - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS V, BLOCK CONTAINS 0. Do not code the 4 bytes for record length in FD. i.e. JCL record length will be max record length in program + 4

Variable Unblocked - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS V, do not use BLOCK CONTAINS. Do not code 4 bytes for record length in FD ie JCL rec length will be max rec length in pgm + 4.

ESDS VSAM file - Use ORGANISATION IS SEQUENTIAL.

KSDS VSAM file - Use ORGANISATION IS INDEXED, RECORD KEY IS, Alternate Record Key Is

RRDS File - Use ORGANISATION IS RELATIVE, RELATIVE KEY IS

Printer File - Use ORGANISATION IS SEQUENTIAL. Use RECORDING MODE IS F, BLOCK CONTAINS 0. (Use RECFM=FBA in JCL DCB).

138.What are different file OPEN modes available in COBOL? In which modes are the files Opened to write.

A. Different Open modes for files are INPUT, OUTPUT, I-O and EXTEND. Of which Output and Extend modes are used to write new records into a file.

139. In the JCL, how do you define the files referred to in a subroutine?  
 A. Supply the DD cards just as you would for files referred to in the main program.

140. Can you REWRITE a record in an ESDS file? Can you DELETE a record from it?  
 A. Can rewrite (record length must be same), but not delete.

141. What is file status 92?  
 A. Logic error. e.g., a file is opened for input and an attempt is made to write to it.

142. What is file status 39?  
 A. Mismatch in LRECL or BLOCKSIZE or RECFM between your COBOL pgm & the JCL (or the dataset label). You will get file status 39 on an OPEN.

143. What is Static, Dynamic linking?  
 A. In static linking, the called subroutine is link-edited into the calling program, while in dynamic linking, the subroutine & the main program will exist as separate load modules. You choose static/dynamic linking by choosing either the DYNAM or NODYNAM link edit option. (Even if you choose NODYNAM, a CALL identifier (as opposed to a CALL literal), will translate to a DYNAMIC call).  
 A statically called subroutine will not be in its initial state the next time it is called unless you explicitly use INITIAL or you do a CANCEL. A dynamically called routine will always be in its initial state.

144. Explain NEXT and CONTINUE verbs for file handling.  
 A. The Continue verb is used for a situation where there is no EOF condition. i.e. The records are to be accessed again and again in a file. Whereas in the next verb the indexed file is accessed sequentially, whence when index clause is accessed sequentially read next record command is used.

145. What is AMODE(24), AMODE(31), RMODE(24) and RMODE(ANY)? (applicable to only MVS/ESA).  
 A. These are compile/link edit options. AMODE - Addressing mode. RMODE - Residency mode.  
 AMODE(24) - 24 bit addressing. AMODE(31) - 31 bit addressing. AMODE(ANY) - Either 24 bit or 31 bit addressing depending on RMODE. RMODE(24) - Resides in virtual storage below 16 Meg line. Use this for 31 bit programs that call 24 bit programs. (OS/VS Cobol pgms use 24 bit addresses only). RMODE(ANY) - Can reside above or below 16 Meg line.

146. What compiler option would you use for dynamic linking?  
 DYNAM.

147. What is SSRANGE, NOSSRANGE?  
 A. These are compiler options w.r.t subscript out of range checking. NOSSRANGE is the default and if chosen, no run time error will be flagged if your index or subscript goes out of the permissible range.

148. How do you set a return code to the JCL from a COBOL program?  
 A. Move a value to RETURN-CODE register. RETURN-CODE should not be declared in your program.

149. How can you submit a job from COBOL programs?  
 A. Write JCL cards to a dataset with  
 //xxxxxxx SYSOUT=(A,INTRDR) where 'A' is output class, and dataset should be opened for output in the program. Define a 80 byte record layout for the file.

150. What are the differences between OS VS COBOL and VS COBOL II?  
 OS/VS Cobol pgms can only run in 24 bit addressing mode, VS Cobol II pgms can run either in 24 bit or 31 bit addressing modes allowing program to address above 16 Meg main storage line.  
 Report writer is supported only in OS/VS Cobol.  
 USAGE IS POINTER is supported only in VS COBOL II.  
 Reference modification eg: WS-VAR(1:2) is supported only in VS COBOL II.  
 COBOL II introduces new features (EVALUATE, SET ... TO TRUE, CALL ... BY CONTEXT, etc)  
 Scope terminators are supported in COBOL II.

OS/VS Cobol follows ANSI 74 stds while VS COBOL II follows ANSI 85 stds. Under CICS Calls between VS COBOL II programs are supported. COBOL II supports structured programming by using in-line PERFORM 's. COBOL II does not support old features (READY TRACE, REPORT-WRITER, ISAM, etc.). In non-CICS environment, it is possible. In CICS, this is not possible.

#### COBOL FREQUENTLY ASKED QUESTIONS

last updated 09/21/2002 06:18:03

Note: The most recent questions appear last. Also, even though some questions relate to assignments from previous terms the questions are dealing with problems that may occur any term and so all the information should be helpful.

Q: I get an error message saying my directory space has run out. Answer  
Q: Check doesn't seem to stop below an obvious error. Answer  
Q: Check stopped on a name in the input file description and said it was invalid. How can the name of something I am inputting be invalid? Answer  
Q: When I try to change the spacing between my heading or detail line elements the spacing stays exactly the same. Answer  
Q: In assignment 3 the instructions say to use the evaluate verb to test stu-status. What is evaluate and how do I code it and where do I put it inside all my code to make it work right? Answer  
Q: How do I create a data file? Can't I just create it in WordPerfect? Answer  
Q: I don't know where to start on assignment 3. Help! Answer  
Q: When I run my program I get the message, " Read part record error: EOF before EOR or file open in wrong mode." Answer  
Q: I get a nestcall error when I run my program. What is wrong? Answer  
Q: I'm confused about how to print two reports with the same program. Answer  
Q: How do I use COMM-CODE as a subscript when I don't see it anywhere. Answer  
Q: I'm using the READ INTO verb to read my sorted file but where is the file being read into? Answer  
Q: I'd like to use a Printer Spacing Chart but they don't sell them in the bookstore and I can't find them anywhere in town. Where can I get one? Answer  
Q: The Animator V2 looks like it would be easier to use than the character based interface but I don't know where to start in using it. Answer  
Q: I am having trouble downloading assignment 1a from Mr. Ustick's home page. It is saying that it cannot open it in Media Player. I copied the files in the computer lab previously, but my assignment 1 is not working, so I thought I might need to download something off the net. Do you have any suggestions? Answer  
Q: My column heading printed above my summary on the last page. How do I get rid of the column heading and just print the summary? Answer  
Q: How do I put a date in my heading in the form MM/DD/YY? Answer  
Q: Can I use another compiler such as the one by Fujitsu to do my assignments? Answer  
Q: My printout comes out on 3 pages for assignment 2 but you have everything posted as being on 2 pages. Answer  
Q: When I look at my display of our assignment 2 the names start at a Leigh Glover. I can not scroll any upwards any further. I have tried for several days everything I can think of to change my display. When I compile the program I do not get an error message, so I am pretty sure I have put in the commands correctly. Answer  
Answers:  
Q: I get an error message saying my directory space has run out.

A: Make sure you have a floppy disk with sufficient space to hold the file you are editing or attempting to create. Try another newly formatted floppy disk if the error persists. Back to top

Q: Check doesn't seem to stop below an obvious error.

A: Make sure all the division names are spelled correctly including Working-Storage section. Note only one hyphen in that title. When a division name is misspelled check may stop much further down the program and never highlight the misspelling. The most common misspelling is ENVIRONMENT. Also, if you trace down one line of code that you know for certain is causing a problem but nothing seems misspelled or incorrect syntactically then delete the line and re-type it. Sometimes a hidden ASCII character can inadvertently get typed in and this will cause an error when checking. Back to top

Q: Check stopped on a name in the input file description and said it was invalid. How can the name of something I am inputting be invalid?

A: The problem is probably in the Procedure division. Micro Focus can't find a reference to that File Description element in your program. Make sure the input FD elements are spelled correctly as well as the references in the Procedure Division. This problem can arise from a simple misspelling or if you are doing Extra credit problem 1 and modify the FD but not references to the FD elements later on in the Procedure division. Back to top

Q: When I try to change the spacing between my heading or detail line elements the spacing stays exactly the same.

A: Two common problems can cause this. For any change to take effect you must save the program and then re-check and animate (compile and run). If you have done this then the second common error is putting spaces between columns when you are out of spaces in the line. Take spaces out of the very end of the line and see if the heading or detail line spacing changes. If so then I would suggest drawing the heading and/or detail line out on IBM Print Chart paper or common graphing paper and setting the heading and/or detail line up with proper spacing to fill the 80 or 132 columns that your output calls for. Drawing your headings and/or detail lines will allow you to easily see the character and filler spaces necessary to write pic statements. While writing the pic statements "on the fly" seems quicker, drawing them out on graph paper and writing pic statements could save you hours in the long run. Also, in industry a well documented program would require the output pages to be drawn out for reference in case the program needed modification. Back to top

Q: In assignment 3 the instructions say to use the evaluate verb to test stu-status. What is evaluate and how do I code it and where do I put it inside all my code to make it work right?

A: I have explained the EVALUATE VERB <evaluate.html> with extensive examples that everyone from beginner to experienced programmer can follow and immediately implement in their code. Back to top

Q: How do I create a data file? Can't I just create it in WordPerfect?

A: I have seen a number of people use WordPerfect and not save the file as an ASCII file which results in an unusable data file. You should look at the data file for a previous assignment along with it's File Description and read the exhaustive instructions I have written on CREATING A DATA FILE <datafile.html> before you create the file the wrong way and waste hours trying to figure out why your program won't run. Back to top

Q: I don't know where to start on assignment 3

A: I have prepared a GUIDE <firstprog.html> listing the steps I would take in approaching assignment 3 or any of the latter assignments. Back to top

Q: When I run my program I get the message, " Read part record error: EOF before EOR or file open in wrong mode."

A: You must use the phrase "ORGANIZATION IS LINE SEQUENTIAL" in the

select statement of the Environment Division for your data file. See your first two sample programs or the text for proper placement of the phrase. Back to top

Q: I get a nestcall error when I run my program. What is wrong?

A: If you are running a nested subprogram ( a subprogram within the file containing your main program) you need to set the compiler directive. There are several ways of doing this. Your assignment instructions let you know a manual method of setting the directive. There is however; a way to hard code the directive. At the very beginning of your program code the following line:

Column 789

```
$SET NESTCALL
```

```
IDENTIFICATION DIVISION.
```

The column numbers and identification division are there to give you a reference. Starting in COLUMN 7 code \$SET NESTCALL and the compiler directive will be set when you compile the program. Back to top

I'm confused about how to print two reports with the same program.

A: If you are printing two different reports while each record is being processed such as an error report and regular good record report then you should use two different files. This means where you have one select statement now in the Environment Division you need two along with and FD for each select statement. If you are printing one report while processing the records and then printing another report after the records are processed (such as traversing your wholesale price table to print all the entries) you only need one print-out. In this latter case if you think about what is physically happening all of the records have been processed and the report has been printed. The second report doesn't require the records to be read again, it only requires the price table to be traversed and the entries printed out. In this case you can use one print-out and both reports will be in the same file and you only need to print one file to print both reports. Back to top

How do I use COMM-CODE as a subscript when I don't see it anywhere.

A: COMM-CODE appears in your copy file. You might want to print a copy of the "cpy" file to aid you in debugging your program. If COMMISSION redefined the commission table (your embedded table) then you would say COMMISSION(COMM-CODE) to access the proper entry. Back to top

I'm using the READ INTO verb to read my sorted file but where is the file being read into?

A: You are reading into a file description that is specified by the copy statement and this copy file is read into your main program at the time of compilation. Back to top

I'd like to use a Printer Spacing Chart but they don't sell them in the bookstore and I can't find them anywhere in town. Where can I get one?

A: You can download a 132 COLUMN PRINTER SPACING CHART <../docs/spchrt.zip> here by clicking on the hyperlinked text. I designed the chart in Microsoft Excel. If you have Excel on your home system you can click on the file and it should open in Excel and allow you to print it; otherwise, you can print it out at the UWF Computer Lab. Back to top

Q: The Animator V2 looks like it would be easier to use than the character based interface but I don't know where to start in using it.

A: I have written a brief MANUAL <../docs/v2manual.zip> which you can examine online or print. The MANUAL <../docs/v2manual.zip> takes you through common tasks in the Animator such as "Entering a program", "Compiling a program", "Beginning and advanced debugging options", and more. Back to top

Q: I am having trouble downloading assignment 1a from Mr. Ustick's home page. It is saying that it cannot open it in Media Player. I copied the files in the computer lab previously, but my assignment 1 is not working, so I thought I might need to download something off the net. Do you have any suggestions?

A: It sounds like you tried to download the file to your home computer (which is fine) but your system has files with a "dat" extension associated with the media player you mentioned. You may have told the system to automatically open files of that type using the media player application or it may have done so by default. In any case if you are using Netscape Navigator 4.0 or higher then to correct the problem do the following: Click "Edit", "Preferences", double click "Navigator", click "Applications", then find the media player and click on "edit". Simply check the box that says "ask me before opening downloaded files of this type". Then you will have the option to save or open the file. You always want to download it to the drive on your system where your assignment is located. The theory is the same if you are using Internet Explorer but of course the steps will be different. Back to top

Q: My column heading printed above my summary on the last page. How do I get rid of the column heading and just print the summary?

A: There are a couple of ways to solve this problem depending on where you want the summary to print and whether it needs it's own top of page. I have a section devoted to SUMMARY TIPS <summary.html> so this might help. Back to top

Q: How do I put a date in my heading in the form MM/DD/YY?

A: I have a section devoted to DATES <dates.html> that you may want to read. Back to top

Q: Can I use another compiler such as the one by Fujitsu to do my assignments?

A: You can use any Cobol compiler that adheres to the ANSI 85 standards. UWF uses Micro Focus because it is one of the very best compilers enabling mainframe code to be developed on a PC. There are many Cobol compilers such as RM, Microsoft, Fujitsu, others on the market. A student used the Fujitsu compiler, which also is a graphical compiler similar to Micro Focus Animator V2, in the past with no problems. The Fujitsu compiler plus documentation takes over 20 megabytes of space. You can follow this link to download the FUJITSU COMPILER <<http://www.adtools.com/download/v3starter/index.htm>>. I suggest downloading it to a zip disk from the UWF LAN due the universities higher speed Internet connection. If you are someone that is struggling to create folders and move files in Windows you probably are not a candidate to use this compiler. If; however, you are comfortable downloading and installing programs in Windows and you want to work at home but can't afford to buy the Micro Focus compiler then this demo compiler may help you. I have to give you one final word of caution. I offer no support to help you install or debug specifically in the Fujitsu environment. At the beginning Cobol level you should have no problem compiling your code with either Micro Focus or Fujitsu. Remember the source file is only an ASCII text file. You could therefore still bring your program in and recompile it on the LAN and produce and print your output with Micro Focus after developing your program at home with either Micro Focus or Fujitsu. Back to top

Q: My printout comes out on 3 pages for assignment 2 but you have everything posted as being on 2 pages.

A: Micro Focus lacks the versatility of a word-processing program in allowing you to easily do print previews and formatting of your output before printing. Also, as in the case of assignment 2 it can be downright "buggy". If you look at the assign2.out file in Micro Focus you can see some strange characters near the first page break. These characters don't print but they let the printer know when to perform a page break. Usually these work but sometimes the Animator has a problem sending the output properly to a network printer resulting in split printouts and wasted blank pages. To solve this problem you can easily print your assignment 2 output in Wordpad, Notepad, and Microsoft Word 97. To open the output file in Wordpad or Notepad click "Start", "Programs", "Accessories", then Wordpad or Notepad. Then after starting

Wordpad or Notepad use "File" and "Open" to select the output file on your floppy disk and print it with "file" and "print" as is standard in Windows.

For Word 97 (actually the easier method) simply click "start", "new office document " from the main menu bar", then select "blank document" and click "ok". Then click "file" and "open" and select your assgn1.out file. When you try to open the "out" file in Word you may get a conversion box that says the system has detected Unicode (UTF-8). Click "ok" and let the document be converted. You can delete any unnecessary page breaks and use "file" "print preview" to verify you have only two pages to print. Then click "file" and "print" and "ok" in the network print box and you're done. You can also save the "out" file with a "doc" extension so you can open and print the document in Word again. Back to top

Q: When I look at my display of our assignment 2 the names start at a Leigh Glover. I can not scroll any upwards any further. I have tried for several days everything I can think of to change my display. When I compile the program I do not get an error message, so I am pretty sure I have put in the commands correctly.

A: I ran your program and everything looked great. I think your confusion lies in understanding the "Display" verb. If you examine the code the "Display" is placed near the end of the processing loop in the Procedure Division. "Display" sends the detail line (in this case) to the screen. Therefore, you can click the orange Animator icon on the bottom bar of the Animator screen and get a DOS screen. But remember what we see on the display screen is temporary. Your permanent data is sent to the file "a:\\assgn2.out". (or whatever path you are using) The "Display" verb and display screen are aids to debugging and the "Display" was included so you could see it in action. You might need it later in your debugging arsenal (hint hint)

If you re-run your program you will find that by using "step" on the bottom bar of the Animator V2 window you can run each line of code one line at a time and when the "Display" is executed that single line will be written to the display screen. You will also see in the code where print out is written from the detail line. That code is where your permanent output file is written. Additionally concerning the display screen, you can not scroll up or clear the DOS Display window. I don't think that's a good design feature but that's how Micro Focus designed it. You will find that quirk about the display screen covered in my Animator V2 manual <../docs/v2manual.zip>1 which you can download.

At last you are ready to print your output which looks great by the way--good job. If you encounter a quirk where Micro Focus splits your output into 3 pages at a bizarre location (which it will for some inexplicable reason not related to your code) then you can print the output very simply in Word 97. I explain in detail how to print your output in Word in a previous question. Back to top.

#### CICS

1. Which of the following does multithreading allow?

A. several transactions that require the same program to use one copy of the program. B. many tasks to be allocated to the terminal. C. an audit trail of all files records from all files updated by a particular application

2. Under CICS, multitasking achieved by what method?

A. virtual paging. B. task switching. C. priority numbering, D. pseudo conversational

3. What are programs that are reusable to each task and restarted by each task said to be?

A. Command-Level. B. Transaction Dependent. C. Prioritized. D. Quasi-

Reentrant.

4. What three control programs execute in a task?

A. File Control/Temp Storage Control/Trace Control. B. Task Control/Interval Control/BMS Control. C. Terminal Control/Task Control/Program Control. D. Journal Control/Dump Control/Storage Control

5. Which are the correct ways to initiate CICS tasks?

A. Automatic Task Initiation/Exec CICS Start. B. CALL Statement/Receivable Map/Send Map. C. Permanent Transaction ID/Temporary Transaction ID. D. PA Key/XCTL Statement/Interval Control Transaction ID

6. A CICS Cobol program must first be \_\_\_\_\_ before compiled.

A. linked to CICS tables. B. new copied. C. loaded to CICS object table. D. translated.

7. Online files must have an entry in the:

A. resource control table. B. vsam master catalog. C. file control table. D. file initialization table.

8. For data fields that should not be entered or cleared you can use what characteristic?

A. Unprotected. B. Normal. C. Initial Value. D. Autoskip.

9. The cursor can be controlled by using a special one byte field called:

A. stopper field. B. jump field. C. shift field. D. tag field.

10. Name the types of maps used in CICS:

A. BMS Map/Mapset. B. Offline Map/Online Map. C. Physical Map/Symbolic map. D. Symbolic Map/Temp Map.

11. BMS uses \_\_\_\_\_ to load the appropriate physical map into main storage.

A. load library. B. program control. C. mapset. D. temp storage.

12. With BMS, two (2) major application benefits are given to the programmer. They are:

A. Physical Map/Assembler Macro. B. Symbolic Maps/Mapsets. C. Device and Data independence. D. Mapsets/Coding Rules.

13. Which answer describes a rule for coding a BMS Macro?

A. Label is from one (1) to seven (7) characters long with the first character being alphabetic. B. Getmain command should be coded first. C. Op-code is separated from the label by an asterisk. D. Operands start in column 20 separated by commas.

14. The second BMS macro (OP Code DFHMDI) has which function?

A. Specifies length of the field. B. Defines a field with a map and its position. C. States purpose of field - Input, Output or both. D. Contains size parameters of Map.

15. If the program uses other keys besides "enter" to control logic, a copy of \_\_\_\_\_ should be used in working storage of program.

A. ebaid. B. dfhaid. C. dfhbmsca. D. dfheivar.

16. Which two entries are usually found in the linkage section?

A. Execute Interface Block/Transaction Work Area. B. Symbolic Maps/DFATTRBS. C. DFHEIV11 / Communication Area. D. Dfhcommarea/Execute Interfaced Block.

Tentative answer key: 1. A 2. D 3. D 4. C 5. D 6. D 7. C 8. D 9, A 10. C 11. B 12. C 13. A 14. D 15. B 16. D.

17. Which of the following fields will be found with the execute interface block?

A. Attr-prot/Attr-unprot/Attr-Prot-askip. B. Eibtranid/Eibtramid/Eitbaid/. C. Eibposn/Eibmapnm/Eibfilm. D. Dfheiv0/Dfheiv99/Dfhnul.

18. When coding linkage pointers, what is it important to ensure?

A. that Symbolic storage is never over 4096K. B. that the structure is packed decimal. C. that the size pointer is equal to the symbolic map size. D. that each pointer appears in the same sequence as the 01 level entry it refers to.

19. Which of the following CICS Tables utilizes trans IDs?

A. TCT. B. PCT. C. RCT. D. PPT.

20. Which of the following terminates a task in true pseudo-conversational fashion?  
A. Erase. B. Suspend. C. End-Exec. D. Return.
21. Which of the following is acquired for a program before it executes a task?  
A. Transaction Word Area. B. Dfhcommarea. C. Communication Area. D. Map Area.
22. What does the Handle Aid command do?  
A. It specifies terminal keys and/or other attention identifiers with corresponding routines for execution. B. It automatically tries to correct error storage abends. C. It identifies status codes on file reads to determine error messages. D. It sets all PF-keys to ANSI standards where pre-processing proceeds to generate logic for routines necessary.
23. Which of the following best describes the Handle condition?  
A. method of detecting an error condition and then branching to logic in a program to handle the error. B. used to determine whether to release resources and save starting point. C. automatically determines that an inputted field is to be updated. D. terminates session based upon stated return-codes.
24. Which of the following is only true of the fields with modified data tag "On"?  
A. They can be modified. B. They are made available for upgrade, regardless of map name and fset usage. C. They will be transferred to the symbolic map on a receive command. D. They may be used on a send command.
25. Which of the following describes a way of setting the Modified Data Tag (MDT) on?  
A. Attributes may be changed by the programmer to include the fset attribute. B. Attributes can be set to fset via passing them to call program "DFHFSET" prior to sending map. C. Specify FSET as one of the attributes when coding the BMS macro map definition. D. Moving fields necessary to "Fset" type symbolic map. E. Either a or c.
26. Why are maps grouped into mapsets?  
A. to load all related maps into main storage for quick retrieval. B. to document maps within a process or application. C. to identify all application maps in the order in which they will appear. D. to allow map-names to be duplicated in different applications
27. Debug or debug translation options are utilized by what facility?  
A. Time Sharing Option (TSO). B. Linkage Editor. C. Information Efficiency Facility (IEF). D. Execute Diagnostic Facility (EDF).
28. What action will the translation option "Seq" cause?  
A. sequencing the source statements. B. flagging all statements that are not in sequence. C. The priority order of terminals will be the function of resource utilization. D. Telling CICS that the program will re-sequence map execution in order of program usage, not mapset order.
29. What type of abend is issued by the system if a receive map is executed when no map has been displayed?  
A. Record not found. B. Map not found/Map failure. C. Duplicate record. D. Invalid attention identifier used. E. Initialization Queue error condition.
30. When the dataonly operand on sending a map is used, which item below would be left out of the SEND command?  
A. Map. B. Erase. C. Delete. D. Set-on. E. Cursor.
31. What is the purpose of issuing eraseup?  
A. to erase unchanged user entered fields and set modified data tags to "on". B. to set the values of all non-protected fields to null. C. to automatically erase all successfully updated fields and set modified data tags and fset to "off". D. to erase all updated fields and reset map prior to change.
32. Which of the following is true about online files?

A. Definition of files resides in the File Control Table which determines what action are allowed. B. Such files are used by many transactions at different times. C. Files that are needed by all applications may be opened when CICS is initialized and closed when CICS is terminated. D. Programs that open and close online files require special CICS macros. E. All of the above.

Tentative answer key: 17. C 18, D 19. B 20. D 21. B 22. A 23, A 24. C 25. E 26. A 27. D 28 D? 29. B 30. B 31. C 32.

33. Which of the following are uses of the Getmain command?  
 A. adding a record to the file. B. writing out a journal record. C. obtaining new temp storage. D. manipulating fields defined in the Linking Area. E. all of the above

34. Which of the following is the correct syntax for reading a record from a temporary storage queue?  
 A. Read TSQ. B. ReadTSQ. C. ReadQue TS. D. ReadQ TS.

35. The readnext command is performed in which case?  
 A. sequential read/update. B. Vsam ESDS file access. C. Dynamic searches. D. After a browse is started.

36. On which type of file would you use readprev?  
 A. Vsam. B. Qsam. C. IMS. D. Bdam.

37. Which of the following are the two (2) commands needed to release exclusive control from a record or block?  
 A. Freemain/Erase. B. Delete/syncpoint. C. Unlock/Rewrite. D. Rollback/Release. E. Return/Suspend.

38. Which of the following is a function of syncpoint?  
 A. to clear out buffers and temp storage. B. to clear out buffers and physically write records to file. C. to reset all Key-Sequence files to current key in use at syncpoint declare. D. to backout all transactions from buffers upon no update decision.

39. Which of the following best defines the action of a suspend command?  
 A. takes a current task out of service and places it in the Wait queue. B. cancels a transaction dump of transient storage data. C. deactivates the debugging activities in process. D. cancels and restarts program execution.

40. Which of the following are the four basic areas affected by CICS commands?  
 A. Terminal I-O/Temporary Storage/File Control/Program Control. B. CEMT/Resource Control/Task Control/Terminal I-O. C. Process Control/Program Control/Address Pointers/BMS. D. Suspend/Getmain/Reads/Writes

41. The release command will delete from main storage any mapset table and program previously obtained through which of the following?  
 A. XCTL. B. Link. C. Return. D. Load.

42. The XCTL command transfers control from one program to another at the same:  
 A. storage address. B. logical level. C. higher level. D. lower level.

43. Into where can the load command load a program from the library?  
 A. transient storage. B. communications area. C. main storage. D. symbolic map

44. The link command can call another program at the next \_\_\_\_\_ and regains control when the last program issues a:  
 A. lower send map; link. B. Lower logical level; return. C. Higher logical level; freemain. D. issued transaction ID; load.

45. For what is the CESN transaction primarily utilized?  
 A. system security. B. closing files. C. application library controls. D. debugging

46. Which of the following is an example of correct usage of the CEMT transaction?  
 A. Security control. B. Debugging. C. Terminal information and controls. D. Temporary storage allocations

47. How does a program gain access to the TWA?  
A. reading a dataset. B. the Address Command. C. the Exec-CICS statement. D. calling program 'DFHEI1'.

48. For what is the CEDF transaction used?  
A. task management. B. files and DASD control. C. CICS data facility manager. D. Debugging programs.

Tentative answer key: 1. A 2. D 3. D 4. C 5. D 6. D 7. C 8. D 9, A 10. C 11. B 12. C 13. A 14. D 15. B 16. D 17. C 18, D 19. B 20. D 21. B 22. A 23, A 24. C 25. E 26. A 27. D 28 D? 29. B 30. B 31. C 32. E 33. C 34. D 35. D 36. A 37. C 38. B 39. A 40. A 41. D 42. B 43. C 44. B 45. A 46. C 47. B 48. D.

11/14/99: Karl Haynes: 'Can you use the INSPECT (with TALLYING option) Cobol verb in a CICS COBOL program? My program abends as soon as it hits this statement at run time. However, it does cleanly compile.' Web note: My initial take is that you can; the problem is elsewhere. I'm posting in case I've missed something and will post corrections.

6/4/99: Roland: 'I have two questions regarding CICS. "how to build up LU 6.2 communication?" and "what Psuedo-conversational and real conversational transaction are and their differences." Web note: Pseudo-conversational transactions are almost always the preferred method. In this mode CICS releases resources between responses to user input, i.e. the task is ended awaiting the user response. Please mail LU 6.2 answers to Roland at <mailto:vlpa@netvigator.com>

Q1. Name some of the common tables in CICS and their usage.

A1. PCT Program Control Table - defines each transaction, containing a list of valid transaction identifiers (transid) where each transaction is paired with its matching program; PPT Program Processing Table - contains a list of valid program names and maps and whether a current version is in the CICS region or needs to be brought in as a new copy; FCT File Control Table - contains a list of files known to CICS, the dataset name and status (closed/open, enabled/disabled); TCT Terminal Control Table - a list of the terminals known to CICS.

Q2. Name some common CICS service programs and explain their usage.

A2. Terminal Control, File Control, Task Control, Storage Control, etc. Each CICS services program controls the usage and status for its resource (file, terminal, etc) within the CICS region.

Q3. What is meant by a CICS task?

A3. A CICS task exists from the time the operator presses the enter key until the application program returns control to CICS.

Q4. What is meant by program reentrance?

A4. A program is considered reentrant if more than one task can execute the code without interfering with the other tasks' execution.

Q5. What is the common systsems area (CSA)?

A5. The common systems area is the major CICS control block that contains system information, including pointers to most other CICS control blocks. The CSA points to all members of STATIC storage.

Q6. What is the COMMAREA (communications area)?

A6. This is the area of main storage designed to let programs or tasks communicate with one another, used in programs via RETURN, XCTL and LINK commands.

Q7. What is the EIB (execute interface block)?

A7. The execute interface block lets the program communicate with the execute interface program, which processes CICS commands. It contains terminal id, time of day and response codes.

Q8. What is an mdt (modified data tag) - it's meaning and use?

A8. The modified data tag is the last bit in the attribute byte for each screen field. It indicates whether the corresponding field has been changed.

Q9. What is a transid and explain the system transid CEMT.

A9. Transid is a transaction identifier, a four character code used to invoke a CICS task. CEMT is the master terminal transaction that lets

you display and change the status of resources - it is the primary CICS service transaction.

Q10. What is the common work area (CWA)?

A10. The common work area is a storage area that can be accessed by any task in a CICS system.

Q11. How do you access storage outside your CICS program?

A11. In COBOL storage was accessed via BLL cells using the SET option of ADDRESS commands. In COBOL II the special register, ADDRESS OF lets you reference the address of any Linkage Section field.

Q12. How does COBOL II and CICS release 1.7 provide for exceptional conditions and how does that differ from VS COBOL and earlier CICS releases?

A12. VS COBOL used the HANDLE CONDITION command to name routines to pass program control when exceptional conditions were encountered. COBOL II and CICS release 1.7 introduced the RESP option on many CICS commands.

Q13. What is the meaning and use of the EIBAID field?

A13. EIBAID is a key field in the execute interface block; it indicates which attention key the user pressed to initiate the task.

Q14. How do you control cursor positioning?

A14. It's controlled by the CURSOR option of the SEND MAP command using a direct (0 through 1919) or symbolic value.

Q15. What are attribute bytes and how and why are they modified?

A15. Attribute bytes define map field characteristics (brightness, protection, etc); they are modified prior to issuing a SEND MAP command, eg. from normal to intense to highlight an error field.

Q16. How do you invoke other programs? What are the pros and cons of each method.

A16. There are three ways: 1). use a COBOL II CALL statement to invoke a subprogram. This method is transparent to CICS, which sees only the one load module. 2). an EXEC LINK is similar to a call; it invokes a separate CICS program and ends with a RETURN to the invoking program. or 3). an EXEC XCTL which transfers control to another CICS program and does not get control back.

Q17. What is BMS?

A17. BMS is Basic Map Support; it allows you to code assembler level programs to define screens.

Q18. What is the difference between FSET and FRSET?

A18. FSET specifies that the modified data tag should be turned on before the map is sent to the screen. FRSET turns off the attribute byte; it's used to transmit only changed data from the terminal.

Q19. What is the difference between the enter key, the PF keys and the PA keys?

A19. The enter and PF keys transmit data from the screen; the PA keys tell CICS that a terminal action took place, but data is not transmitted.

Q20. Explain the difference among the EXEC LINK, EXEC XCTL and Cobol II static call statements in CICS.

A20. COBOL II allows for static calls which are more efficient than the LINK instruction which establishes a new run-unit.

Q21. Are sequential files supported by CICS?

A21. Yes, but not as part of the File Control Program. They are supported as extra partition transient data files.

Q22. What option can be coded on the RETURN command to associate a transaction identifier with the next terminal input?

A22. The TRANSID option.

Q23. What is an ASRA?

A23. An ASRA is the CICS interrupt code, the equivalent of an MVS abend code.

Q24. What is temporary storage?

A24. Temporary storage is either main or auxiliary storage that allows the program to save data between task invocations.

Q25. What is transient data?

A25. Transient data provides CICS programs with a simple method for sequential processing, often used to produce output for 3270 printers.

Q26. What are the two types of transient data queues?

A26. They are intrapartition, which can only be accessed from within CICS and extrapartition, which are typically used to collect data online, but process it in a batch environment.

Q27. Where are transient data sets defined to CICS?

A27. They are defined in the destination control table (DCT).

Q28. Once a transient data queue is read, can it be reread?

A28. No, silly! That's why IBM calls it transient.

Q29. Name some commands used for CICS file browsing.

A29. STARTBR, READNEXT, READPREV, ENDBR and RESETBR.

Q30. What other file control processing commands are used for file updating?

A30. WRITE, REWRITE, DELETE and UNLOCK.

Q31. What is Journal Recovery and Dynamic Transaction Backout?

A31. Journal Recovery is recovery of changes made to a file during online processing. If a file has I/O problems it is restored from a backup taken before online processing began and the journalled changes are applied. Dynamic transaction backout is the removal of partial changes made by a failed transaction.

Q32. What tables must be updated when adding a new transaction and program?

A32. At a bare minimum the Program Control Table ( PCT) and Program Processing Table (PPT) must be updated.

Q33. What is the meaning of the SYNCPOINT command?

A33. SYNCPOINT without the ROLLBACK option makes all updates to protected resources permanent, with the ROLLBACK option it reverses all updates.

Q34. What do the terms locality of reference and working set mean?

A34. They refer to CICS efficiency techniques. Locality of reference requires that the application program should consistently reference instructions and data within a relatively small number of pages. The working set is the number of program pages needed by a task.

Q35. What do the keywords MAPONLY and DATAONLY mean?

A35. MAPONLY is a SEND MAP operand that sends only fields with initial values to the screen. DATAONLY is the SEND MAP operand that specifies only data from the map area should be displayed.

Q36. What is the MASSINSERT option?

A36. MASSINSERT is a WRITE option that modifies normal VSAM split processing, leaving free space after the inserted record, so subsequent records can be inserted without splits. It is ended by an UNLOCK command.

Q37. What is a cursor in CICS sql processing.

A37. A cursor is a pointer that identifies one row in a sql results table as the current row.

Q38. What are the DB2 steps required to migrate a CICS DB2 program from source code to load module?

A38. A DB2 precompiler processes some sql statements and converts others. It creates a data base request module (DBRM) for the binding step. The bind process uses the DBRM to create an application plan, which specifies the techniques DB2 will use to process the embedded sql statements. The link/edit step includes an interface to the CICS/DB2 attachment facility.

Q39. What is the SQL Communications Area and what are some of its key fields?

A39. It is a data structure that must be included in any host-language program using SQL. It is used to pass feedback about the sql operations to the program. Fields are return codes, error messages, handling codes and warnings.

Q40. What is DCLGEN?

A40. DCLGEN stands for declarations generator; it is a facility to generate DB2 sql data structures in COBOL or PL/I programs.

Q41. Name some translator and compile options and explain their meaning.

A41. For translator SOURCE option prints the program listing, DEBUG enables EDF and COBOL2 alerts the system to use the COBOL II compiler. For the compiler XREF prints a sorted data cross reference and FDUMP prints a formatted dump if the program abends.

Q42. What is the significance of RDO?

A42. RDO is Resource Definition Online. Since release 1.6 RDO allows resources (terminals, programs, transactions and files) to be defined interactively while CICS is running.

Q43. What is CECI?

A43. CECI is the command level interpreter tranid that interactively executes CICS commands. It is a rudimentary CICS command debugger which does not require coding an entire program.

Q44. What is CEDF?

A44. CEDF is the execute diagnostic facility that can be used for debugging CICS programs.

Q45. What is CEBR?

A45. CEBR lets you browse the contents of a specific temporary storage queue.

Q46. Name and explain some common CICS abend codes.

A46. Any AEI\_ indicates an execute interface program problem - the abending program encountered an exceptional condition that was not anticipated by the coding. APCT - the program could not be found or is disabled. ASRA - most common CICS abend, indicating a program check, identified by a one-byte code in the Program Status Word in the dump. AKCP - the task was cancelled; it was suspended for a period longer than the transaction's defined deadlock timeout period. AKCT - The task was cancelled because it was waiting too long for terminal input.

Q47. What is a logical message in CICS?

A47. A logical message is a single unit of output created by SEND TEXT or SEND MAP commands. BMS collects the separate output from each command and treats them as one entity. This technique may be used to build CICS reports.

Q48. What are the CICS commands associated with temporary storage queue processing?

A48. WRITEQ TS, READQ TS, and DELETEQ, whose meanings should be self-explanatory.

Q49. What are the CICS commands associated with transient data queue processing?

A49. WRITEQ TD, READQ TD, DELETEQ TD, ENQ and DEQ.

Q50. Ok, so what is the meaning of the ENQ and DEQ commands?

A50. Neither command is exclusively a transient data command. The ENQ command reserves any user defined resource for the specific task. For enqueued transient data no other task will be able to write records to it for as long as it is enqueued. DEQ removes the lock.

Q51. How do you delete Item 3 in a five-item TSQ?

A51. You can't--at least not directly. Options, none of them good, include: 1) adding a logical-delete flag to the contents of each item; 2) moving item 4 to 3 and 5 to 4 and initializing item 5, all thru rewrites; this is a variant on 1; 3) creating a new 'copy' tsq that excludes the unwanted item, killing the old tsq (deleteq ts), writing the new tsq with the original name from the new tsq, and then deleting the 'copy' tsq. This way, you will get an accurate report from NUMITEMS.

Q52. What CICS command would you use to read a VSAM KSDS sequentially in ascending order?

A52. READNEXT reads the next record from a browse operation for any of the three VSAM files.

Q53. How do you get data from a task that began with a START command?

A53. The RETRIEVE command is used to get data from a task that began with a START command.

Q54. What is interval control and what are some of the CICS commands associated with it?

A54. CICS interval control provides a variety of time-related features - common commands are ASKTIME, FORMATTIME, START, RETRIEVE, and CANCEL.

Q55. What is task control and what are the CICS commands associated with it?

A55. Task control refers to the CICS functions that manage the execution of tasks. (Elementary, my dear Watson!) Task control commands are SUSPEND, ENQ, and DEQ.

Q56. What is the CICS LOAD command?

A56. The LOAD command retrieves an object program from disk and loads it into main storage - it's primarily used for a constant table that will be available system-wide.

Q57. What is the ABEND command and when would you use it?

A57. The ABEND command forces a task to end abnormally. It creates a transaction dump and invokes the dynamic transaction backout.

Q58. 4/99 Mail from Joseph Howard: 'Q: DB2 What is the difference between a package and a plan? How does one bind 2 versions of a CICS transaction with the same module name in two different CICS regions that share the same DB2 subsystem?'

A58. Package and plan are usually used synonymously, as in this site. Both contain optimized code for SQL statements - a package for a single program, module or subroutine contained in the database request module (DBRM) library. A plan may contain multiple packages and pointers to packages. The one CICS module would then exist in a package that could be referenced in two different plans.

Email comments, suggestions or additional questions and answers to <mailto:cronid@aol.com>

#### COBOL & COBOL II

11/14/99: Karl Haynes: 'Can you use the INSPECT (with TALLYING option) Cobol verb in a CICS COBOL program? My program abends as soon as it hits this statement at run time. However, it does cleanly compile.' Web note: My initial take is that you can; the problem is elsewhere. I'm posting in case I've missed something and will post corrections.

Q1. What are the differences between COBOL and COBOL II?

A1. There are at least five differences: COBOL II supports structured programming by using in line PERFORMs and explicit scope terminators, it introduces new features (EVALUATE, SET .. TO TRUE, CALL .. BY CONTEXT, etc), it permits programs to be loaded and addressed above the 16 megabyte line, it does not support many old features (READY TRACE, REPORT-WRITER, ISAM, etc.), and it offers enhanced CICS support.

Q2. What is an explicit scope terminator?

A2. A scope terminator brackets its preceding verb, eg. IF .. END-IF, so that all statements between the verb and its scope terminator are grouped together. Other common COBOL II verbs are READ, PERFORM, EVALUATE, SEARCH and STRING.

Q3. What is an in line PERFORM? When would you use it? Anything else to say about it?

A3. The PERFORM and END-PERFORM statements bracket all COBOL II statements between them. The COBOL equivalent is to PERFORM or PERFORM THRU a paragraph. In line PERFORMs work as long as there are no internal GO TOs, not even to an exit. The in line PERFORM for readability should not exceed a page length - often it will reference other PERFORM paragraphs.

Q4. What is the difference between NEXT SENTENCE and CONTINUE?

A4. NEXT SENTENCE gives control to the verb following the next period. CONTINUE gives control to the next verb after the explicit scope

terminator. (This is not one of COBOL II's finer implementations). It's safest to use CONTINUE rather than NEXT SENTENCE in COBOL II.

Q5. What COBOL construct is the COBOL II EVALUATE meant to replace?

A5. EVALUATE can be used in place of the nested IF THEN ELSE statements.

Q6. What is the significance of 'above the line' and 'below the line'?

A6. Before IBM introduced MVS/XA architecture in the 1980's a program's virtual storage was limited to 16 megs. Programs compiled with a 24 bit mode can only address 16 Mb of space, as though they were kept under an imaginary storage line. With COBOL II a program compiled with a 31 bit mode can be 'above the 16 Mb line. (This 'below the line', 'above the line' imagery confuses most mainframe programmers, who tend to be a literal minded group.)

Q7. What was removed from COBOL in the COBOL II implementation?

A7. Partial list: REMARKS, NOMINAL KEY, PAGE-COUNTER, CURRENT-DAY, TIME-OF-DAY, STATE, FLOW, COUNT, EXAMINE, EXHIBIT, READY TRACE and RESET TRACE.

Q8. Explain call by context by comparing it to other calls.

A8. The parameters passed in a call by context are protected from modification by the called program. In a normal call they are able to be modified.

Q9. What is the linkage section?

A9. The linkage section is part of a called program that 'links' or maps to data items in the calling program's working storage. It is the part of the called program where these share items are defined.

Q10. What is the difference between a subscript and an index in a table definition?

A10. A subscript is a working storage data definition item, typically a PIC (999) where a value must be moved to the subscript and then incremented or decremented by ADD TO and SUBTRACT FROM statements. An index is a register item that exists outside the program's working storage. You SET an index to a value and SET it UP BY value and DOWN BY value.

Q11. If you were passing a table via linkage, which is preferable - a subscript or an index?

A11. Wake up - you haven't been paying attention! It's not possible to pass an index via linkage. The index is not part of the calling programs working storage. Those of us who've made this mistake, appreciate the lesson more than others.

Q12. Explain the difference between an internal and an external sort, the pros and cons, internal sort syntax etc.

A12. An external sort is not COBOL; it is performed through JCL and PGM=SORT. It is understandable without any code reference. An internal sort can use two different syntaxes: 1.) USING, GIVING sorts are comparable to external sorts with no extra file processing; 2) INPUT PROCEDURE, OUTPUT PROCEDURE sorts allow for data manipulation before and/or after the sort.

Q13. What is the difference between comp and comp-3 usage? Explain other COBOL usages.

A13. Comp is a binary usage, while comp-3 indicates packed decimal. The other common usages are binary and display. Display is the default.  
3/28/00 Dave Herrmann: 'I was reading your FAQ on Cobol, as an fyi Comp is defined as the fastest/preferred numeric data type for the machine it runs on. IBM Mainframes are typically binary and AS400's are packed.'

Q14. When is a scope terminator mandatory?

A14. Scope terminators are mandatory for in-line PERFORMS and EVALUATE statements. For readability, it's recommended coding practice to always make scope terminators explicit.

Q15. In a COBOL II PERFORM statement, when is the conditional tested, before or after the perform execution?

A15. In COBOL II the optional clause WITH TEST BEFORE or WITH TEST AFTER can be added to all perform statements. By default the test is performed

before the perform.

Q16. In an EVALUATE statement is the order of the WHEN clauses significant?

A16. Absolutely. Evaluation of the WHEN clauses proceeds from top to bottom and their sequence can determine results.

Q17. What is the default value(s) for an INITIALIZE and what keyword allows for an override of the default.

A17. INITIALIZE moves spaces to alphabetic fields and zeros to alphanumeric fields. The REPLACING option can be used to override these defaults.

Q18. What is SET TO TRUE all about, anyway?

A18. In COBOL II the 88 levels can be set rather than moving their associated values to the related data item. (Web note: This change is not one of COBOL II's better specifications.)

Q19. What is LENGTH in COBOL II?

A19. LENGTH acts like a special register to tell the length of a group or elementary item.

Q20. What is the difference between a binary search and a sequential search? What are the pertinent COBOL commands?

A20. In a binary search the table element key values must be in ascending or descending sequence. The table is 'halved' to search for equal to, greater than or less than conditions until the element is found. In a sequential search the table is searched from top to bottom, so (ironically) the elements do not have to be in a specific sequence. The binary search is much faster for larger tables, while sequential works well with smaller ones. SEARCH ALL is used for binary searches; SEARCH for sequential.

Q21. What is the point of the REPLACING option of a copy statement?

A21. REPLACING allows for the same copy to be used more than once in the same code by changing the replace value.

Email comments, criticisms, suggestions or additional questions and answers to <<mailto:cronid@aol.com>>

## DB2

Q1. What is a DB2 bind?

A1. A DB2 bind is a process that builds an access path to DB2 tables.

Q2. What is a DB2 access path?

A2. An access path is the method used to access data specified in DB2 sql statements.

Q3. What is a DB2 plan?

A3. An application plan or package is generated by the bind to define an access path.

Q4. What is normalization and what are the five normal forms?

A4. Normalization is a design procedure for representing data in tabular format. The five normal forms are progressive rules to represent the data with minimal redundancy.

Q5. What are foreign keys?

A5. These are attributes of one table that have matching values in a primary key in another table, allowing for relationships between tables.

Q6. Describe the elements of the SELECT query syntax.

A6. SELECT element FROM table WHERE conditional statement.

Q7. Explain the use of the WHERE clause.

A7. WHERE is used with a relational statement to isolate the object element or row.

Q8. What techniques are used to retrieve data from more than one table in a single SQL statement?

A8. Joins, unions and nested selects are used to retrieve data.

Q9. What do the initials DDL and DML stand for and what is their meaning?

A9. DDL is data definition language and DML is data manipulation

language. DDL statements are CREATE, ALTER, TRUNCATE. DML statements are SELECT, INSERT, DELETE and UPDATE.

Q10. What is a view? Why use it?

A10. A view is a virtual table made up of data from base tables and other views, but not stored separately.

Q11. Explain an outer join.

A11. An outer join includes rows from tables when there are no matching values in the tables.

Q12. What is a subselect? Is it different from a nested select?

A12. A subselect is a select which works in conjunction with another select. A nested select is a kind of subselect where the inner select passes to the where criteria for the outer select.

Q13. What is the difference between group by and order by?

A13. Group by controls the presentation of the rows, order by controls the presentation of the columns for the results of the SELECT statement.

Q14. Explain the EXPLAIN statement.

A14. The explain statement provides information about the optimizer's choice of access path of the sql.

Q15. What is tablespace?

A15. Tables are stored in tablespaces (hence the name)! There are three types of tablespaces: simple, segmented and partitioned.

Q16. What is a cursor and what is its function?

A16. An embedded sql statement may return a number of rows while the programming language can only access one row at a time. The programming device called a cursor controls the position of the row.

Q17. What is referential integrity?

A17. Referential integrity refers to the consistency that must be maintained between primary and foreign keys, ie every foreign key value must have a corresponding primary key value.

Q18. Usually, which is more important for DB2 system performance - CPU processing or I/O access?

A18. I/O operations are usually most critical for DB2 performance (or any other database for that matter).

Q19. Is there any advantage to denormalizing DB2 tables?

A19. Denormalizing DB2 tables reduces the need for processing intensive relational joins and reduces the number of foreign keys.

Q20. What is the database descriptor?

A20. The database descriptor, DBD is the DB2 component that limits access to the database whenever objects are created, altered or dropped.

Q21. What is lock contention?

A21. To maintain the integrity of DB2 objects the DBD permits access to only on object at a time. Lock contention happens if several objects are required by contending application processes simultaneously.

Q22. What is SPUFI?

A22. SPUFI stands for SQL processing using file input. It is the DB2 interactive menu-driven tool used by developers to create database objects.

Q23. What is the significance of DB2 free space and what parameters control it?

A23. The two parameters used in the CREATE statement are the PCTFREE which specifies the percentage of free space for each page and FREEPAGE which indicates the number of pages to be loaded with data between each free page. Free space allows room for the insertion of new rows.

Q24. What is a NULL value? What are the pros and cons of using NULLS?

A24. A NULL value takes up one byte of storage and indicates that a value is not present as opposed to a space or zero value. It's the DB2 equivalent of TBD on an organizational chart and often correctly portrays a business situation. Unfortunately, it requires extra coding for an application program to handle this situation.

Q25. What is a synonym? How is it used?

A25. A synonym is used to reference a table or view by another name. The

other name can then be written in the application code pointing to test tables in the development stage and to production entities when the code is migrated. The synonym is linked to the AUTHID that created it.

Q26. What is an alias and how does it differ from a synonym?

A26. An alias is an alternative to a synonym, designed for a distributed environment to avoid having to use the location qualifier of a table or view. The alias is not dropped when the table is dropped.

Q27. What is a LIKE table and how is it created?

A27. A LIKE table is created by using the LIKE parameter in a CREATE table statement. LIKE tables are typically created for a test environment from the production environment.

Q28. If the base table underlying a view is restructured, eg. attributes are added, does the application code accessing the view need to be redone?

A28. No. The table and its view are created anew, but the programs accessing the view do not need to be changed if the view and attributes accessed remain the same.

Q29. Under what circumstances will DB2 allow an SQL statement to update more than one primary key value at a time?

A29. Never. Such processing could produce duplicate values violating entity integrity. Primary keys must be updated one at a time.

Q30. What is the cascade rule and how does it relate to deletions made with a subselect.

A30. The cascade rule will not allow deletions based on a subselect that references the same table from which the deletions are being made.

Q31. What is the self-referencing constraint?

A31. The self-referencing constraint limits in a single table the changes to a primary key that the related foreign key defines. The foreign key in a self referencing table must specify the DELETE CASCADE rule.

Q32. What are delete-connected tables?

A32. Tables related with a foreign key are called delete-connected because a deletion in the primary key table can affect the contents of the foreign key table.

Q33. When can an insert of a new primary key value threaten referential integrity?

A33. Never. New primary key values are not a problem. However, the values of foreign key inserts must have corresponding primary key values in their related tables. And updates of primary key values may require changes in foreign key values to maintain referential integrity.

Q34. In terms of DB2 indexing, what is the root page?

A34. The simplest DB2 index is the B-tree and the B-tree's top page is called the root page. The root page entries represent the upper range limits of the index and are referenced first in a search.

Q35. How does Db2 use multiple table indexes?

A35. DB2 use the multiple indexes to satisfy multiple predicates in a SELECT statement that are joined by an AND or OR.

Q36. What are some characteristics of columns that benefit from indexes?

A36. Primary key and foreign key columns; columns that have unique values; columns that have aggregates computed frequently and columns used to test the existence of a value.

Q37. What is a composite index and how does it differ from a multiple index?

A37. A multiple index is not one index but two indexes for two different columns of a table. A composite index is one index made up of combined values from two columns in a table. If two columns in a table will often be accessed together a composite index will be efficient.

Q38. What is meant by index cardinality?

A38. The number of distinct values for a column is called index cardinality. DB2's RUNSTATS utility analyzes column value redundancy to determine whether to use a tablespace or index scan to search for data.

Q39. What is a clustered index?

A39. For a clustered index DB2 maintains rows in the same sequence as the columns in the index for as long as there is free space. DB2 can then process that table in that order efficiently.

Q40. What keyword does an SQL SELECT statement use for a string search?

A40. The LIKE keyword allows for string searches. The % sign is used as a wildcard.

Q41. What are some sql aggregates and other built-in functions?

A41. The common aggregate, built-in functions are AVG, SUM, MIN, MAX, COUNT and DISTINCT.

Q42. How is the SUBSTR keyword used in sql?

A42. SUBSTR is used for string manipulation with column name, first position and string length used as arguments. Eg. SUBSTR (NAME, 1 3) refers to the first three characters in the column NAME.

Q43. What are the three DB2 date and time data types and their associated functions?

A43. The three data types are DATE, TIME and TIMESTAMP. CHAR can be used to specify the format of each type. The DAYS function calculates the number of days between two dates. (It's Y2K compliant).

Q44. Explain transactions, commits and rollbacks in DB2.

A44. In DB2 a transaction typically requires a series of updates, insertions and deletions that represent a logical unit of work. A transaction puts an implicit lock on the DB2 data. Programmers can use the COMMIT WORK statement to terminate the transaction creating smaller units for recovery. If the transaction fails DB2 uses the log to roll back values to the start of the transaction or to the preceding commit point.

Q45. What is deadlock?

A45. Deadlock occurs when transactions executing at the same time lock each other out of data that they need to complete their logical units of work.

Q46. What are the four lockable units for DB2?

A46. DB2 imposes locks of four differing sizes: pages, tables, tablespace and for indexes subpage.

Q47. What are the three lock types?

A47. The three types are shared, update and exclusive. Shared locks allow two or more programs to read simultaneously but not change the locked space. An exclusive lock bars all other users from accessing the space. An update lock is less restrictive; it allows other transactions to read or acquire shared locks on the space.

Q48. What is isolation level?

A48. SQL statements may return any number of rows, but most host languages deal with one row at a time by declaring a cursor that presents each row at a unique isolation level.

Q49. What is an intent lock?

A49. An intent lock is at the table level for a segmented tablespace or at the tablespace level for a nonsegmented tablespace. They indicate at the table or tablespace level the kinds of locks at lower levels.

Q50. What is the difference between static and dynamic sql?

A50. Static sql is hard-coded in a program when the programmer knows the statements to be executed. For dynamic sql the program must dynamically allocate memory to receive the query results.

Q51. What is cursor stability?

A51. Cursor stability means that DB2 takes a lock on the page the cursor is accessing and releases the lock when the cursor moves to another page.

Q52. What is the significance of the CURSOR WITH HOLD clause in a cursor declaration?

A52. The clause avoids closing the cursor and repositioning it to the last row processed when the cursor is reopened.

Q53. What is the SQL Communications Area and what are some of its key

fields?

A53. It is a data structure that must be included in any host-language program using SQL. It is used to pass feedback about the sql operations to the program. Fields are return codes, error messages, handling codes and warnings.

Q54. What is the purpose of the WHENEVER statement?

A54. The WHENEVER statement is coded once in the host program to control program actions depending on the SQL-CODE returned by each sql statement within the program.

Q55. What is DCLGEN?

A55. DCLGEN stands for declarations generator; it is a facility to generate DB2 sql data structures in COBOL or PL/I programs.

Q56. What is the FREE command?

A56. The FREE command can be used to delete plans and/or packages no longer needed.

Q57. DB2 can implement a join in three ways using a merge join, a nested join or a hybrid join. Explain the differences.

A57. A merge join requires that the tables being joined be in a sequence; the rows are retrieved with a high cluster ratio index or are sorted by DB2. A nested join does not require a sequence and works best on joining a small number of rows. DB2 reads the outer table values and each time scans the inner table for matches. The hybrid join is a nested join that requires the outer table be in sequence.

Q58. Compare a subselect to a join.

A58. Any subselect can be rewritten as a join, but not vice versa. Joins are usually more efficient as join rows can be returned immediately, subselects require a temporary work area for inner selects results while processing the outer select.

Q59. What is the difference between IN subselects and EXISTS subselect?

A59. If there is an index on the attributes tested an IN is more efficient since DB2 uses the index for the IN. (IN for index is the mnemonic).

Q60. What is a Cartesian product?

A60. A Cartesian product results from a faulty query. It is a row in the results for every combination in the join tables.

Q61. 4/99 Mail from Joseph Howard: 'Q: DB2 What is the difference between a package and a plan? How does one bind 2 versions of a CICS transaction with the same module name in two different CICS regions that share the same DB2 subsystem?

A61. Package and plan are usually used synonymously, as in this site. Both contain optimized code for SQL statements - a package for a single program, module or subroutine contained in the database request module (DBRM) library. A plan may contain multiple packages and pointers to packages. The one CICS module would then exist in a package that could be referenced in two different plans.

Q62. What is an asynchronous write?

A62. It is a write to disk that may occur before or long after a commit. The write is controlled by the buffer manager.

Q63. What is a lock?

A63. A lock is the mechanism that controls access to data pages and tablespaces.

Q64. What is meant by isolation level?

A64. This is a key concept for any relational database. Isolation level is the manner in which locks are applied and released during a transaction. For DB@ a 'repeatable read' holds all locks until the transaction completes or a syncpoint is issued. For transactions using 'cursor stability' the page lock releases are issued as the cursor 'moves', i.e. as the transaction releases addressability to the records.

Q65. What are leaf pages?

A65. They are the opposite of root pages. Leaf pages are the lowest level index pages - the pages that contain index entries and information

to the corresponding table rows.

Q66. What is a precompiler?

A66. It is a DB2 facility for static SQL statements - it replaces these statements with calls to the DB2 language interface module.

Q67. What is a root page?

A67. The opposite of a leaf page; it is the highest level index page. An index can contain only the one root page; all other index pages are associated to the root.

Q68. What is a thread?

A68. A thread is the connection between DB2 and some other subsystem, such as CICS or IMS/DC.

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#### IDMS

Q1. What is the difference between a schema and a subschema?

A1. The schema is the physical arrangement of the data as it appears in the DBMS. The subschema is the logical view of the data as it appears to the application program.

Q2. What is a region?

A2. Region is used synonymously with area. It is a group of logically contiguous pages.

Q3. What is a page?

A3. A page is the smallest unit of storage in an IDMS database.

Q4. Explain the difference between record occurrence and record type.

A4. A record occurrence is the instances of a record; it is the smallest addressable unit of data. A type is the description of a record; there needn't be any occurrences.

Q5. What is the difference between local and central version operating modes?

A5. In local there is no IDMS System running above the DBMS. It's the more efficient mode but lacks the recovery and integrity facilities of the central version (CV) control program. In CV many application programs access the database through a single copy of the DBMS.

Q6. What is a run unit?

A6. A run-unit is a logical unit of work; it is analogous to a CICS task.

Q7. What is an OOK-Rec?

A7. An OOK-Rec is a one of a kind record set, used to get to another record set. 5/4/99; Sihab: 'I have one doubt in IDMS regarding the OOK records. In this FAQ it is saying that "A OOK-Rec is a one of a kind record set, used to get to another record set". Can you please elaborate it little more? What is it mean by 'a kind of record set'. If possible give me a small example also. Please send reply to <<mailto:kpsihab@wipsys.ge.com>>' Web note: Sorry, but my recollection is vague on this one. I think the example was a system date - just the one record, not a set, that pointed to other sets. Hopefully, someone else will fill in the blanks. Or perhaps a call to Computer Associates.

Q8. What is a junction record?

A8. A junction record is a member record type that allows for many-to-many relationship between its two owner records. For a school database the CLASS record is a junction for the TEACHER and SUBJECT record types.

Q9. Name and explain the three location modes.

A9. Calc is based on a symbolic value which is used to determine the target page. Via mode is for members only. Via records are stored near to their owners. In direct mode the target is specified by the user and is stored as close as possible to that page.

Q10. What is a set? What pointers are required, what are possible? How may sets be ordered?

A10. A set is an owner record and, optionally, its member records. There

are three types of pointers: next, prior and owner, but only next is required. There are five possible orders for arrangements of sets; they are: first - insert at beginning, last - insert at end of set, next - insert after current of set, prior - insert prior to current of set and sorted - insert according to sort value.

Q11. What is the purpose of a READY?

A11. The READY prepares a database area for access by DML functions.

Q12. What does a COMMIT statement do?

A12. It writes a checkpoint to the Journal File and releases any record locks.

Q13. What does a ROLLBACK do?

A13. It rolls back (reverses) all database updates to the point of the last rollback or to the beginning of the run-unit.

Q14. What does a FINISH do?

A14. It releases all database resources, terminates database processes, writes statistical information to IDMS and logs the checkpoint.

Q15. What is the IDD?

A15. IDD is the Integrated Data Dictionary. It contains information about the elements, record types, sets, maps and dialogues within the database.

Q16. What is the meaning of the return codes 0307 and 0326?

A16. 0307 is end-of-set and 0326 is record not found.

Q17. What is the meaning of 'Copy IDMS Subschema-Binds'?

A17. It generates a bind run-unit and binds all the records for the sub-schema the program is referencing.

Q18. What is autostatus?

A18. Autostatus is a protocol mode which causes the expansion of each DML statement to include a 'perform IDMS-Status' statement.

Q19. What does a store statement do?

A19. It places a record in the database based on the location mode specified.

Q20. What sets will the stored record connect to?

A20. It will connect to all sets where it is defined as an automatic member. The store requires that currency be established for all these set occurrences.

Q21. What is currency?

A21. The old joke - where the programmer thinks he is, but the DBMS knows he isn't. Currency is the location within the database during run-unit execution. There are four levels of currency: current of run-unit is the record occurrence of the last successful find or obtain; current of record type is for the most recent of each record type; current of record set is the most recent within each set and current of area is within each area.

Q22. If the stored record is not defined as automatic of a set, how can it be stored as a member of the set.

A22. Store the record then connect it to each set where it is a manual member.

Q23. So manual and automatic are the connect options for a set. What are the disconnect options.

A23. Mandatory and optional.

Q24. Distinguish among erase, erase permanent, erase selective and erase all.

A24. Erase cancels the membership of a record in specific set occurrences and removes only the named record. Erase permanent removes the specific record and all mandatory occurrences it owns. It disconnects all optional members. Erase selective removes the record, all mandatory members and all optional members not connected to other sets. It disconnects those that are connected. Erase all removes the specified record and all the mandatory and optional records it owns.

Q25. How does IDMS insure data integrity?

A25. IDMS uses record locks to prevent another run-unit from updating

the same record.

Q26. What are the types of record locks and how are they set?

A26. Locks may be shared or exclusive. Shared means that other run units can retrieve the record but can not modify it. Exclusive means that other run units can neither retrieve nor modify it. Record locks may be implicit or explicit. Implicit locks are set in the ready statement usage clause. Explicit locks are set using either the keep statement or keep option of the find/obtain command.

Q27. How are record locks released?

A27. Locks are released by a change in currency or by a commit, rollback or finish command.

Q28. What does a status return code of nn29 mean in relation to record locks.

A28. nn29 means that two run units are waiting to set locks on the same record and are in deadlock.

Q29. What is an area sweep and when is it used?

A29. An area sweep accesses records on the basis of the physical location in a database area. It can be total, meaning a record by record search of the area, or it can be of occurrences of records of a specific type.

Q30. Why would you use find and get rather than an obtain?

A30. Find tells you whether the record is actually in the database. If it is not found you save the overhead of an obtain.

Q31. When you are obtaining next within a set and get a end of set return code, on what record are you now current?

A31. You are current on the owner.

Q32. What is a bind?

A32. A bind associates record types with the program work area; for run unit and records it is the first command issued in the program.

Q33. How does IDMS communicate with CICS?

A33. They communicate via service MVS request calls.

Q34. Is there a application program coding difference between local and central version mode?

A34. No. The mode is specified via the SYSCTL DD card in the JCL.

Q35. If you are current on the owner of a set, what is the difference between an obtain next and obtain first?

A35. No difference. There is a difference between obtain first and obtain next for an area sweep, but not when current on the owner in a set.

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JCL

Q1. What are the kinds of job control statements?

A1. The JOB, EXEC and DD statement.

Q2. What is the meaning of keyword in JCL? What is its opposite?

A2. A keyword in a JCL statement may appear in different places and is recognized by its name, eg. MSGCLASS in the JOB statement. The opposite is positional words, where their meaning is based on their position in the statement, eg. in the DISP keyword the =(NEW,CATLG,DELETE) meanings are based on first, second and third position.

Q3. Describe the JOB statement, its meaning, syntax and significant keywords.

A3. The JOB statement is the first in a JCL stream. Its format is //jobname, keyword JOB, accounting information in brackets and keywords, MSGCLASS, MSGLEVEL, NOTIFY, CLASS, etc.

Q4. Describe the EXEC statement, its meaning, syntax and keywords.

A4. The EXEC statement identifies the program to be executed via a PGM=program name keyword. Its format is //jobname EXEC PGM=program name. The PARM= keyword can be used to pass external values to the executing

program.

Q5. Describe the DD statement, its meaning, syntax and keywords.

A5. The DD statement links the external dataset name (DSN) to the DDNAME coded within the executing program. It links the file names within the program code to the file names known to the MVS operating system. The syntax is // ddname DD DSN=dataset name. Other keywords after DSN are DISP, DCB, SPACE, etc.

Q6. What is a PROC? What is the difference between an instream and a catalogued PROC?

A6. PROC stands for procedure. It is 'canned' JCL invoked by a PROC statement. An instream PROC is presented within the JCL; a catalogued PROC is referenced from a proclib partitioned dataset.

Q7. What is the difference between a symbolic and an override in executing a PROC?

A7. A symbolic is a PROC placeholder; the value for the symbolic is supplied when the PROC is invoked, eg. &symbol=value. An override replaces the PROC's statement with another one; it substitutes for the entire statement.

Q8. What is RESTART? How is it invoked?

A8. RESTART is a JOB statement keyword. It is used to restart the job at a specified step rather than at the beginning.

Q9. What is a GDG? How is it referenced? How is it defined? What is a MODELDSCB?

A9. GDG stands for generation data group. It is a dataset with versions that can be referenced absolutely or relatively. It is defined by an IDCAMS define generation datagroup execution.

Q10. Explain concatenating datasets.

A10. Datasets can be grouped in a DD statement one after another, eg. in a JOBLIB statement where the load module can exist in one of many datasets.

Q11. What is the difference between specifying DISP=OLD and DISP=SHR for a dataset?

A11. DISP=OLD denotes exclusive control of the dataset; DISP=SHR means there is no exclusivity.

Q12. What is MOD and when would you use it?

A12. DISP=MOD is used when the dataset can be extended, ie, you can add records at the end of an existing dataset.

Q13. What are the keywords associated with DCB? How can you specify DCB information? What is the OS precedence for obtaining that DCB information, ie. where does the system look for it first?

A13. The keywords associated with the DCB parameter are LRECL, RECFM, BLKSIZE and DSORG. The DCB information can be supplied in the DD statement. The system looks for DCB information in the program code first.

Q14. How do you designate a comment in JCL?

A14. The comment statement is /\* followed by the comments.

Q15. What is the meaning of the EXEC statement keyword, COND? What is its syntax?

A15. COND specifies the conditions for executing the subsequent job step. The value after the COND= is compared to the return codes of the preceding steps and if the comparison is true, the step is bypassed. (If this answer confuses you, welcome to the club - memorize it and don't ask questions!)

Q16. What is the improvement to COND= in the latest version of MVS?

A16. MVS now allows for an IF bracketed by an END IF around any job step to replace the COND= syntax. Again, if the IF statement is true, the step is bypassed.

Q17. What is the purpose of the PARM keyword in the EXEC statement?

A17. The value after the PARM= specifies control information to be passed to the executing program of the job step.

Q18. What is the purpose and meaning of the REGION keyword and what JCL

statement is it associated with?

A18. REGION specifies the maximum CPU memory allocated for a particular job or job step. If REGION is in the JOB card, it relates to the entire job; if in the EXEC statement, it relates to the job step.

Q19. What is the purpose and meaning of the TIME keyword and what JCL statement is it associated with?

A19. TIME specifies the maximum CPU time allocated for a particular job or job step. If TIME is in the JOB card, it relates to the entire job; if in the EXEC statement, it relates to the job step.

Q20. What is the meaning of data definition name (ddname) and dataset name (dsname) in the DD statement?

A20. Data definition name is the eight character designation after the // of the DD statement. It matches the internal name specified in the steps executing program. In COBOL that's the name specified after the ASSIGN in the SELECT ASSIGN statement. Dataset name is the operating system (MVS) name for the file.

Q21. How is the keyword DUMMY used in JCL?

A21. For an output file DUMMY specifies that the output is to be discarded. For input it specifies that the file is empty.

Q22. What does the keyword DCB mean and what are some of the keywords associated with it?

A22. DCB stands for data control block; it is a keyword for the DD statement used to describe datasets. Keywords associated with it are BLKSIZE, DEN, LRECL and RECFM.

Q23. What is the difference between BLKSIZE and LRECL?

A23. BLKSIZE specifies the number of bytes

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SAS

Q1. SAS is a series of steps made up of statements. What are the two types of SAS steps? What do they mean?

A1. The two steps are the DATA and PROC steps. The DATA step defines and acts upon the program data; the PROC calls prewritten procedures that are part of the SAS software.

Q2. What is the difference between the SAS DATA statements INFILE and INPUT?

A2. The INFILE statement provides the SAS ddname in the program which maps to the JCL ddname and the external dataset name. It links the internal SAS file name to the system external name. The INPUT statement provides the variable names that will be used in the SAS program.

Q3. How is output described in the DATA step?

A3. By means of the DATA statement, not to be confused with the DATA step.

Q4. What is the meaning of the SAS log?

A4. The SAS log provides a runtime journal for statements executed, datasets created, time and memory usage for each step, records read and error messages.

Q5. What is the meaning of list input for SAS?

A5. List input allows the SAS programmer to quickly define instream data by naming each variable with a \$ after character input.

Q6. List and explain the PROC statements commonly associated with producing reports.

A6. They are PROC PRINT, PROC FREQ, PROC FORMAT and PROC SORT.

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sql

Q1. What is the basic difference between a join and a union?

A1. A join selects columns from 2 or more tables. A union selects rows.  
Q2. What is normalization and what are the five normal forms?  
A2. Normalization is a design procedure for representing data in tabular format. The five normal forms are progressive rules to represent the data with minimal redundancy.  
Q3. What are foreign keys?  
A3. These are attributes of one table that have matching values in a primary key in another table, allowing for relationships between tables.  
Q4. Describe the elements of the SELECT query syntax.  
A4. SELECT element FROM table WHERE conditional statement.  
Q5. Explain the use of the WHERE clause.  
A5. WHERE is used with a relational statement to isolate the object element or row.  
Q6. What techniques are used to retrieve data from more than one table in a single SQL statement?  
A6. Joins, unions and nested selects are used to retrieve data.  
Q7. What is a view? Why use it?  
A7. A view is a virtual table made up of data from base tables and other views, but not stored separately.  
Q8. Explain an outer join.  
A8. An outer join includes rows from tables when there are no matching values in the tables.  
Q9. What is a subselect? Is it different from a nested select?  
A9. A subselect is a select which works in conjunction with another select. A nested select is a kind of subselect where the inner select passes to the where criteria for the outer select.  
Q10. What is the difference between group by and order by?  
A10. Group by controls the presentation of the rows, order by controls the presentation of the columns for the results of the SELECT statement.  
Q11. What keyword does an SQL SELECT statement use for a string search?  
A11. The LIKE keyword allows for string searches. The % sign is used as a wildcard.  
Q12. What are some sql aggregates and other built-in functions?  
A12. The common aggregate, built-in functions are AVG, SUM, MIN, MAX, COUNT and DISTINCT.  
Q13. How is the SUBSTR keyword used in sql?  
A13. SUBSTR is used for string manipulation with column name, first position and string length used as arguments. Eg. SUBSTR (NAME, 1 3) refers to the first three characters in the column NAME.  
Q14. Explain the EXPLAIN statement.  
A14. The explain statement provides information about the optimizer's choice of access path of the sql.  
Q15. What is referential integrity?  
A15. Referential integrity refers to the consistency that must be maintained between primary and foreign keys, ie every foreign key value must have a corresponding primary key value.  
Q16. What is a NULL value? What are the pros and cons of using NULLS?  
A16. A NULL value takes up one byte of storage and indicates that a value is not present as opposed to a space or zero value. It's the DB2 equivalent of TBD on an organizational chart and often correctly portrays a business situation. Unfortunately, it requires extra coding for an application program to handle this situation.  
Q17. What is a synonym? How is it used?  
A17. A synonym is used to reference a table or view by another name. The other name can then be written in the application code pointing to test tables in the development stage and to production entities when the code is migrated. The synonym is linked to the AUTHID that created it.  
Q18. What is an alias and how does it differ from a synonym?  
A18. An alias is an alternative to a synonym, designed for a distributed environment to avoid having to use the location qualifier of a table or view. The alias is not dropped when the table is dropped.

Q19. When can an insert of a new primary key value threaten referential integrity?

A19. Never. New primary key values are not a problem. However, the values of foreign key inserts must have corresponding primary key values in their related tables. And updates of primary key values may require changes in foreign key values to maintain referential integrity.

Q20. What is the difference between static and dynamic sql?

A20. Static sql is hard-coded in a program when the programmer knows the statements to be executed. For dynamic sql the program must dynamically allocate memory to receive the query results.

Q21. Compare a subselect to a join.

A21. Any subselect can be rewritten as a join, but not vice versa. Joins are usually more efficient as join rows can be returned immediately, subselects require a temporary work area for inner selects results while processing the outer select.

Q22. What is the difference between IN subselects and EXISTS subselect?

A22. If there is an index on the attributes tested an IN is more efficient since DB2 uses the index for the IN. (IN for index is the mnemonic).

Q23. What is a Cartesian product?

A23. A Cartesian product results from a faulty query. It is a row in the results for every combination in the join tables.

Q24. What is a tuple?

A24. A tuple is an instance of data within a relational database.

Q25. What is the difference between static and dynamic sql?

A25. Static sql is compiled and optimized prior to its execution; dynamic is compiled and optimized during execution.

Q26. Any SQL implementation covers data types in couple of main categories. Which of the following are those data types ? (Check all that apply) A. NUMERIC B. CHARACTER C. DATE AND TIME D. BLOBS E. BIT

A26. A,B,C. Not all SQL implementations have a BLOB or a BIT data types.

Q27. We have a table with a CHARACTER data type field. We apply a ">" row comparison between this field and another CHARACTER field in another table. What will be the results for records with field value of NULL ? (Check one that applies the best) A. TRUE B. FALSE C. UNKNOWN D. Error. E. Those records will be ignored

A27. C. NULL in a row when compared will give an UNKNOWN result.

Q28. Any database needs to go through a normalization process to make sure that data is represented only once. This will eliminate problems with creating or destroying data in the database. The normalization process is done usually in three steps which results in first, second and third normal forms. Which best describes the process to obtain the third normal form? (Check one that applies the best) A. Each table should have related columns. B. Each separate table should have a primary key. C. We have a table with multi-valued key. All columns that are dependent on only one or on some of the keys should be moved in a different table. D. If a table has columns not dependent on the primary keys, they need to be moved in a separate table. E. Primary key is always UNIQUE and NOT NULL.

A28. D. All columns in a table should be dependent on the primary key. This will eliminate transitive dependencies in which A depends on B, and B depends on C, but we're not sure how C depends on A.

Q29. SQL can be embedded in a host program that uses a relational database as a persistent data repository. Some of the most important pre-defined structures for this mechanism are SQLDA ("SQL Descriptor Area") and SQLCA ("SQL Communications Area") SQLCA contains two structures - SQLCODE and SQLSTATE. SQLSTATE is a standard set of error messages and warnings in which the first two characters defines the class and the last three defines the subclass of the error. Which of the following SQLSTATE codes is interpreted as "No data returned"? (Check one that applies the best) A. 00xxx B. 01xxx C. 02xxx D. 22xxx E. 2Axxx

A29. C. 00 - is successful completion, 01 - warnings, 22 - is data exception and 2A is syntax error. The SQLSTATE code format returned for "No data returned" is "02xxx".

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## VSAM

Q1. What are the types of VSAM datasets?

A1. Entry sequenced datasets (ESDS), key sequenced datasets (KSDS) and relative record dataset (RRDS).

Q2. How are records stored in an ESDS, entry sequenced dataset?

A2. They are stored without respect to the contents of the records and in the order in which they are included in the file.

Q3. What is a CI, control interval?

A3. A control interval is the unit of information that VSAM transfers between virtual and auxiliary storage.

Q4. What are the distinctive features of a ksdS, key sequenced dataset?

A4. The index and the distributed free space.

Q5. What is a CA, control area?

A5. A group of control intervals makes up a control area.

Q6. What is a sequence set?

A6. This is the part of the index that points to the CA and CI of the record being accessed.

Q7. What is the index set?

A7. This is the other part of the index. It has multiple levels with pointers that ultimately reach to the sequence set.

Q8. What is a cluster?

A8. A cluster is the combination of the index, sequence set and data portions of the dataset. The operating system gives program access to the cluster, ie. to all parts of the dataset simultaneously.

Q9. What is the catalog?

A9. The catalog contains the names of all datasets, VSAM and non-VSAM. It is used to access these datasets.

Q10. What is an alternate index?

A10. An AIX is a file that allows access to a VSAM dataset by a key other than the primary one.

Q11. What is a path?

A11. A path is a file that allows you to access a file by alternate index - the path provides an association between the AIX and the base cluster.

Q12. What is the upgrade set?

A12. The upgrade set is the list of all AIXes that VSAM must maintain for a specific base cluster, so that when data in the base cluster is updated, the AIX files are also updated.

Q13. What is free space?

A13. Free space is reserved within the data component of a KSDS to accommodate inserting new records.

Q14. What is a VSAM split?

A14. If there isn't enough space in the control interval VSAM performs a control interval split by moving some records to the free control intervals. If there isn't a free control interval VSAM performs a control area split by allocating a new control area and moving half of the control intervals to it.

Q15. What is the base cluster?

A15. The base cluster consists of the data component and the index component for the primary index of a KSDS.

Q16. Do primary key values have to be unique? Do alternate key values have to be unique?

A16. Primary key values must be unique; alternate key values need not

be.

Q17. In the COBOL SELECT statement what is the ORGANIZATION for a KSDS?

A17. The ORGANIZATION is INDEXED.

Q18. In the COBOL SELECT statement for a KSDS what are the three possibilities for ACCESS?

A18. ACCESS can be SEQUENTIAL, RANDOM or DYNAMIC.

Q19. What is the COBOL RECORD KEY clause?

A19. The RECORD KEY in the SELECT clause identifies the files primary key as it will be known to the program.

Q20. What is the purpose of the FILE STATUS clause in the SELECT statement?

A20. The FILE STATUS field identifies the field that VSAM uses to provide information about each I/O operation for the file.

Q21. If you wish to use the REWRITE command how must the VSAM file be opened?

A21. It must be opened as I/O.

Q22. Explain the meaning and syntax for the START command.

A22. The START command is used read other than the next VSAM record. A value must be moved into the RECORD KEY. The KEY clause is optional, but it can be used to specify a relational (equal, less than, etc.) operator.

Q23. What is the meaning of dynamic processing?

A23. It's rarely used. It means one program uses both sequential and random processing for a VSAM KSDS file.

Q24. Name some common VSAM error conditions and codes.

A24. They are end of file (10), duplicate key (22), record not found (23), VSAM logic error (90), open problem (92) and space problem (93).

Q25. What is the VSAM-code field?

A25. It is a COBOL II enhancement to VSAM batch processing expanding the FILE STATUS field. It is defined in WORKING-STORAGE as a six byte group item with three two byte elements, the normal return code, the function code and the feedback code.

Q26. What is a VSAM slot?

A26. A relative record dataset (RRDS) consists of a specified number of areas called slots. Each slot is identified by a relative record number (RRN) which indicates its relative position in the file.

Q27. What is the utility program closely associated with VSAM?

A27. IDCAMS, the access method services utility.

Q28. There are at least seven IDCAMS commands; name and explain each of them.

A28. ALTER modifies information for a catalog, alternate index, cluster or path. BLDINDEX builds the alternate index, ofcourse. DEFINE is used for ALTERNATEINDEX, CLUSTER or PATH. DELETE removes the catalog entry for a catalog, cluster, alternate index or path. LISTCAT lists information about the dataset. PRINT prints the dataset contents. REPRO copies records from one file to another.

Q29. What are the three levels of definition for the VSAM DEFINE?

A29. They are DEFINE CLUSTER, DATA and INDEX.

Q30. What is the significance of the SHAREOPTIONS parameter?

A30. It specifies how the file may be shared between jobs and between batch and CICS environments.

Q31. What is the meaning of the DEFINE MODEL parameter?

A31. It specifies whether Daniela Pestova or Yamila - oops! Wrong models! The MODEL parameter allows you to model your cluster by modelling it after an existing cluster.

## DB2

1. What do the initials DDL and DML stand for? What does they mean?

A. DDL is data definition language and DML is data manipulation language. DDL statements are CREATE, ALTER, TRUNCATE. DML statements are

SELECT, INSERT, DELETE and UPDATE.

2. What is the difference between static SQL and dynamic SQL?

A. The static SQL statement is prepared before the program is executed and the operational form of the statement persists beyond the execution of the program. The source form of a static SQL statement is embedded within an application program written in a host language such as COBOL. Unlike static SQL, the dynamic statements are constructed and prepared at run time. The source form of a dynamic statement is a character string that is passed to DB2 by the program using the static SQL statement PREPARE or EXECUTE IMMEDIATE. Whether the operational form of the statement is persistent depends on whether dynamic statement caching is enabled.

3. What is deferred embedded SQL?

A. A deferred embedded SQL statement is neither fully static nor fully dynamic. Like a static statement, it is embedded within an application, but like a dynamic statement, it is prepared during the execution of the application. Although prepared at run time, a deferred embedded SQL statement is processed with bind-time rules such that the authorization ID and qualifier determined at bind time for the plan or package owner are used. Deferred embedded SQL statements are used for DB2 private protocol access to remote data.

4. What is DB2 ODBC?

A. DB2 Open Database Connectivity (DB2 ODBC) is an alternative to using embedded static or dynamic SQL. DB2 ODBC is an application-programming interface in which functions are provided to application programs to process SQL statements. The function calls are available only for C and C++ application programs. Through the interface, the application invokes a C function at execution time to connect to the data source, to issue SQL statements, and to get returned data and status information. Unlike using embedded SQL, no pre-compilation is required. Applications developed using this interface might be executed on a variety of data sources without being compiled against each of the databases. Note that only C and C++ applications can use this interface.

5. What are JDBC and SQLJ?

A. JavaSoft(TM) Java Database Connectivity (JDBC) and SQLJ are two methods for accessing DB2 data from the Java programming language. In general, Java applications use JDBC for dynamic SQL and SQLJ for static SQL.

6. What is a schema?

A. A schema is a collection of named objects. The objects that a schema can contain include distinct types, functions, stored procedures, and triggers. An object is assigned to a schema when it is created.

The schema name of the object determines the schema to which the object belongs. When a distinct type, function, or trigger is created, it is given a qualified, two-part name. The first part is the schema name (or the qualifier), which is either implicitly or explicitly specified. The second part is the name of the object. When a stored procedure is created, it is given a three-part name. The first part is a location name, which is implicitly or explicitly specified, the second part is the schema name, which is implicitly or explicitly specified, and the third part is the name of the object.

7. What are the differences between base table, auxiliary table and temporary table?

A. A base table is a table created with the SQL statement CREATE TABLE and used to hold persistent user data. An auxiliary table is a table created with the SQL statement CREATE AUXILIARY TABLE and used to hold the data for a column that is defined in a base table. A temporary table is a table described by the SQL statement CREATE GLOBAL TEMPORARY TABLE and used to hold data temporarily, such as the intermediate results of SQL transactions. Temporary tables persist as long as the application supports them. Table space and database operations, locking, logging,

and recovery do not apply.

8. What is an index?

A. An index is an ordered set of pointers to rows of a base table or an auxiliary table. Each index is based on the values of data in one or more columns. An index is an object that is separate from the data in the table. When you define an index using the CREATE INDEX statement, DB2 builds this structure and maintains it automatically.

9. Define a composite key

A. A key composed of more than one column is called a composite key.

10. Define unique key

A. A unique key is a key that is constrained so that no two of its values are equal (no duplicates).

11. How can the uniqueness of a key be enforced? When does DB2 enforce this constraint?

A. The mechanism used to enforce the uniqueness of a key is a unique index. Thus, every unique key is a key of a unique index. Such an index is also said to have the UNIQUE attribute. A unique key can be defined using the UNIQUE clause of the CREATE TABLE statement. A table can have an arbitrary number of unique keys.

12. When does DB2 enforce the various constraints.

A. DB2 enforces the constraint during the execution of the LOAD utility and the SQL INSERT and UPDATE statements.

13. How many primary keys are possible for a table?

A. One

14. Describe primary index.

A. The unique index on a primary key is called a primary index. When a primary key is defined in a CREATE TABLE statement, the table is marked unavailable until the primary index is created by the user unless the CREATE TABLE statement is processed by the schema processor. In that case, DB2 automatically creates the primary index.

15. Does every table need a primary key?

A. No, primary keys are optional.

16. Define a trigger.

A. A trigger defines a set of actions that are executed when a delete, insert, or update operation occurs on a specified table. When such an SQL operation is executed, the trigger is said to be activated.

17. Which statement is used to create a trigger?

A. CREATE TRIGGER

18. How many indexes can be stored in an index space?

A. One

19. How many tables can be stored in a table space?

A. One or more

20. How many tables can be stored in a partitioned table space?

A. One

21. What is a view? Why use it?

A. A view is a named specification of a result table. The specification is an SQL SELECT statement that is effectively executed whenever the view is referenced in an SQL statement. In other words, a view is a virtual table made up of data from base tables and other views, but not stored separately.

22. Can an index be defined for a view? How does an index improve the performance of a view?

A. An index cannot be created for a view. However, an index created for a table on which a view is based might improve the performance of operations on the view.

23. How will you create a Read-only view? Can you use COMMIT and ROLLBACK in the application program when the program is executed under IMS or CICS?

A. No, under CICS and IMS environment, CICS or IMS performs commit and rollback

24. What is a DB2 package?

A. A package contains control structures used to execute SQL statements. Packages are produced during program preparation. During the program preparation, the pre-compiler generates DBRM (database request module) that contains SQL statements extracted from the source program. From DBRM, the bind operation generates operational form of SQL or internal control structures to access the data. All control structures in a package are derived from the SQL statements embedded in a single source program.

25. What is a DB2 plan?

A. An application plan relates an application process to a local instance of DB2, specifies processing options, and contains one or both of the following elements: A list of package names. The bound form of SQL statements taken from one or more DBRMs. Every DB2 application requires an application plan. Plans and packages are created using the DB2 subcommands BIND PLAN and BIND PACKAGE

26. What is the difference between a package and a plan? How does one bind 2 versions of a CICS transaction with the same module name in two different CICS regions that share the same DB2 subsystem?

A. Package and plan contain optimized code for SQL statements - a package for a single program, module or subroutine contained in the database request module (DBRM) library. A plan may contain multiple packages and pointers to packages. The one CICS module would then exist in a package that could be referenced in two different plans.

27. What is a distributed operation?

A. A DB2 application program can use SQL to access data at other database management systems (DBMSs) other than the DB2 at which the application's plan is bound. This DB2 is known as the local DB2. The local DB2 and the other DBMSs are called application servers. Any application server other than the local DB2 is considered a remote server, and access to its data is a distributed operation.

28. What is meant by local DB2?

A. The DB2 application server in which the application's plan is bound is known as local DB2.

29. How many connections are possible for an application program at a time?

A. At a time, only one connection is possible for an application program.

A) The local DB2 is connected to a remote a DBMS. The application program issues a SELECT statement. Then it tries to connect to another DBMS. What can you expect?

DB2 will not allow it. An application program can have only one connection at a time and cannot connect to new application server until it executes a commit or rollback operation.

B) What if the program closes the connection and tries to connect to another DBMS?

30. What are the different types of methods by which a local DB2 connect to a remote DBMS?

A. DB2 provides two methods of accessing data at remote application server

1. DRDA: This protocol allows the application program to connect to DB2 as well as other types of DBMS.

2. DB2 private protocol access: It allows DB2 connect to another DB2 running on a different application server

31. What does Remote unit of work mean?

A. A unit of work is a transaction made up of a related set of SQL statements. Under remote UOW, DB2 on one computer can send multiple, related set of SQL statements to another DBMS on a remote computer. The remote site performs the processing for the statements, but the sending site controls whether to commit or rollback the UOW.

32. What does an SQL connection mean?

A. An SQL connection is an association between an application process

and a local or remote application server. SQL connections can be managed by the application or by using bind options. At any time:

33. Max number of columns in a DB2 table ?

A. 224. Tables without foreign keys and parent tables can have up to 750 columns. Tables with foreign keys can have up to 749 columns.

34. What is the maximum length of a column name?

A. 18

35. How will you set default values for columns? What is the minimum and max value of n in CHAR (n)?

A. PRIMARY\_ID CHAR (8) WITH DEFAULT USER,  
SQL\_ID CHAR (8) WITH DEFAULT CURRENT SQLID

The min and max value of n in char(n) of var-char is 1 and 254.

36. What is a thread?

A thread is the connection between DB2 and some other subsystem, such as CICS or IMS/DC.

37. If not specified what are the default values for numbers, fixed-length strings, variable length strings dates, time and timestamp?

A. Numbers - 0 (SMALLINT, INTEGER, DECIMAL, or FLOAT); Fixed-length strings - blanks (CHAR or GRAPHIC); Varying-length strings - empty strings (VARCHAR, LONG VARCHAR, VARGRAPHIC, or LONG VARGRAPHIC); DATE - CURRENT DATE; TIME - CURRENT TIME; TIMESTAMP - CURRENT TIMESTAMP

37. What is RUNSTATS command in DB2? When will you need to run the RUNSTATS utility?

The RUNSTATS utility collects statistics about DB2 objects. These statistics can be stored in the DB2 catalog, and are used during the bind process by optimizer to choose the path in accessing data. If you never use RUNSTATS and subsequently rebind your packages or plans DB2 will not have the information that it needs to choose the most efficient access path. This can result in unnecessary I/O operations and excessive processor consumption. It also collects statistics used for space management.

Run RUNSTATS at least once against each table and its associated indexes, After a load, or after mass updates, inserts, deletes, or after REORG...

39. I need to view the number of tables owned by one particular Owner. Is it possible? If so, please give the SQL query for this?

A. The query SELECT \* FROM SYSIBM.SYSTABLES WHERE CREATOR = 'owner id' this displays the table names with that If you want only the number of tables give the following query. SELECT COUNT(\*) FROM SYSIBM.SYSTABLES WHERE CREATOR = 'owner id' Make sure that you are in correct subsystem.

40. What is JOIN and different types of JOIN.

A. The ability to join rows and combine data from two or more tables is one of the most powerful features of relational system. Three type of joins:1. Equi-join2.Non-equi-join3.self-join

41. Can I alter a table (e.g. adding a column) when other user is selecting some columns or updating some columns from the same table?

A. Yes possible. until the updating or selection is committed db2 table will not be restructured. new column definition will be there but it will not be included until all the tasks on the table are committed.

42. How many sub-queries can you combine together ?

A Total 16 queries and sub-queries are 15

43. What are the different methods of accessing db2 from TSO?

A. There are three ways in establishing tso/db2 connection 1. SPUFI 2. QMF 3. CATALOG VISIBILITY

44. How is the connection established between TSO & DB2?

A. A thread between TSO & DB2 is established while attempting to make connection between TSO & DB2.

45. What are buffer pools?

A. Buffer pools, also known as virtual buffer pools, are areas of virtual storage used temporarily to store pages of table spaces or indexes. When an application program needs to access a row of a table,

DB2 retrieves the page containing that row and places the page in a buffer. If the row is changed, the buffer must be written back to the table space. If the needed data is already in a buffer, the application program will not have to wait for it to be retrieved from DASD. The result is faster performance. The sizes of virtual buffer pools can be changed while DB2 is running. The result is greater flexibility.

46. How many buffer pools are available in db2?

A. Ten 32k size buffer-pools and fifty 4k size buffer-pools (bp0 to bp49) default buffer pools are bp0, bp1, bp2 & bp32

47. How many Bufferpools are there in DB2 and what are they?

A. There are 4 Bufferpools. They are BP0, BP1, BP2 and BP32.

48. What is normalization? Explain the different rules?

A. Normalization rules help to avoid redundancies and inconsistencies in the data. It protects against update and delete anomalies and provide smaller tables and fewer total bytes. The rules of normalization are: 1st Normal Form:- No data item (repeating groups) should not be repeated within a given record.

2nd Normal Form: Each column that is not in the key provides a fact that depends on the entire key.

3rd Normal Form: Each non-key column provides a fact that it's independent of other non-key columns and depends only on key columns.

4th Normal Form: No row contains two or more independent multi-valued facts about an entity. 5th Normal Form: Sub-relations that cannot be reconstructed.

49. Explain de-normalization technique?

A. The rules of normalization do not consider performance. De-normalization concentrates on performance, but not on redundancy. What you have to consider is the trade-off--whether duplication, in several tables, of often-requested columns is less expensive than the time it takes to perform joins. This duplication of columns in multiple tables is de-normalization, and increases redundancy.

50. What are the possible reasons to use views instead of tables?

A. Some of your users might find that no single table contains all the data they need; rather, the data might be scattered among several tables. A view is an alternative way of describing data that exists in one or more tables. To limit access to certain kinds of data. One table might contain more data than the users want to see, or more than they should be authorized to see. For those situations, you can create views. To allow you to alter tables without affecting application programs

51. What is referential integrity?

A. Referential integrity refers to the consistency that must be maintained between primary and foreign keys.

It is the state in which all values of all foreign keys at a given DB2 are valid. Rules of referential integrity:

Every foreign key value must have a matching primary key value.

An insert into a primary key table can not violate referential integrity and no checking is required.

A deletion of foreign key value can not violate referential integrity and no checking is required.

Changes in primary key values are allowed only for those values that don't have a matching foreign key.

Insert and update rules: The insertion of any given foreign key value (non-null value) or an update to that value is allowed only if the matching value exists in the primary key.

Delete rules for primary key value:

If RESTRICT is specified on foreign key definition, deletion of primary key value is not allowed.

If CASCADE is specified, both primary key and the foreign key values will be deleted.

IF SET NULL is specified, the foreign key value will be set to null, provided nulls are allowed in the foreign key column.

52. When can an insert of a new primary key value threaten referential integrity?

A. Never. New primary key values are not a problem. However, the values of foreign key inserts must have corresponding primary key values in their related tables. And updates of primary key values may require changes in foreign key values to maintain referential integrity.

53. What is the self-referencing constraint?

A. A single table can include both a primary key and a related foreign key. The limitations to changes in the primary key that the foreign key defines are called self-referencing constraints. The foreign key in a self-referencing table must specify the DELETE CASCADE rule.

54. What happens if either the DELETE RESTRICT or DELETE SET NULL is specified on a self-referencing table during the execution of an ALTER TABLE statement?

A. DB2 issues error message defining an invalid constraint is attempted.

55. What is table check constraint?

Table check constraints designate the values that specific columns of a base table can contain, providing you a method of controlling the integrity of data entered into tables. You can create tables with table check constraints using the CREATE TABLE statement, or add the constraints with the ALTER TABLE statement. E.g.,  
CREATE TABLE EMPVAL (ID INTEGER NOT NULL,  
SALARY INTEGER CHECK (SALARY >= 15000)).

56. What is Check integrity and check pending state?

A. If the check integrity is compromised, or cannot be guaranteed for a table, the table space or partition that contains the table is placed in a check pending state. Check integrity is the condition that exists when each row of a table conforms to the check constraints defined on that table.

57. What are delete-connected tables?

A. Tables related with a foreign key are called delete-connected because a deletion in the primary key table can affect or be affected by the contents of the foreign key table.

58. What is a cycle in DB2 mean?

A cycle is a situation in which tables are related to each other through both primary and foreign key relationships. I.e., A set of referential constraints in which each associated table is a descendent of itself.

59. Which statement would you use to find out whether DB2 has used index to access the data?

A. EXPLAIN statement or the EXPLAIN option of bind.

60. What are the difference types of indexes and how will you create them?

A. There are two types of indexes: TYPE 1 & TYPE 2. Use the statement CREATE INDEX to create either type. TYPE 2 index comes with DB2V4 onwards. With TYPE 2 index data can be retrieved faster as only the data pages are locked and not the index pages. Hence TYPE 2 index is recommended.

61. What is the default value of index when you use CREATE INDEX?

A. The default value depends on the value of LOCKSIZE for the associated table space.

1. If LOCKSIZE is ROW then the default index type is type 2. You can't use row locking with a type 1 index.

2. If LOCKSIZE is not ROW, then the default for CREATE INDEX is the type specified in field DEFAULT INDEX TYPE of installation panel DSNTIPE.

62. What is a Leaf Page?

A. Index page that points directly to the data in the table is called a leaf page. The leaf page contains the key of the record and a pointer to the record.

63. What is a root page?

A. The opposite of a leaf page; it is the highest-level index page. An index can contain only one root page; all other index pages are

associated to the root. Each record of a root page contains a pointer to another index page and the highest of key of that page.

64. What is B-tree Index. Explain.

A. The simplest DB2 index is the B-tree and the B-tree's top page is called the root page. The root page entries represent the upper range limits of the index and are referenced first in a search.

65. How many indexes a table can have?

A. A table can have more than one index

66. What is the function of UNIQUE WHERE NOT NULL clause?

A. The clause is used with CREATE INDEX command. This ensures the uniqueness of the key column on which the index is defined, but it allows null values in the column. Or, DB2 will not allow duplication of non-null values in the key column.

67. What advantage does clustering index provide?

A. When a table has a clustering index, an INSERT statement inserts records as nearly as possible in the order of their index values. These clustered inserts can provide a significant performance advantage in some operations, particularly those that involve many records, such as comparisons other than equal, grouping and ordering. Although a table can have several indexes, only one can be a Clustering index.

68. How many clustering indexes are allowed for a table?

A. Only one.

69. How will you specify a clustering index?

To specify a clustering index, use the CLUSTER clause in the CREATE INDEX statement.

70. You have loaded data using a non-clustering index. Now, You are defining a clustering index for the table. What is its effect on the new inserts?

A. It does not have any effect on the new insert. The data will still be organized using the non-clustering index. However, when the table space is reorganized by REORG utility, DB2 clusters data in accordance with the clustering index.

71. What is a partitioning index?

A. When you store a table in a partitioned table space, you tell DB2 how to divide the data among partitions by using the PART clause of a CREATE INDEX statement. The index that divides the data is called a partitioning index. It is also a clustering index, because the data is clustered by the index key values. Thus, your PART clause must be preceded by the CLUSTER clause.

72. Can you compress data in LOB space?

A. No

73. Name the different types of Table spaces.

A. 1. Simple Table Space

2. Segmented Table Space

3. Partitioned Table Space (some partitioned table spaces can also be EA-enabled table spaces)

4. LOB Table Space

74. How will compress data in a table space or partition?

A. To compress data in a table space or partition, specify COMPRESS YES on CREATE TABLESPACE or ALTER TABLESPACE, then run LOAD or REORG. When you compress data, bit strings that occur frequently are replaced by shorter strings. Information about the mapping of bit strings to their replacements is stored in a compression dictionary. Computer processing is required to compress data before it is stored and to decompress the data when it is retrieved from storage.

75. B37 abend during SPUFI

A. The B37 ABEND in the SPUFI is because of space requirements, the query has resulted in so many rows that the SPUFI.OUT file is not large enough to handle it, increase the space allocation of spufi.out.

76. What is the command used by TSO users to invoke DB2?

A. DSN RUN

77. What is the error code -803?  
A. Unique index violation (Duplicate rows are not allowed)
78. How do you filter out the rows retrieved from a Db2 table?  
A. One way is to use The SQL WHERE clause.
79. What is a collection?  
A. A collection is something that every programmer should assign/Specify for every package. The Collection name is about 1-18 characters long. It's a user defined name that is the anchor for packages. It has no physical existence. Main usage is to group packages.
80. What is Skeleton cursor table (SKCT)?  
A. When you bind a plan, DB2 creates a skeleton cursor table in the skeleton cursor table space (SCT02). IT is the executable form of a Plan. This is stored in sysibm.sct02 table.
81. What is a record in a DB2 environment?  
A. In DB2, a record is the storage representation of a row.
82. What is the size constrain of a row?  
A. In DB2, records or rows are stored in 4K or 32K pages and a single record cannot occupy more than one page. Therefore, a table cannot be created with a maximum record size greater than the page size.  
Why is it preferable to place variable length columns at the end of the row? When you use ALTER to add a new column to an existing table, where will the new column be placed?  
A. When you use alter to add a new column to an existing table, it is added a the end of the row.
84. What's the equivalent Cobol Data type for Decimal(x,y) in DB2?  
A. PIC S9(x-y)V9(Y) Comp-3;
85. What does the CURRENT SQLID register contain?  
The current SQLID contains the current authorization ID.
86. Can we declare DB2 HOST variable in COBOL COPY book?  
A. NO. If we declare DB2 host variable in COBOL COPY book, at the time of Pre-compilation we get the host variable not defined, because pre-compiler will not expand COBOL COPY book. So we declare it either in DCLGEN with EXEC SQL INCLUDE Dclgenname END-EXEC or we directly hardcode it in the working storage section.
87. What should be specified along with a cursor in order to continue updating process after commit?  
A. With Hold option.
88. What is the name of the default DB2 Catalog Database?  
A. DSNDB06
89. When can you be sure that a query will return only one row?  
A. When you use the primary key and only the primary key in the where clause.
90. What is the difference between join and union?  
A. Join is used to retrieve data from different tables using a single SQL statement. Union is used to combine the results of two or more SQL queries.
91. What is the difference between a UNION and UNION ALL?  
A. UNION: eliminates duplicates. UNION ALL: retains duplicates. Both are used to combine the results from different SELECT statements.
92. What is a correlated sub-query?  
Answer: In a sub-query, if the outer query refers back to the outcome of inner-query it is called correlated sub-query. That's why the outer query is evaluated first unlike an ordinary sub-query
93. What are the functions of Bind?  
A. BIND mainly performs two things syntax checking and authorization checking. It binds together all packages into an application plan hence the name BIND. Apart from this bind has optimizer as a sub-component. Its function is to determine the optimum access strategy.
94. MAX. NO OF ROWS PER PAGE  
A. 127
95. The only place of VSAM KSDS in DB2 is?

- A. BSDS is a VSAM KSDS.
96. Question: Can all Users have the privilege to use the SQL Statement SELECT \* (DML)?
- A. No, the user should be granted privilege to use it.
97. Question: what's the best locksize that you could use when you create a tablespace?
- A. The answer is Locksize = ANY. Unless you are Sure what's the Purpose of tablespace ie., Read-only or R/W. If you use lock size =any, Db2 would automatically determine what type of locks it should use.
98. What's the error code for Unique Index Violation:
- A. -803
99. What's the percentage free space for
- A. ZERO
100. Can you define an Index if the table size less than 10 PAGES?
- The Answer is : NO
101. What's the Maximum Length of SQLCA and what's the content of SQLCABC?
- A. The Max length is 136. and the SQLCABC has the Value of SQLCA.
2. What's the percentage free space for
- A. The answer is ZERO.
3. What's the maximum number of volumes that can be added to a STOGROUP?
- A. The answer is 133. Usually it will be difficult monitor more than 3 or 4 volumes to a STOGROUP.
4. What's the maximum number of characters that a table name can have?
- A. The answer is 18 characters.
5. What is the meaning of -805 SQL return code?
- A. Program name not in plan. Bind the plan and include the DBRM for the program named as part of plan.
6. When does the SQL statement gets executed when you use cursor in the application programming?
- A. SQL statement gets executed when we open cursor
7. What does CURRENTDATA option in bind indicate?
- A. CURRENTDATA option ensures block fetch while selecting rows from a table. In DB2V4 the default has been changed to NO. Therefore it is necessary to change all the bind cards with CURRENTDATA(YES), which is default in DB2V3 & earlier to CURRENTDATA(NO).
8. What are the levels of isolation available with DB2V4 ?
- CS, RR, UR (added new for DB2V4 which stands for uncommitted read which allows to retrieve records from the space which has exclusive locks also but data integrity will be affected if this option is used ) The best available option for data integrity & data concurrency is CS.
9. How do you achieve record locking in DB2 in the versions, which don't support record level locking?
- A. Yesterday I had posted this queue. The answer should have read as follows: By having the record length more than half of the page size !Sorry again & Thanks
10. How do u achieve record level locking in DB2 versions when record level locking is not allowed?
- A. By having the length of the record greater than that of a page!
11. In a DB2-CICS program, which is, acts as co-coordinator and which is participant?
- A. DB2 - participant CICS- coordinator
12. What does DML stand for and what are some examples of it?
- A. Data Manipulation Language. Some examples are SELECT, INSERT, DELETE, REPLACE.
13. How to define the data items to receive the fetch items for the SQL?
- A. Using the DSECT, followed by lines of - 'dataitems DS datatype'.
14. How will you delete duplicate records from a table?
- A. Delete From Table1 Where Id In (Select Id From Table1 As Temp Group By Id Having Count(\*) >1)
15. What is the difference between Where and Having Clause?

A. WHERE is for Rows and HAVING is for Groups.

16. How to see the structure of db2 table?  
A. Using QMF.

17. How do you declare a host variable (in COBOL) for an attribute named EMP-NAME of type VARCHAR(25) ?  
A. 01 EMP-GRP. 49 E-LEN PIC S9(4) COMP. 49 E-NAME PIC X(25).

18. What is the maximum number of tables that can be stored on a Partitioned Table Space ?  
A. ONE .

19. What are the max. & min. no. of partitions allowed in a partition tablespace?  
A. Minimum is 4. maximum is 64.

20. What is the maximum number of tables that can be joined ?  
A. Fifteen

21. What technique is used to retrieve data from more than one table in a single SQL statement?  
A. The Join statement combines data from more than two tables

22. Question: What is a foreign key?  
A. It identifies a related row in another table and establishes a logical relationship between rows in two tables.

23. Explain the use of the WHERE clause.  
It directs DB2 to extract data from rows where the value of the column is the same as the current value of the host variable.

24. What is a DB2 bind?  
Answer: A DB2 bind is a process that builds an access path to DB2 tables.

25. What is a DB2 access path?  
A. An access path is the method used to access data specified in DB2 SQL statements.

26. What is normalization and what are the five normal forms?  
A. Normalization is a design procedure for representing data in tabular format. The five normal forms are progressive rules to represent the data with minimal redundancy.

27. What are foreign keys?  
A. These are attributes of one table that have matching values in a primary key in another table, allowing for relationships between tables.

28. Describe the elements of the SELECT query syntax.  
SELECT element FROM table WHERE conditional statement.

29. Explain the use of the WHERE clause.  
A. WHERE is used with a relational statement to isolate the object element or row.

30. What techniques are used to retrieve data from more than one table in a single SQL statement?  
A. Joins, unions and nested selects are used to retrieve data.

31. Explain an outer join.  
A. An outer join includes rows from tables when there are no matching values in the tables.

32. What is a subselect? Is it different from a nested select?  
A. A subselect is a select which works in conjunction with another select. A nested select is a kind of subselect where the inner select passes to the where criteria for the outer select.

33. What is the difference between group by and order by?  
A. Group by controls the presentation of the rows, order by controls the presentation of the columns for the results of the SELECT statement.

34. Explain the EXPLAIN statement.  
A. The explain statement provides information about the optimizer's choice of access path of the SQL. It can be used in SPUFI (for single SQL statement ) or in BIND step (for embedded SQL ).

35. What is a tablespace?  
A. Tables are stored in tablespaces (hence the name)! There are three types of tablespaces: simple, segmented and partitioned.

36. What is a cursor and what is its function?  
A. An embedded SQL statement may return a number of rows while the programming language can only access one row at a time. Cursor is a programming device that allows the SELECT to find a set of rows but return them one at a time. Cursor should be used because the host language can deal with only one row at a time.

37. Usually, which is more important for DB2 system performance - CPU processing or I/O access?  
A. I/O operations are usually most critical for DB2 performance (or any other database for that matter).

38. Is there any advantage to de-normalizing DB2 tables?  
A. Denormalizing DB2 tables reduces the need for processing intensive relational joins and reduces the number of foreign keys.

39. What is the database descriptor?  
A. The database descriptor, DBD is the DB2 component that limits access to the database whenever objects are created, altered or dropped.

40. What is lock contention?  
A. To maintain the integrity of DB2 objects the DBD permits access to only on object at a time. Lock contention happens if several objects are required by contending application processes simultaneously.

41. What is SPUFI?  
A. SPUFI stands for SQL processing using file input. It is the DB2 interactive menu-driven tool used by developers to create database objects.

42. What is the significance of DB2 free space and what parameters control it?  
A. The two parameters used in the CREATE statement are the PCTFREE which specifies the percentage of free space for each page and FREEPAGE which indicates the number of pages to be loaded with data between each free page. Free space allows room for the insertion of new rows.

43. What is a NULL value? What are the pros and cons of using NULLS?  
A. A NULL value takes up one byte of storage and indicates that a value is not present as opposed to a space or zero value. It's the DB2 equivalent of TBD on an organizational chart and often correctly portrays a business situation. Unfortunately, it requires extra coding for an application program to handle this situation.

44. What is a synonym? How is it used?  
A synonym is used to reference a table or view by another name. The other name can then be written in the application code pointing to test tables in the development stage and to production entities when the code is migrated. The synonym is linked to the AUTHID that created it, so it is accessible only by creator.

45. What is an alias and how does it differ from a synonym?  
A. An alias is an alternative to a synonym, designed for a distributed environment to avoid having to use the location qualifier of a table or view. The alias is not dropped when the table is dropped.

46. What is a LIKE table and how is it created?  
A. A LIKE table is created by using the LIKE parameter in a CREATE table statement. LIKE tables are typically created for a test environment from the production environment.

47. If the base table underlying a view is restructured, e.g. attributes are added, does the application code accessing the view need to be redone?  
A. No. The table and its view are created anew, but the programs accessing the view do not need to be changed if the view and attributes accessed remain the same.

48. Under what circumstances will DB2 allow an SQL statement to update more than one primary key value at a time?  
A. Never. Such processing could produce duplicate values violating entity integrity. Primary keys must be updated one at a time.

49. What is the cascade rule and how does it relate to deletions made

with a subselect?

A. The cascade rule will not allow deletions based on a subselect that references the same table from which the deletions are being made.

212804.2271040.3703584.456650/D=geocities/S=76001084:NE/A=1171385/R=1/212804.2271040.3703584.456650/D=geocities/S=76001084:NE/A=1171385/R=0/\*http://geocities.yahoo.com/ps/info?.refer=bsm>1. What do the initials DDL and DML stand for? What does they mean?

A. DDL is data definition language and DML is data manipulation language. DDL statements are CREATE, ALTER, TRUNCATE. DML statements are SELECT, INSERT, DELETE and UPDATE.

2. What is the difference between static SQL and dynamic SQL?

A. The static SQL statement is prepared before the program is executed and the operational form of the statement persists beyond the execution of the program. The source form of a static SQL statement is embedded within an application program written in a host language such as COBOL. Unlike static SQL, the dynamic statements are constructed and prepared at run time. The source form of a dynamic statement is a character string that is passed to DB2 by the program using the static SQL statement PREPARE or EXECUTE IMMEDIATE. Whether the operational form of the statement is persistent depends on whether dynamic statement caching is enabled.

3. What is deferred embedded SQL?

A. A deferred embedded SQL statement is neither fully static nor fully dynamic. Like a static statement, it is embedded within an application, but like a dynamic statement, it is prepared during the execution of the application. Although prepared at run time, a deferred embedded SQL statement is processed with bind-time rules such that the authorization ID and qualifier determined at bind time for the plan or package owner are used. Deferred embedded SQL statements are used for DB2 private protocol access to remote data.

4. What is DB2 ODBC?

A. DB2 Open Database Connectivity (DB2 ODBC) is an alternative to using embedded static or dynamic SQL. DB2 ODBC is an application-programming interface in which functions are provided to application programs to process SQL statements. The function calls are available only for C and C++ application programs. Through the interface, the application invokes a C function at execution time to connect to the data source, to issue SQL statements, and to get returned data and status information. Unlike using embedded SQL, no pre-compilation is required. Applications developed using this interface might be executed on a variety of data sources without being compiled against each of the databases. Note that only C and C++ applications can use this interface.

5. What are JDBC and SQLJ?

A. JavaSoft(TM) Java Database Connectivity (JDBC) and SQLJ are two methods for accessing DB2 data from the Java programming language. In general, Java applications use JDBC for dynamic SQL and SQLJ for static SQL.

6. What is a schema?

A. A schema is a collection of named objects. The objects that a schema can contain include distinct types, functions, stored procedures, and triggers. An object is assigned to a schema when it is created.

The schema name of the object determines the schema to which the object belongs. When a distinct type, function, or trigger is created, it is given a qualified, two-part name. The first part is the schema name (or the qualifier), which is either implicitly or explicitly specified. The second part is the name of the object. When a stored procedure is created, it is given a three-part name. The first part is a location name, which is implicitly or explicitly specified, the second part is the schema name, which is implicitly or explicitly specified, and the third part is the name of the object.

7. What are the differences between base table, auxiliary table and temporary table?

A. A base table is a table created with the SQL statement CREATE TABLE and used to hold persistent user data. An auxiliary table is a table created with the SQL statement CREATE AUXILIARY TABLE and used to hold the data for a column that is defined in a base table. A temporary table is a table described by the SQL statement CREATE GLOBAL TEMPORARY TABLE and used to hold data temporarily, such as the intermediate results of SQL transactions. Temporary tables persist as long as the application supports them. Table space and database operations, locking, logging, and recovery do not apply.

8. What is an index?

A. An index is an ordered set of pointers to rows of a base table or an auxiliary table. Each index is based on the values of data in one or more columns. An index is an object that is separate from the data in the table. When you define an index using the CREATE INDEX statement, DB2 builds this structure and maintains it automatically.

9. Define a composite key

A. A key composed of more than one column is called a composite key.

10. Define unique key

A. A unique key is a key that is constrained so that no two of its values are equal (no duplicates).

11. How can the uniqueness of a key be enforced? When does DB2 enforce this constraint?

A. The mechanism used to enforce the uniqueness of a key is a unique index. Thus, every unique key is a key of a unique index. Such an index is also said to have the UNIQUE attribute. A unique key can be defined using the UNIQUE clause of the CREATE TABLE statement. A table can have an arbitrary number of unique keys.

12. When does DB2 enforce the various constraints.

A. DB2 enforces the constraint during the execution of the LOAD utility and the SQL INSERT and UPDATE statements.

13. How many primary keys are possible for a table?

A. One

14. Describe primary index.

A. The unique index on a primary key is called a primary index. When a primary key is defined in a CREATE TABLE statement, the table is marked unavailable until the primary index is created by the user unless the CREATE TABLE statement is processed by the schema processor. In that case, DB2 automatically creates the primary index.

15. Does every table need a primary key?

A. No, primary keys are optional.

16. Define a trigger.

A. A trigger defines a set of actions that are executed when a delete, insert, or update operation occurs on a specified table. When such an SQL operation is executed, the trigger is said to be activated.

17. Which statement is used to create a trigger?

A. CREATE TRIGGER

18. How many indexes can be stored in an index space?

A. One

19. How many tables can be stored in a table space?

A. One or more

20. How many tables can be stored in a partitioned table space?

A. One

21. What is a view? Why use it?

A. A view is a named specification of a result table. The specification is an SQL SELECT statement that is effectively executed whenever the view is referenced in an SQL statement. In other words, a view is a virtual table made up of data from base tables and other views, but not stored separately.

22. Can an index be defined for a view? How does an index improve the

performance of a view?

A. An index cannot be created for a view. However, an index created for a table on which a view is based might improve the performance of operations on the view.

23. How will you create a Read-only view? Can you use COMMIT and ROLLBACK in the application program when the program is executed under IMS or CICS?

A. No, under CICS and IMS environment, CICS or IMS performs commit and rollback

24. What is a DB2 package?

A. A package contains control structures used to execute SQL statements. Packages are produced during program preparation. During the program preparation, the pre-compiler generates DBRM (database request module) that contains SQL statements extracted from the source program. From DBRM, the bind operation generates operational form of SQL or internal control structures to access the data. All control structures in a package are derived from the SQL statements embedded in a single source program.

25. What is a DB2 plan?

A. An application plan relates an application process to a local instance of DB2, specifies processing options, and contains one or both of the following elements: A list of package names. The bound form of SQL statements taken from one or more DBRMs. Every DB2 application requires an application plan. Plans and packages are created using the DB2 subcommands BIND PLAN and BIND PACKAGE

26. What is the difference between a package and a plan? How does one bind 2 versions of a CICS transaction with the same module name in two different CICS regions that share the same DB2 subsystem?

A. Package and plan contain optimized code for SQL statements - a package for a single program, module or subroutine contained in the database request module (DBRM) library. A plan may contain multiple packages and pointers to packages. The one CICS module would then exist in a package that could be referenced in two different plans.

27. What is a distributed operation?

A. A DB2 application program can use SQL to access data at other database management systems (DBMSs) other than the DB2 at which the application's plan is bound. This DB2 is known as the local DB2. The local DB2 and the other DBMSs are called application servers. Any application server other than the local DB2 is considered a remote server, and access to its data is a distributed operation.

28. What is meant by local DB2?

A. The DB2 application server in which the application's plan is bound is known as local DB2.

29. How many connections are possible for an application program at a time?

A. At a time, only one connection is possible for an application program.

A) The local DB2 is connected to a remote a DBMS. The application program issues a SELECT statement. Then it tries to connect to another DBMS. What can you expect?

DB2 will not allow it. An application program can have only one connection at a time and cannot connect to new application server until it executes a commit or rollback operation.

B) What if the program closes the connection and tries to connect to another DBMS?

30. What are the different types of methods by which a local DB2 connect to a remote DBMS?

A. DB2 provides two methods of accessing data at remote application server

1. DRDA: This protocol allows the application program to connect to DB2 as well as other types of DBMS.

2. DB2 private protocol access: It allows DB2 connect to another DB2 running on a different application server

31. What does Remote unit of work mean?

A. A unit of work is a transaction made up of a related set of SQL statements. Under remote UOW, DB2 on one computer can send multiple, related set of SQL statements to another DBMS on a remote computer. The remote site performs the processing for the statements, but the sending site controls whether to commit or rollback the UOW.

32. What does an SQL connection mean?

A. An SQL connection is an association between an application process and a local or remote application server. SQL connections can be managed by the application or by using bind options. At any time:

33. Max number of columns in a DB2 table ?

A. 224. Tables without foreign keys and parent tables can have up to 750 columns. Tables with foreign keys can have up to 749 columns.

34. What is the maximum length of a column name?

A. 18

35. How will you set default values for columns? What is the minimum and max value of n in CHAR (n)?

A. PRIMARY\_ID CHAR (8) WITH DEFAULT USER,  
SQL\_ID CHAR (8) WITH DEFAULT CURRENT SQLID

The min and max value of n in char(n) of var-char is 1 and 254.

36. What is a thread?

A thread is the connection between DB2 and some other subsystem, such as CICS or IMS/DC.

37. If not specified what are the default values for numbers, fixed-length strings, variable length strings dates, time and timestamp?

A. Numbers - 0 (SMALLINT, INTEGER, DECIMAL, or FLOAT); Fixed-length strings - blanks (CHAR or GRAPHIC); Varying-length strings - empty strings (VARCHAR, LONG VARCHAR, VARGRAPHIC, or LONG VARGRAPHIC); DATE - CURRENT DATE; TIME - CURRENT TIME; TIMESTAMP - CURRENT TIMESTAMP

37. What is RUNSTATS command in DB2? When will you need to run the RUNSTATS utility?

The RUNSTATS utility collects statistics about DB2 objects. These statistics can be stored in the DB2 catalog, and are used during the bind process by optimizer to choose the path in accessing data. If you never use RUNSTATS and subsequently rebind your packages or plans DB2 will not have the information that it needs to choose the most efficient access path. This can result in unnecessary I/O operations and excessive processor consumption. It also collects statistics used for space management.

Run RUNSTATS at least once against each table and its associated indexes, After a load, or after mass updates, inserts, deletes, or after REORG...

39. I need to view the number of tables owned by one particular Owner. Is it possible? If so, please give the SQL query for this?

A. The query SELECT \* FROM SYSIBM.SYSTABLES WHERE CREATOR = 'owner id' this displays the table names with that If you want only the number of tables give the following query. SELECT COUNT(\*) FROM SYSIBM.SYSTABLES WHERE CREATOR = 'owner id' Make sure that you are in correct subsystem.

40. What is JOIN and different types of JOIN.

A. The ability to join rows and combine data from two or more tables is one of the most powerful features of relational system. Three type of joins:1. Equi-join2.Non-equijoin3.self-join

41. Can I alter a table (e.g. adding a column) when other user is selecting some columns or updating some columns from the same table?

A. Yes possible. until the updating or selection is committed db2 table will not be restructured. new column definition will be there but it will not be included until all the tasks on the table are committed.

42. How many sub-queries can you combine together ?

A Total 16 queries and sub-queries are 15

43. What are the different methods of accessing db2 from TSO?  
A. There are three ways in establishing tso/db2 connection 1. SPUFI 2. QMF 3. CATALOG VISIBILITY

44. How is the connection established between TSO & DB2?  
A. A thread between TSO & DB2 is established while attempting to make connection between TSO & DB2.

45. What are buffer pools?  
A. Buffer pools, also known as virtual buffer pools, are areas of virtual storage used temporarily to store pages of table spaces or indexes. When an application program needs to access a row of a table, DB2 retrieves the page containing that row and places the page in a buffer. If the row is changed, the buffer must be written back to the table space. If the needed data is already in a buffer, the application program will not have to wait for it to be retrieved from DASD. The result is faster performance. The sizes of virtual buffer pools can be changed while DB2 is running. The result is greater flexibility.

46. How many buffer pools are available in db2?  
A. Ten 32k size buffer-pools and fifty 4k size buffer-pools (bp0 to bp49) default buffer pools are bp0, bp1, bp2 & bp32

47. How many Bufferpools are there in DB2 and what are they?  
A. There are 4 Bufferpools. They are BP0, BP1, BP2 and BP32.

48. What is normalization? Explain the different rules?  
A. Normalization rules help to avoid redundancies and inconsistencies in the data. It protects against update and delete anomalies and provide smaller tables and fewer total bytes. The rules of normalization are:  
1st Normal Form:- No data item (repeating groups) should not be repeated within a given record.  
2nd Normal Form: Each column that is not in the key provides a fact that depends on the entire key.  
3rd Normal Form: Each non-key column provides a fact that it's independent of other non-key columns and depends only on key columns.  
4th Normal Form: No row contains two or more independent multi-valued facts about an entity. 5th Normal Form: Sub-relations that cannot be reconstructed.

49. Explain de-normalization technique?  
A. The rules of normalization do not consider performance. De-normalization concentrates on performance, but not on redundancy. What you have to consider is the trade-off--whether duplication, in several tables, of often-requested columns is less expensive than the time it takes to perform joins. This duplication of columns in multiple tables is de-normalization, and increases redundancy.

50. What are the possible reasons to use views instead of tables?  
A. Some of your users might find that no single table contains all the data they need; rather, the data might be scattered among several tables. A view is an alternative way of describing data that exists in one or more tables. To limit access to certain kinds of data. One table might contain more data than the users want to see, or more than they should be authorized to see. For those situations, you can create views. To allow you to alter tables without affecting application programs

51. What is referential integrity?  
A. Referential integrity refers to the consistency that must be maintained between primary and foreign keys.  
It is the state in which all values of all foreign keys at a given DB2 are valid. Rules of referential integrity:  
Every foreign key value must have a matching primary key value.  
An insert into a primary key table can not violate referential integrity and no checking is required.  
A deletion of foreign key value can not violate referential integrity and no checking is required.  
Changes in primary key values are allowed only for those values that don't have a matching foreign key.

Insert and update rules: The insertion of any given foreign key value (non-null value) or an update to that value is allowed only if the matching value exists in the primary key.

Delete rules for primary key value:

If RESTRICT is specified on foreign key definition, deletion of primary key value is not allowed.

If CASCADE is specified, both primary key and the foreign key values will be deleted.

IF SET NULL is specified, the foreign key value will be set to null, provided nulls are allowed in the foreign key column.

52. When can an insert of a new primary key value threaten referential integrity?

A. Never. New primary key values are not a problem. However, the values of foreign key inserts must have corresponding primary key values in their related tables. And updates of primary key values may require changes in foreign key values to maintain referential integrity.

53. What is the self-referencing constraint?

A. A single table can include both a primary key and a related foreign key. The limitations to changes in the primary key that the foreign key defines are called self-referencing constraints. The foreign key in a self-referencing table must specify the DELETE CASCADE rule.

54. What happens if either the DELETE RESTRICT or DELETE SET NULL is specified on a self-referencing table during the execution of an ALTER TABLE statement?

A. DB2 issues error message defining an invalid constraint is attempted.

55. What is table check constraint?

Table check constraints designate the values that specific columns of a base table can contain, providing you a method of controlling the integrity of data entered into tables. You can create tables with table check constraints using the CREATE TABLE statement, or add the constraints with the ALTER TABLE statement. E.g.,  
CREATE TABLE EMP (ID INTEGER NOT NULL,  
SALARY INTEGER CHECK (SALARY >= 15000)).

56. What is Check integrity and check pending state?

A. If the check integrity is compromised, or cannot be guaranteed for a table, the table space or partition that contains the table is placed in a check pending state. Check integrity is the condition that exists when each row of a table conforms to the check constraints defined on that table.

57. What are delete-connected tables?

A. Tables related with a foreign key are called delete-connected because a deletion in the primary key table can affect or be affected by the contents of the foreign key table.

58. What is a cycle in DB2 mean?

A cycle is a situation in which tables are related to each other through both primary and foreign key relationships. I.e., A set of referential constraints in which each associated table is a descendent of itself.

59. Which statement would you use to find out whether DB2 has used index to access the data?

A. EXPLAIN statement or the EXPLAIN option of bind.

60. What are the difference types of indexes and how will you create them?

A. There are two types of indexes: TYPE 1 & TYPE 2. Use the statement CREATE INDEX to create either type. TYPE 2 index comes with DB2V4 onwards. With TYPE 2 index data can be retrieved faster as only the data pages are locked and not the index pages. Hence TYPE 2 index is recommended.

61. What is the default value of index when you use CREATE INDEX?

A. The default value depends on the value of LOCKSIZE for the associated table space.

1. If LOCKSIZE is ROW then the default index type is type 2. You can't

use row locking with a type 1 index.

2. If LOCKSIZE is not ROW, then the default for CREATE INDEX is the type specified in field DEFAULT INDEX TYPE of installation panel DSNTIPE.

62. What is a Leaf Page?

A. Index page that points directly to the data in the table is called a leaf page. The leaf page contains the key of the record and a pointer to the record.

63. What is a root page?

A. The opposite of a leaf page; it is the highest-level index page. An index can contain only one root page; all other index pages are associated to the root. Each record of a root page contains a pointer to another index page and the highest of key of that page.

64. What is B-tree Index. Explain.

A. The simplest DB2 index is the B-tree and the B-tree's top page is called the root page. The root page entries represent the upper range limits of the index and are referenced first in a search.

65. How many indexes a table can have?

A. A table can have more than one index

66. What is the function of UNIQUE WHERE NOT NULL clause?

A. The clause is used with CREATE INDEX command. This ensures the uniqueness of the key column on which the index is defined, but it allows null values in the column. Or, DB2 will not allow duplication of non-null values in the key column.

67. What advantage does clustering index provide?

A. When a table has a clustering index, an INSERT statement inserts records as nearly as possible in the order of their index values. These clustered inserts can provide a significant performance advantage in some operations, particularly those that involve many records, such as comparisons other than equal, grouping and ordering. Although a table can have several indexes, only one can be a Clustering index.

68. How many clustering indexes are allowed for a table?

A. Only one.

69. How will you specify a clustering index?

To specify a clustering index, use the CLUSTER clause in the CREATE INDEX statement.

70. You have loaded data using a non-clustering index. Now, You are defining a clustering index for the table. What is its effect on the new inserts?

A. It does not have any effect on the new insert. The data will still be organized using the non-clustering index. However, when the table space is reorganized by REORG utility, DB2 clusters data in accordance with the clustering index.

71. What is a partitioning index?

A. When you store a table in a partitioned table space, you tell DB2 how to divide the data among partitions by using the PART clause of a CREATE INDEX statement. The index that divides the data is called a partitioning index. It is also a clustering index, because the data is clustered by the index key values. Thus, your PART clause must be preceded by the CLUSTER clause.

72. Can you compress data in LOB space?

A. No

73. Name the different types of Table spaces.

A. 1. Simple Table Space

2. Segmented Table Space

3. Partitioned Table Space (some partitioned table spaces can also be EA-enabled table spaces)

4. LOB Table Space

74. How will compress data in a table space or partition?

A. To compress data in a table space or partition, specify COMPRESS YES on CREATE TABLESPACE or ALTER TABLESPACE, then run LOAD or REORG. When you compress data, bit strings that occur frequently are replaced by

shorter strings. Information about the mapping of bit strings to their replacements is stored in a compression dictionary. Computer processing is required to compress data before it is stored and to decompress the data when it is retrieved from storage.

75. B37 abend during SPUFI

A. The B37 ABEND in the SPUFI is because of space requirements, the query has resulted in so many rows that the SPUFI.OUT file is not large enough to handle it, increase the space allocation of spufi.out.

76. What is the command used by TSO users to invoke DB2?

A. DSN RUN

77. What is the error code -803?

A. Unique index violation (Duplicate rows are not allowed)

78. How do you filter out the rows retrieved from a Db2 table?

A. One way is to use The SQL WHERE clause.

79. What is a collection?

A. A collection is something that every programmer should assign/Specify for every package. The Collection name is about 1-18 characters long. It's a user defined name that is the anchor for packages. It has no physical existence. Main usage is to group packages.

80. What is Skeleton cursor table (SKCT)?

A. When you bind a plan, DB2 creates a skeleton cursor table in the skeleton cursor table space (SCT02). IT is the executable form of a Plan. This is stored in sysibm.sct02 table.

81. What is a record in a DB2 environment?

A. In DB2, a record is the storage representation of a row.

82. What is the size constrain of a row?

A. In DB2, records or rows are stored in 4K or 32K pages and a single record cannot occupy more than one page. Therefore, a table cannot be created with a maximum record size greater than the page size.

Why is it preferable to place variable length columns at the end of the row? When you use ALTER to add a new column to an existing table, where will the new column be placed?

A. When you use alter to add a new column to an existing table, it is added at the end of the row.

84. What's the equivalent Cobol Data type for Decimal(x,y) in DB2?

A. PIC S9(x-y)V9(Y) Comp-3;

85. What does the CURRENT SQLID register contain?

The current SQLID contains the current authorization ID.

86. Can we declare DB2 HOST variable in COBOL COPY book?

A. NO. If we declare DB2 host variable in COBOL COPY book, at the time of Pre-compilation we get the host variable not defined, because pre-compiler will not expand COBOL COPY book. So we declare it either in DCLGEN with EXEC SQL INCLUDE Dclgenname END-EXEC or we directly hardcode it in the working storage section.

87. What should be specified along with a cursor in order to continue updating process after commit?

A. With Hold option.

88. What is the name of the default DB2 Catalog Database?

A. DSNDB06

89. When can you be sure that a query will return only one row?

A. When you use the primary key and only the primary key in the where clause.

90. What is the difference between join and union?

A. Join is used to retrieve data from different tables using a single SQL statement. Union is used to combine the results of two or more SQL queries.

91. What is the difference between a UNION and UNION ALL?

A. UNION: eliminates duplicates. UNION ALL: retains duplicates. Both are used to combine the results from different SELECT statements.

92. What is a correlated sub-query?

Answer: In a sub-query, if the outer query refers back to the outcome of

inner-query it is called correlated sub-query. That's why the outer query is evaluated first unlike an ordinary sub-query

93. What are the functions of Bind?

A. BIND mainly performs two things syntax checking and authorization checking. It binds together all packages into an application plan hence the name BIND. Apart from this bind has optimizer as a sub-component. Its function is to determine the optimum access strategy.

94. MAX. NO OF ROWS PER PAGE

A. 127

95. The only place of VSAM KSDS in DB2 is?

A. BSDS is a VSAM KSDS.

96. Question: Can all Users have the privilege to use the SQL Statement SELECT \* (DML)?

A. No, the user should be granted privilege to use it.

97. Question: what's the best locksize that you could use when you create a tablespace?

A. The answer is Locksize = ANY. Unless you are Sure what's the Purpose of tablespace ie., Read-only or R/W. If you use lock size =any, Db2 would automatically determine what type of locks it should use.

98. What's the error code for Unique Index Violation:

A. -803

99. What's the percentage free space for

A. ZERO

100. Can you define an Index if the table size less than 10 PAGES?

The Answer is : NO

101. What's the Maximum Length of SQLCA and what's the content of SQLCABC?

A. The Max length is 136. and the SQLCABC has the Value of SQLCA.

2. What's the percentage free space for

A. The answer is ZERO.

3. What's the maximum number of volumes that can be added to a STOGROUP?

A. The answer is 133. Usually it will be difficult monitor more than 3 or 4 volumes to a STOGROUP.

4. What's the maximum number of characters that a table name can have?

A. The answer is 18 characters.

5. What is the meaning of -805 SQL return code?

A. Program name not in plan. Bind the plan and include the DBRM for the program named as part of plan.

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A. SQL statement gets executed when we open cursor

7. What does CURRENTDATA option in bind indicate?

A. CURRENTDATA option ensures block fetch while selecting rows from a table. In DB2V4 the default has been changed to NO. Therefore it is necessary to change all the bind cards with CURRENTDATA(YES), which is default in DB2V3 & earlier to CURRENTDATA(NO).

8. What are the levels of isolation available with DB2V4 ?

CS, RR, UR (added new for DB2V4 which stands for uncommitted read which allows to retrieve records from the space which has exclusive locks also but data integrity will be affected if this option is used )The best available option for data integrity & data concurrency is CS.

9. How do you achieve record locking in DB2 in the versions, which don't support record level locking?

A. Yesterday I had posted this queue. The answer should have read as follows: By having the record length more than half of the page size !Sorry again & Thanks

10. How do u achieve record level locking in DB2 versions when record level locking is not allowed?

A. By having the length of the record greater than that of a page!

11. In a DB2-CICS program, which is, acts as co-coordinator and which is participant?

A. DB2 - participant CICS- coordinator

12. What does DML stand for and what are some examples of it?  
A. Data Manipulation Language. Some examples are SELECT, INSERT, DELETE, REPLACE.

13. How to define the data items to receive the fetch items for the SQL?  
A. Using the DSECT, followed by lines of - 'dataitems DS datatype'.

14. How will you delete duplicate records from a table?  
A. Delete From Table1Where Id In (Select Id From Table1 As Temp Group By Id Having Count(\*) >1)

15. What is the difference between Where and Having Clause?  
A. WHERE is for Rows and HAVING is for Groups.

16. How to see the structure of db2 table?  
A. Using QMF.

17. How do you declare a host variable (in COBOL) for an attribute named EMP-NAME of type VARCHAR(25) ?  
A. 01 EMP-GRP. 49 E-LEN PIC S9(4) COMP. 49 E-NAME PIC X(25).

18. What is the maximum number of tables that can be stored on a Partitioned Table Space ?  
A. ONE .

19. What are the max. & min. no. of partitions allowed in a partition tablespace?  
A. Minimum is 4. maximum is 64.

20. What is the maximum number of tables that can be joined ?  
A. Fifteen

21. What technique is used to retrieve data from more than one table in a single SQL statement?  
A. The Join statement combines data from more than two tables

22. Question: What is a foreign key?  
A. It identifies a related row in another table and establishes a logical relationship between rows in two tables.

23. Explain the use of the WHERE clause.  
It directs DB2 to extract data from rows where the value of the column is the same as the current value of the host variable.

24. What is a DB2 bind?  
Answer: A DB2 bind is a process that builds an access path to DB2 tables.

25. What is a DB2 access path?  
A. An access path is the method used to access data specified in DB2 SQL statements.

26. What is normalization and what are the five normal forms?  
A. Normalization is a design procedure for representing data in tabular format. The five normal forms are progressive rules to represent the data with minimal redundancy.

27. What are foreign keys?  
A. These are attributes of one table that have matching values in a primary key in another table, allowing for relationships between tables.

28. Describe the elements of the SELECT query syntax.  
SELECT element FROM table WHERE conditional statement.

29. Explain the use of the WHERE clause.  
A. WHERE is used with a relational statement to isolate the object element or row.

30. What techniques are used to retrieve data from more than one table in a single SQL statement?  
A. Joins, unions and nested selects are used to retrieve data.

31. Explain an outer join.  
A. An outer join includes rows from tables when there are no matching values in the tables.

32. What is a subselect? Is it different from a nested select?  
A. A subselect is a select which works in conjunction with another select. A nested select is a kind of subselect where the inner select passes to the where criteria for the outer select.

33. What is the difference between group by and order by?  
A. Group by controls the presentation of the rows, order by controls the presentation of the columns for the results of the SELECT statement.
34. Explain the EXPLAIN statement.  
A. The explain statement provides information about the optimizer's choice of access path of the SQL. It can be used in SPUFI (for single SQL statement ) or in BIND step (for embedded SQL ).
35. What is a tablespace?  
A. Tables are stored in tablespaces (hence the name)! There are three types of tablespaces: simple, segmented and partitioned.
36. What is a cursor and what is its function?  
A. An embedded SQL statement may return a number of rows while the programming language can only access one row at a time. Cursor is a programming device that allows the SELECT to find a set of rows but return them one at a time. Cursor should be used because the host language can deal with only one row at a time.
37. Usually, which is more important for DB2 system performance - CPU processing or I/O access?  
A. I/O operations are usually most critical for DB2 performance (or any other database for that matter).
38. Is there any advantage to de-normalizing DB2 tables?  
A. Denormalizing DB2 tables reduces the need for processing intensive relational joins and reduces the number of foreign keys.
39. What is the database descriptor?  
A. The database descriptor, DBD is the DB2 component that limits access to the database whenever objects are created, altered or dropped.
40. What is lock contention?  
A. To maintain the integrity of DB2 objects the DBD permits access to only on object at a time. Lock contention happens if several objects are required by contending application processes simultaneously.
41. What is SPUFI?  
A. SPUFI stands for SQL processing using file input. It is the DB2 interactive menu-driven tool used by developers to create database objects.
42. What is the significance of DB2 free space and what parameters control it?  
A. The two parameters used in the CREATE statement are the PCTFREE which specifies the percentage of free space for each page and FREEPAGE which indicates the number of pages to be loaded with data between each free page. Free space allows room for the insertion of new rows.
43. What is a NULL value? What are the pros and cons of using NULLS?  
A. A NULL value takes up one byte of storage and indicates that a value is not present as opposed to a space or zero value. It's the DB2 equivalent of TBD on an organizational chart and often correctly portrays a business situation. Unfortunately, it requires extra coding for an application program to handle this situation.
44. What is a synonym? How is it used?  
A synonym is used to reference a table or view by another name. The other name can then be written in the application code pointing to test tables in the development stage and to production entities when the code is migrated. The synonym is linked to the AUTHID that created it, so it is accessible only by creator.
45. What is an alias and how does it differ from a synonym?  
A. An alias is an alternative to a synonym, designed for a distributed environment to avoid having to use the location qualifier of a table or view. The alias is not dropped when the table is dropped.
46. What is a LIKE table and how is it created?  
A. A LIKE table is created by using the LIKE parameter in a CREATE table statement. LIKE tables are typically created for a test environment from the production environment.
47. If the base table underlying a view is restructured, e.g. attributes

are added, does the application code accessing the view need to be redone?

A. No. The table and its view are created anew, but the programs accessing the view do not need to be changed if the view and attributes accessed remain the same.

48. Under what circumstances will DB2 allow an SQL statement to update more than one primary key value at a time?

A. Never. Such processing could produce duplicate values violating entity integrity. Primary keys must be updated one at a time.

49. What is the cascade rule and how does it relate to deletions made with a subselect?

A. The cascade rule will not allow deletions based on a subselect that references the same table from which the deletions are being made.

Question: maxx number of columns in a db2 table

Answer: 224

Question: Question: Question: I need to view the number of tables existing under one particular Owner. Is it possible? If so, pl give the SQL query for this?

Answer: The query `SELECT * FROM SYSIBM.SYSTABLES WHERE CREATOR = 'owner id'` This displays the table names with that If you want only the number of tables give the following query. `SELECT COUNT(*) FROM SYSIBM.SYSTABLES WHERE CREATOR = 'owner id'` Make sure that you are in correct subsystem.

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Answer: The query `SELECT * FROM SYSTABLES WHERE OWNER=` should work.

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Answer: Answer to Ravi's query: Db2 records information for its operation in a catalog which is actually a group of tables. So we can use the SYSTABLES to get answer to ur query. So

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Question: What is JOIN and different types of JOIN.

Answer: The ability to join rows and combaine data from two or more tables is one of the most powerful features of relational system. Three type of joins: 1. Equi-join 2. Non-equi join 3. self-join

Question: can I alter a table (e.g. adding a column) when other user is selecting some columns or updating some columns from the same table?

Answer: yes possible. until the updation or selection is committed db2 table will not be restructured. new column definition will be there but it will not be included until all the tasks on the table are committed.

Question: How many subqueries can you combine together ?

Answer: Total 16 queries and subqueries are 15

Question: A. What are the different methods of accessing db2 from tso? B. How is the connection established between TSO & DB2?

Answer: A. There are three ways in establishing tso/db2 connection 1. SPUFI 2. QMF 3. CATALOG VISIBILITY B. A thread between TSO & DB2 is established while attempting to make connection between tso & db2.

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Answer: Delete From Table1Where Id In (Select Id From Tabell As Temp Group By Id Having Count(\*) >1)

Question: What is the difference between Where and Having Clause

Answer: WHERE is for Rows and HAVING is for Groups

Question: How to see the structure of db2 table??

Answer: Using QMF.

Question: How do you declare a host variable (in COBOL) for an attribute named EMP-NAME of type VARCHAR(25) ?

Answer: 01 EMP-GRP. 49 E-LEN PIC S9(4) COMP. 49 E-NAME PIC X(25).

Question: What is the maximum number of tables that can be stored on a

Partitioned Table Space ?

Answer: ONE

Question: Name the different types of Table spaces.

Answer: 1. Simple Table Space 2. Segmented Table Space and 3. Partitioned Table Space

Question: what are the max. & min. no. of partitions allowed in a partition tablespace?

Answer: minimum is 4. maximum is 64.

Question: what is the maximum number of tables that can be joined ?

Answer: fifteen

Question: What technique is used to retrieve data from more than one table in a single SQL statement?

Answer: The Join statement combines data from more than two tables

Question: What is a foreign key?

Answer: It identifies a related row in another table and establishes a logical relationship between rows in two tables.

Question: Explain the use of the WHERE clause.

Answer: It directs DB2 to extract data from rows where the value of the column is the same as the current value of the host variable.

CICS

3/1/00 48 questions and a tentative answer key for a Tech Test for CICS/COBOL Programmers.

1. Which of the following does multithreading allow?

A. several transactions that require the same program to use one copy of the program. B. many tasks to be allocated to the terminal. C. an audit trail of all files records from all files updated by a particular application

2. Under CICS, multitasking achieved by what method?

A. virtual paging. B. task switching. C. priority numbering, D. pseudo conversational

3. What are programs that are reusable to each task and restarted by each task said to be?

A. Command-Level. B. Transaction Dependent. C. Prioritized. D. Quasi-Reentrant.

4. What three control programs execute in a task?

A. File Control/Temp Storage Control/Trace Control. B. Task Control/Interval Control/BMS Control. C. Terminal Control/Task Control/Program Control. D. Journal Control/Dump Control/Storage Control

5. Which are the correct ways to initiate CICS tasks?

A. Automatic Task Initiation/Exec CICS Start. B. CALL Statement/Receivable Map/Send Map. C. Permanent Transaction ID/Temporary Transaction ID. D. PA Key/XCTL Statement/Interval Control Transaction ID

6. A CICS Cobol program must first be \_\_\_\_\_ before compiled.

A. linked to CICS tables. B. new copied. C. loaded to CICS object table. D. translated.

7. Online files must have an entry in the:

A. resource control table. B. vsam master catalog. C. file control table. D. file initialization table.

8. For data fields that should not be entered or cleared you can use what characteristic?

A. Unprotected. B. Normal. C. Initial Value. D. Autoskip.

9. The cursor can be controlled by using a special one byte field called:

A. stopper field. B. jump field. C. shift field. D. tag field.

10. Name the types of maps used in CICS:

A. BMS Map/Mapset. B. Offline Map/Online Map. C. Physical Map/Symbolic map. D. Symbolic Map/Temp Map.

11. BMS uses \_\_\_\_\_ to load the appropriate physical map into main storage.

- A. load library. B. program control. C. mapset. D. temp storage.
12. With BMS, two (2) major application benefits are given to the programmer. They are:  
 A. Physical Map/Assembler Macro. B. Symbolic Maps/Mapsets. C. Device and Data independence. D. Mapsets/Coding Rules.
13. Which answer describes a rule for coding a BMS Macro?  
 A. Label is from one (1) to seven (7) characters long with the first character being alphabetic. B. Getmain command should be coded first. C. Op-code is separated from the label by an asterisk. D. Operands start in column 20 separated by commas.
14. The second BMS macro (OP Code DFHMDI) has which function?  
 A. Specifies length of the field. B. Defines a field with a map and its position. C. States purpose of field - Input, Output or both. D. Contains size parameters of Map.
15. If the program uses other keys besides "enter" to control logic, a copy of \_\_\_\_\_ should be used in working storage of program.  
 A. ebaid. B. dfhaid. C. dfhbmsca. D. dfheivar.
16. Which two entries are usually found in the linkage section?  
 A. Execute Interface Block/Transaction Work Area. B. Symbolic Maps/DFATTRBS. C. DFHEIV11 / Communication Area. D. Dfhcommarea/Execute Interfaced Block.
- Tentative answer key: 1. A 2. D 3. D 4. C 5. D 6. D 7. C 8. D 9. A 10. C 11. B 12. C 13. A 14. D 15. B 16. D.
17. Which of the following fields will be found with the execute interface block?  
 A. Attr-prot/Attr-unprot/Attr-Prot-askip. B. Eibtranid/Eibtramid/Eitbaid/. C. Eibposn/Eibmapnm/Eibfilm. D. Dfheiv0/Dfheiv99/Dfhnull.
18. When coding linkage pointers, what is it important to ensure?  
 A. that Symbolic storage is never over 4096K. B. that the structure is packed decimal. C. that the size pointer is equal to the symbolic map size. D. that each pointer appears in the same sequence as the 01 level entry it refers to.
19. Which of the following CICS Tables utilizes trans IDs?  
 A. TCT. B. PCT. C. RCT. D. PPT.
20. Which of the following terminates a task in true pseudo-conversational fashion?  
 A. Erase. B. Suspend. C. End-Exec. D. Return.
21. Which of the following is acquired for a program before it executes a task?  
 A. Transaction Word Area. B. Dfhcommarea. C. Communication Area. D. Map Area.
22. What does the Handle Aid command do?  
 A. It specifies terminal keys and/or other attention identifiers with corresponding routines for execution. B. It automatically tries to correct error storage abends. C. It identifies status codes on file reads to determine error messages. D. It sets all PF-keys to ANSI standards where pre-processing proceeds to generate logic for routines necessary.
23. Which of the following best describes the Handle condition?  
 A. method of detecting an error condition and then branching to logic in a program to handle the error. B. used to determine whether to release resources and save starting point. C. automatically determines that an inputted field is to be updated. D. terminates session based upon stated return-codes.
24. Which of the following is only true of the fields with modified data tag "On"?  
 A. They can be modified. B. They are made available for upgrade, regardless of map name and fset usage. C. They will be transferred to the symbolic map on a receive command. D. They may be used on a send

command.

25. Which of the following describes a way of setting the Modified Data Tag (MDT) on?

A. Attributes may be changed by the programmer to include the fset attribute. B. Attributes can be set to fset via passing them to call program "DFHFSET" prior to sending map. C. Specify FSET as one of the attributes when coding the BMS macro map definition. D. Moving fields necessary to "Fset" type symbolic map. E. Either a or c.

26. Why are maps grouped into mapsets?

A. to load all related maps into main storage for quick retrieval. B. to document maps within a process or application. C. to identify all application maps in the order in which they will appear. D. to allow map-names to be duplicated in different applications

27. Debug or debug translation options are utilized by what facility?

A. Time Sharing Option (TSO). B. Linkage Editor. C. Information Efficiency Facility (IEF). D. Execute Diagnostic Facility (EDF).

28. What action will the translation option "Seq" cause?

A. sequencing the source statements. B. flagging all statements that are not in sequence. C. The priority order of terminals will be the function of resource utilization. D. Telling CICS that the program will re-sequence map execution in order of program usage, not mapset order.

29. What type of abend is issued by the system if a receive map is executed when no map has been displayed?

A. Record not found. B. Map not found/Map failure. C. Duplicate record. D. Invalid attention identifier used. E. Initialization Queue error condition.

30. When the dataonly operand on sending a map is used, which item below would be left out of the SEND command?

A. Map. B. Erase. C. Delete. D. Set-on. E. Cursor.

31. What is the purpose of issuing eraseup?

A. to erase unchanged user entered fields and set modified data tags to "on". B. to set the values of all non-protected fields to null. C. to automatically erase all successfully updated fields and set modified data tags and fset to "off". D. to erase all updated fields and reset map prior to change.

32. Which of the following is true about online files?

A. Definition of files resides in the File Control Table which determines what action are allowed. B. Such files are used by many transactions at different times. C. Files that are needed by all applications may be opened when CICS is initialized and closed when CICS is terminated. D. Programs that open and close online files require special CICS macros. E. All of the above.

Tentative answer key: 17. C 18, D 19. B 20. D 21. B 22. A 23, A 24. C 25. E 26. A 27. D 28 D? 29. B 30. B 31. C 32.

33. Which of the following are uses of the Getmain command?

A. adding a record to the file. B. writing out a journal record. C. obtaining new temp storage. D. manipulating fields defined in the Linking Area. E. all of the above

34. Which of the following is the correct syntax for reading a record from a temporary storage queue?

A. Read TSQ. B. ReadTSQ. C. ReadQue TS. D. ReadQ TS.

35. The readnext command is performed in which case?

A. sequential read/update. B. Vsam ESDS file access. C. Dynamic searches. D. After a browse is started.

36. On which type of file would you use readprev?

A. Vsam. B. Qsam. C. IMS. D. Bdam.

37. Which of the following are the two (2) commands needed to release exclusive control from a record or block?

A. Freemain/Erase. B. Delete/syncpoint. C. Unlock/Rewrite. D. Rollback/Release. E. Return/Suspend.

38. Which of the following is a function of syncpoint?

A. to clear out buffers and temp storage. B. to clear out buffers and physically write records to file. C. to reset all Key-Sequence files to current key in use at syncpoint declare. D. to backout all transactions from buffers upon no update decision.

39. Which of the following best defines the action of a suspend command?

A. takes a current task out of service and places it in the Wait queue. B. cancels a transaction dump of transient storage data. C. deactivates the debugging activities in process. D. cancels and restarts program execution.

40. Which of the following are the four basic areas affected by CICS commands?

A. Terminal I-O/Temporary Storage/File Control/Program Control. B. CEMT/Resource Control/Task Control/Terminal I-O. C. Process Control/Program Control/Address Pointers/BMS. D. Suspend/Getmain/Reads/Writes

41. The release command will delete from main storage any mapset table and program previously obtained through which of the following?

A. XCTL. B. Link. C. Return. D. Load.

42. The XCTL command transfers control from one program to another at the same:

A. storage address. B. logical level. C. higher level. D. lower level.

43. Into where can the load command load a program from the library?

A. transient storage. B. communications area. C. main storage. D. symbolic map

44. The link command can call another program at the next \_\_\_\_\_ and regains control when the last program issues a:

A. lower send map; link. B. Lower logical level; return. C. Higher logical level; freemain. D. issued transaction ID; load.

45. For what is the CESN transaction primarily utilized?

A. system security. B. closing files. C. application library controls. D. debugging

46. Which of the following is an example of correct usage of the CEMT transaction?

A. Security control. B. Debugging. C. Terminal information and controls. Temporary storage allocations

47. How does a program gain access to the TWA?

A. reading a dataset. B. the Address Command. C. the Exec-CICS statement. D. calling program 'DFHEI1'.

48. For what is the CEDF transaction used?

A. task management. B. files and DASD control. C. CICS data facility manager. D. Debugging programs.

Tentative answer key: 1. A 2. D 3. D 4. C 5. D 6. D 7. C 8. D 9, A 10. C

11. B 12. C 13. A 14. D 15. B 16. D 17. C 18, D 19. B 20. D 21. B 22. A

23, A 24. C 25. E 26. A 27. D 28 D? 29. B 30. B 31. C 32. E 33. C 34. D

35. D 36. A 37. C 38. B 39. A 40. A 41. D 42. B 43. C 44. B 45. A 46. C

47. B 48. D.

11/14/99: Karl Haynes: 'Can you use the INSPECT (with TALLYING option) Cobol verb in a CICS COBOL program? My program abends as soon as it hits this statement at run time. However, it does cleanly compile.' Web note: My initial take is that you can; the problem is elsewhere. I'm posting in case I've missed something and will post corrections.

6/4/99: Roland: 'I have two questions regarding CICS. "how to build up LU 6.2 communication?" and "what Psuedo-conversational and real conversational transaction are and their differences." Web note: Pseudo-conversational transactions are almost always the preferred method. In this mode CICS releases resources between responses to user input, i.e. the task is ended awaiting the user response. Please mail LU 6.2 answers to Roland at vlpa@netvigator.com. <mailto:vlpa@netvigator.com>

Q1. Name some of the common tables in CICS and their usage.

A1. PCT Program Control Table - defines each transaction, containing a

list of valid transaction identifiers (transid) where each transaction is paired with its matching program; PPT Program Processing Table - contains a list of valid program names and maps and whether a current version is in the CICS region or needs to be brought in as a new copy; FCT File Control Table - contains a list of files known to CICS, the dataset name and status (closed/open, enabled/disabled); TCT Terminal Control Table - a list of the terminals known to CICS.

Q2. Name some common CICS service programs and explain their usage.

A2. Terminal Control, File Control, Task Control, Storage Control, etc. Each CICS services program controls the usage and status for its resource (file, terminal, etc) within the CICS region.

Q3. What is meant by a CICS task?

A3. A CICS task exists from the time the operator presses the enter key until the application program returns control to CICS.

Q4. What is meant by program reentrance?

A4. A program is considered reentrant if more than one task can execute the code without interfering with the other tasks' execution.

Q5. What is the common systems area (CSA)?

A5. The common systems area is the major CICS control block that contains system information, including pointers to most other CICS control blocks. The CSA points to all members of STATIC storage.

Q6. What is the COMMAREA (communications area)?

A6. This is the area of main storage designed to let programs or tasks communicate with one another, used in programs via RETURN, XCTL and LINK commands.

Q7. What is the EIB (execute interface block)?

A7. The execute interface block lets the program communicate with the execute interface program, which processes CICS commands. It contains terminal id, time of day and response codes.

Q8. What is an mdt (modified data tag) - it's meaning and use?

A8. The modified data tag is the last bit in the attribute byte for each screen field. It indicates whether the corresponding field has been changed.

Q9. What is a transid and explain the system transid CEMT.

A9. Transid is a transaction identifier, a four character code used to invoke a CICS task. CEMT is the master terminal transaction that lets you display and change the status of resources - it is the primary CICS service transaction.

Q10. What is the common work area (CWA)?

A10. The common work area is a storage area that can be accessed by any task in a CICS system.

Q11. How do you access storage outside your CICS program?

A11. In COBOL storage was accessed via BLL cells using the SET option of ADDRESS commands. In COBOL II the special register, ADDRESS OF lets you reference the address of any Linkage Section field.

Q12. How does COBOL II and CICS release 1.7 provide for exceptional conditions and how does that differ from VS COBOL and earlier CICS releases?

A12. VS COBOL used the HANDLE CONDITION command to name routines to pass program control when exceptional conditions were encountered. COBOL II and CICS release 1.7 introduced the RESP option on many CICS commands.

Q13. What is the meaning and use of the EIBAID field?

A13. EIBAID is a key field in the execute interface block; it indicates which attention key the user pressed to initiate the task.

Q14. How do you control cursor positioning?

A14. It's controlled by the CURSOR option of the SEND MAP command using a direct (0 through 1919) or symbolic value.

Q15. What are attribute bytes and how and why are they modified?

A15. Attribute bytes define map field characteristics (brightness, protection, etc); they are modified prior to issuing a SEND MAP command, eg. from normal to intense to highlight an error field.

Q16. How do you invoke other programs? What are the pros and cons of each method.

A16. There are three ways: 1). use a COBOL II CALL statement to invoke a subprogram. This method is transparent to CICS, which sees only the one load module. 2). an EXEC LINK is similar to a call; it invokes a separate CICS program and ends with a RETURN to the invoking program. or 3). an EXEC XCTL which transfers control to another CICS program and does not get control back.

Q17. What is BMS?

A17. BMS is Basic Map Support; it allows you to code assembler level programs to define screens.

Q18. What is the difference between FSET and FRSET?

A18. FSET specifies that the modified data tag should be turned on before the map is sent to the screen. FRSET turns off the attribute byte; it's used to transmit only changed data from the terminal.

Q19. What is the difference between the enter key, the PF keys and the PA keys?

A19. The enter and PF keys transmit data from the screen; the PA keys tell CICS that a terminal action took place, but data is not transmitted.

Q20. Explain the difference among the EXEC LINK, EXEC XCTL and Cobol II static call statements in CICS.

A20. COBOL II allows for static calls which are more efficient than the LINK instruction which establishes a new run-unit.

Q21. Are sequential files supported by CICS?

A21. Yes, but not as part of the File Control Program. They are supported as extra partition transient data files.

Q22. What option can be coded on the RETURN command to associate a transaction identifier with the next terminal input?

A22. The TRANSID option.

Q23. What is an ASRA?

A23. An ASRA is the CICS interrupt code, the equivalent of an MVS abend code.

Q24. What is temporary storage?

A24. Temporary storage is either main or auxiliary storage that allows the program to save data between task invocations.

Q25. What is transient data?

A25. Transient data provides CICS programs with a simple method for sequential processing, often used to produce output for 3270 printers.

Q26. What are the two types of transient data queues?

A26. They are intrapartition, which can only be accessed from within CICS and extrapartition, which are typically used to collect data online, but process it in a batch environment.

Q27. Where are transient data sets defined to CICS?

A27. They are defined in the destination control table (DCT).

Q28. Once a transient data queue is read, can it be reread?

A28. No, silly! That's why IBM calls it transient.

Q29. Name some commands used for CICS file browsing.

A29. STARTBR, READNEXT, READPREV, ENDBR and RESETBR.

Q30. What other file control processing commands are used for file updating?

A30. WRITE, REWRITE, DELETE and UNLOCK.

Q31. What is Journal Recovery and Dynamic Transaction Backout?

A31. Journal Recovery is recovery of changes made to a file during online processing. If a file has I/O problems it is restored from a backup taken before online processing began and the journalled changes are applied. Dynamic transaction backout is the removal of partial changes made by a failed transaction.

Q32. What tables must be updated when adding a new transaction and program?

A32. At a bare minimum the Program Control Table ( PCT) and Program

Processing Table (PPT) must be updated.

Q33. What is the meaning of the SYNCPOINT command?

A33. SYNCPOINT without the ROLLBACK option makes all updates to protected resources permanent, with the ROLLBACK option it reverses all updates.

Q34. What do the terms locality of reference and working set mean?

A34. They refer to CICS efficiency techniques. Locality of reference requires that the application program should consistently reference instructions and data within a relatively small number of pages. The working set is the number of program pages needed by a task.

Q35. What do the keywords MAPONLY and DATAONLY mean?

A35. MAPONLY is a SEND MAP operand that sends only fields with initial values to the screen. DATAONLY is the SEND MAP operand that specifies only data from the map area should be displayed.

Q36. What is the MASSINSERT option?

A36. MASSINSERT is a WRITE option that modifies normal VSAM split processing, leaving free space after the inserted record, so subsequent records can be inserted without splits. It is ended by an UNLOCK command.

Q37. What is a cursor in CICS sql processing.

A37. A cursor is a pointer that identifies one row in a sql results table as the current row.

Q38. What are the DB2 steps required to migrate a CICS DB2 program from source code to load module?

A38. A DB2 precompiler processes some sql statements and converts others. It creates a data base request module (DBRM) for the binding step. The bind process uses the DBRM to create an application plan, which specifies the techniques DB2 will use to process the embedded sql statements. The link/edit step includes an interface to the CICS/DB2 attachment facility.

Q39. What is the SQL Communications Area and what are some of its key fields?

A39. It is a data structure that must be included in any host-language program using SQL. It is used to pass feedback about the sql operations to the program. Fields are return codes, error messages, handling codes and warnings.

Q40. What is DCLGEN?

A40. DCLGEN stands for declarations generator; it is a facility to generate DB2 sql data structures in COBOL or PL/I programs.

Q41. Name some translator and compile options and explain their meaning.

A41. For translator SOURCE option prints the program listing, DEBUG enables EDF and COBOL2 alerts the system to use the COBOL II compiler. For the compiler XREF prints a sorted data cross reference and FDUMP prints a formatted dump if the program abends.

Q42. What is the significance of RDO?

A42. RDO is Resource Definition Online. Since release 1.6 RDO allows resources (terminals, programs, transactions and files) to be defined interactively while CICS is running.

Q43. What is CECI?

A43. CECI is the command level interpreter tranid that interactively executes CICS commands. It is a rudimentary CICS command debugger which does not require coding an entire program.

Q44. What is CEDF?

A44. CEDF is the execute diagnostic facility that can be used for debugging CICS programs.

Q45. What is CEBR?

A45. CEBR lets you browse the contents of a specific temporary storage queue.

Q46. Name and explain some common CICS abend codes.

A46. Any AEI\_ indicates an execute interface program problem - the abending program encountered an exceptional condition that was not

anticipated by the coding. APCT - the program could not be found or is disabled. ASRA - most common CICS abend, indicating a program check, identified by a one-byte code in the Program Status Word in the dump. AKCP - the task was cancelled; it was suspended for a period longer than the transaction's defined deadlock timeout period. AKCT - The task was cancelled because it was waiting too long for terminal input.

Q47. What is a logical message in CICS?

A47. A logical message is a single unit of output created by SEND TEXT or SEND MAP commands. BMS collects the separate output from each command and treats them as one entity. This technique may be used to build CICS reports.

Q48. What are the CICS commands associated with temporary storage queue processing?

A48. WRITEQ TS, READQ TS, and DELETEQ, whose meanings should be self-explanatory.

Q49. What are the CICS commands associated with transient data queue processing?

A49. WRITEQ TD, READQ TD, DELETEQ TD, ENQ and DEQ.

Q50. Ok, so what is the meaning of the ENQ and DEQ commands?

A50. Neither command is exclusively a transient data command. The ENQ command reserves any user defined resource for the specific task. For enqueued transient data no other task will be able to write records to it for as long as it is enqueued. DEQ removes the lock.

Q51. How do you delete Item 3 in a five-item TSQ?

A51. You can't--at least not directly. Options, none of them good, include: 1) adding a logical-delete flag to the contents of each item; 2) moving item 4 to 3 and 5 to 4 and initializing item 5, all thru rewrites; this is a variant on 1; 3) creating a new 'copy' tsq that excludes the unwanted item, killing the old tsq (deleteq ts), writing the new tsq with the original name from the new tsq, and then deleting the 'copy' tsq. This way, you will get an accurate report from NUMITEMS.

Q52. What CICS command would you use to read a VSAM KSDS sequentially in ascending order?

A52. READNEXT reads the next record from a browse operation for any of the three VSAM files.

Q53. How do you get data from a task that began with a START command?

A53. The RETRIEVE command is used to get data from a task that began with a START command.

Q54. What is interval control and what are some of the CICS commands associated with it?

A54. CICS interval control provides a variety of time-related features - common commands are ASKTIME, FORMATTIME, START, RETRIEVE, and CANCEL.

Q55. What is task control and what are the CICS commands associated with it?

A55. Task control refers to the CICS functions that manage the execution of tasks. (Elementary, my dear Watson!) Task control commands are SUSPEND, ENQ, and DEQ.

Q56. What is the CICS LOAD command?

A56. The LOAD command retrieves an object program from disk and loads it into main storage - it's primarily used for a constant table that will be available system-wide.

Q57. What is the ABEND command and when would you use it?

A57. The ABEND command forces a task to end abnormally. It creates a transaction dump and invokes the dynamic transaction backout.

Q58. 4/99 Mail from Joseph Howard: 'Q: DB2 What is the difference between a package and a plan? How does one bind 2 versions of a CICS transaction with the same module name in two different CICS regions that share the same DB2 subsystem?

A58. Package and plan are usually used synonymously, as in this site. Both contain optimized code for SQL statements - a package for a single program, module or subroutine contained in the database request module

(DBRM) library. A plan may contain multiple packages and pointers to packages. The one CICS module would then exist in a package that could be referenced in two different plans.

Email comments, suggestions or additional questions and answers to [cronid@aol.com](mailto:cronid@aol.com). <<mailto:cronid@aol.com>>

#### COBOL & COBOL II

11/14/99: Karl Haynes: 'Can you use the INSPECT (with TALLYING option) Cobol verb in a CICS COBOL program? My program abends as soon as it hits this statement at run time. However, it does cleanly compile.' Web note: My initial take is that you can; the problem is elsewhere. I'm posting in case I've missed something and will post corrections.

Q1. What are the differences between COBOL and COBOL II?

A1. There are at least five differences: COBOL II supports structured programming by using in line PERFORMs and explicit scope terminators, it introduces new features (EVALUATE, SET .. TO TRUE, CALL .. BY CONTEXT, etc), it permits programs to be loaded and addressed above the 16 megabyte line, it does not support many old features (READY TRACE, REPORT-WRITER, ISAM, etc.), and it offers enhanced CICS support.

Q2. What is an explicit scope terminator?

A2. A scope terminator brackets its preceding verb, eg. IF .. END-IF, so that all statements between the verb and its scope terminator are grouped together. Other common COBOL II verbs are READ, PERFORM, EVALUATE, SEARCH and STRING.

Q3. What is an in line PERFORM? When would you use it? Anything else to say about it?

A3. The PERFORM and END-PERFORM statements bracket all COBOL II statements between them. The COBOL equivalent is to PERFORM or PERFORM THRU a paragraph. In line PERFORMs work as long as there are no internal GO TOs, not even to an exit. The in line PERFORM for readability should not exceed a page length - often it will reference other PERFORM paragraphs.

Q4. What is the difference between NEXT SENTENCE and CONTINUE?

A4. NEXT SENTENCE gives control to the verb following the next period. CONTINUE gives control to the next verb after the explicit scope terminator. (This is not one of COBOL II's finer implementations). It's safest to use CONTINUE rather than NEXT SENTENCE in COBOL II.

Q5. What COBOL construct is the COBOL II EVALUATE meant to replace?

A5. EVALUATE can be used in place of the nested IF THEN ELSE statements.

Q6. What is the significance of 'above the line' and 'below the line'?

A6. Before IBM introduced MVS/XA architecture in the 1980's a program's virtual storage was limited to 16 megs. Programs compiled with a 24 bit mode can only address 16 Mb of space, as though they were kept under an imaginary storage line. With COBOL II a program compiled with a 31 bit mode can be 'above the 16 Mb line. (This 'below the line', 'above the line' imagery confuses most mainframe programmers, who tend to be a literal minded group.)

Q7. What was removed from COBOL in the COBOL II implementation?

A7. Partial list: REMARKS, NOMINAL KEY, PAGE-COUNTER, CURRENT-DAY, TIME-OF-DAY, STATE, FLOW, COUNT, EXAMINE, EXHIBIT, READY TRACE and RESET TRACE.

Q8. Explain call by context by comparing it to other calls.

A8. The parameters passed in a call by context are protected from modification by the called program. In a normal call they are able to be modified.

Q9. What is the linkage section?

A9. The linkage section is part of a called program that 'links' or maps to data items in the calling program's working storage. It is the part of the called program where these share items are defined.

Q10. What is the difference between a subscript and an index in a table

definition?

A10. A subscript is a working storage data definition item, typically a PIC (999) where a value must be moved to the subscript and then incremented or decremented by ADD TO and SUBTRACT FROM statements. An index is a register item that exists outside the program's working storage. You SET an index to a value and SET it UP BY value and DOWN BY value.

Q11. If you were passing a table via linkage, which is preferable - a subscript or an index?

A11. Wake up - you haven't been paying attention! It's not possible to pass an index via linkage. The index is not part of the calling programs working storage. Those of us who've made this mistake, appreciate the lesson more than others.

Q12. Explain the difference between an internal and an external sort, the pros and cons, internal sort syntax etc.

A12. An external sort is not COBOL; it is performed through JCL and PGM=SORT. It is understandable without any code reference. An internal sort can use two different syntaxes: 1.) USING, GIVING sorts are comparable to external sorts with no extra file processing; 2) INPUT PROCEDURE, OUTPUT PROCEDURE sorts allow for data manipulation before and/or after the sort.

Q13. What is the difference between comp and comp-3 usage? Explain other COBOL usages.

A13. Comp is a binary usage, while comp-3 indicates packed decimal. The other common usages are binary and display. Display is the default. 3/28/00 Dave Herrmann: 'I was reading your FAQ on Cobol, as an fyi Comp is defined as the fastest/preferred numeric data type for the machine it runs on. IBM Mainframes are typically binary and AS400's are packed.'

Q14. When is a scope terminator mandatory?

A14. Scope terminators are mandatory for in-line PERFORMS and EVALUATE statements. For readability, it's recommended coding practice to always make scope terminators explicit.

Q15. In a COBOL II PERFORM statement, when is the conditional tested, before or after the perform execution?

A15. In COBOL II the optional clause WITH TEST BEFORE or WITH TEST AFTER can be added to all perform statements. By default the test is performed before the perform.

Q16. In an EVALUTE statement is the order of the WHEN clauses significant?

A16. Absolutely. Evaluation of the WHEN clauses proceeds from top to bottom and their sequence can determine results.

Q17. What is the default value(s) for an INITIALIZE and what keyword allows for an override of the default.

A17. INITIALIZE moves spaces to alphabetic fields and zeros to alphanumeric fields. The REPLACING option can be used to override these defaults.

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A19. LENGTH acts like a special register to tell the length of a group or elementary item.

Q20. What is the difference between a binary search and a sequential search? What are the pertinent COBOL commands?

A20. In a binary search the table element key values must be in ascending or descending sequence. The table is 'halved' to search for equal to, greater than or less than conditions until the element is found. In a sequential search the table is searched from top to bottom, so (ironically) the elements do not have to be in a specific sequence. The binary search is much faster for larger tables, while sequential

works well with smaller ones. SEARCH ALL is used for binary searches; SEARCH for sequential.

Q21. What is the point of the REPLACING option of a copy statement?

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COBOL & COBOL II

11/14/99: Karl Haynes: 'Can you use the INSPECT (with TALLYING option) Cobol verb in a CICS COBOL program? My program abends as soon as it hits this statement at run time. However, it does cleanly compile.' Web note: My initial take is that you can; the problem is elsewhere. I'm posting in case I've missed something and will post corrections.

Q1. What are the differences between COBOL and COBOL II?

A1. There are at least five differences: COBOL II supports structured programming by using in line PERFORMs and explicit scope terminators, it introduces new features (EVALUATE, SET .. TO TRUE, CALL .. BY CONTEXT, etc), it permits programs to be loaded and addressed above the 16 megabyte line, it does not support many old features (READY TRACE, REPORT-WRITER, ISAM, etc.), and it offers enhanced CICS support.

Q2. What is an explicit scope terminator?

A2. A scope terminator brackets its preceding verb, eg. IF .. END-IF, so that all statements between the verb and its scope terminator are grouped together. Other common COBOL II verbs are READ, PERFORM, EVALUATE, SEARCH and STRING.

Q3. What is an in line PERFORM? When would you use it? Anything else to say about it?

A3. The PERFORM and END-PERFORM statements bracket all COBOL II statements between them. The COBOL equivalent is to PERFORM or PERFORM THRU a paragraph. In line PERFORMs work as long as there are no internal GO TOs, not even to an exit. The in line PERFORM for readability should not exceed a page length - often it will reference other PERFORM paragraphs.

Q4. What is the difference between NEXT SENTENCE and CONTINUE?

A4. NEXT SENTENCE gives control to the verb following the next period. CONTINUE gives control to the next verb after the explicit scope terminator. (This is not one of COBOL II's finer implementations). It's safest to use CONTINUE rather than NEXT SENTENCE in COBOL II.

Q5. What COBOL construct is the COBOL II EVALUATE meant to replace?

A5. EVALUATE can be used in place of the nested IF THEN ELSE statements.

Q6. What is the significance of 'above the line' and 'below the line'?

A6. Before IBM introduced MVS/XA architecture in the 1980's a program's virtual storage was limited to 16 megs. Programs compiled with a 24 bit mode can only address 16 Mb of space, as though they were kept under an imaginary storage line. With COBOL II a program compiled with a 31 bit mode can be 'above the 16 Mb line. (This 'below the line', 'above the line' imagery confuses most mainframe programmers, who tend to be a literal minded group.)

Q7. What was removed from COBOL in the COBOL II implementation?

A7. Partial list: REMARKS, NOMINAL KEY, PAGE-COUNTER, CURRENT-DAY, TIME-OF-DAY, STATE, FLOW, COUNT, EXAMINE, EXHIBIT, READY TRACE and RESET TRACE.

Q8. Explain call by context by comparing it to other calls.

A8. The parameters passed in a call by context are protected from modification by the called program. In a normal call they are able to be modified.

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A9. The linkage section is part of a called program that 'links' or maps to data items in the calling program's working storage. It is the part of the called program where these share items are defined.

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Q1. What is a DB2 bind?

A1. A DB2 bind is a process that builds an access path to DB2 tables.

Q2. What is a DB2 access path?

A2. An access path is the method used to access data specified in DB2 sql statements.

Q3. What is a DB2 plan?

A3. An application plan or package is generated by the bind to define an access path.

Q4. What is normalization and what are the five normal forms?

A4. Normalization is a design procedure for representing data in tabular format. The five normal forms are progressive rules to represent the data with minimal redundancy.

Q5. What are foreign keys?

A5. These are attributes of one table that have matching values in a primary key in another table, allowing for relationships between tables.

Q6. Describe the elements of the SELECT query syntax.

A6. SELECT element FROM table WHERE conditional statement.

Q7. Explain the use of the WHERE clause.

A7. WHERE is used with a relational statement to isolate the object element or row.

Q8. What techniques are used to retrieve data from more than one table in a single SQL statement?

A8. Joins, unions and nested selects are used to retrieve data.

Q9. What do the initials DDL and DML stand for and what is their meaning?

A9. DDL is data definition language and DML is data manipulation language. DDL statements are CREATE, ALTER, TRUNCATE. DML statements are SELECT, INSERT, DELETE and UPDATE.

Q10. What is a view? Why use it?

A10. A view is a virtual table made up of data from base tables and other views, but not stored separately.

Q11. Explain an outer join.

A11. An outer join includes rows from tables when there are no matching values in the tables.

Q12. What is a subselect? Is it different from a nested select?

A12. A subselect is a select which works in conjunction with another select. A nested select is a kind of subselect where the inner select passes to the where criteria for the outer select.

Q13. What is the difference between group by and order by?

A13. Group by controls the presentation of the rows, order by controls the presentation of the columns for the results of the SELECT statement.

Q14. Explain the EXPLAIN statement.

A14. The explain statement provides information about the optimizer's choice of access path of the sql.

Q15. What is tablespace?

A15. Tables are stored in tablespaces (hence the name)! There are three types of tablespaces: simple, segmented and partitioned.

Q16. What is a cursor and what is its function?

A16. An embedded sql statement may return a number of rows while the programming language can only access one row at a time. The programming device called a cursor controls the position of the row.

Q17. What is referential integrity?

A17. Referential integrity refers to the consistency that must be maintained between primary and foreign keys, ie every foreign key value must have a corresponding primary key value.

Q18. Usually, which is more important for DB2 system performance - CPU processing or I/O access?

A18. I/O operations are usually most critical for DB2 performance (or any other database for that matter).

Q19. Is there any advantage to denormalizing DB2 tables?

A19. Denormalizing DB2 tables reduces the need for processing intensive relational joins and reduces the number of foreign keys.

Q20. What is the database descriptor?

A20. The database descriptor, DBD is the DB2 component that limits access to the database whenever objects are created, altered or dropped.

Q21. What is lock contention?

A21. To maintain the integrity of DB2 objects the DBD permits access to only on object at a time. Lock contention happens if several objects are required by contending application processes simultaneously.

Q22. What is SPUFI?

A22. SPUFI stands for SQL processing using file input. It is the DB2 interactive menu-driven tool used by developers to create database objects.

Q23. What is the significance of DB2 free space and what parameters control it?

A23. The two parameters used in the CREATE statement are the PCTFREE which specifies the percentage of free space for each page and FREEPAGE which indicates the number of pages to be loaded with data between each free page. Free space allows room for the insertion of new rows.

Q24. What is a NULL value? What are the pros and cons of using NULLS?

A24. A NULL value takes up one byte of storage and indicates that a value is not present as opposed to a space or zero value. It's the DB2 equivalent of TBD on an organizational chart and often correctly portrays a business situation. Unfortunately, it requires extra coding for an application program to handle this situation.

Q25. What is a synonym? How is it used?

A25. A synonym is used to reference a table or view by another name. The other name can then be written in the application code pointing to test tables in the development stage and to production entities when the code is migrated. The synonym is linked to the AUTHID that created it.

Q26. What is an alias and how does it differ from a synonym?

A26. An alias is an alternative to a synonym, designed for a distributed environment to avoid having to use the location qualifier of a table or view. The alias is not dropped when the table is dropped.

Q27. What is a LIKE table and how is it created?

A27. A LIKE table is created by using the LIKE parameter in a CREATE table statement. LIKE tables are typically created for a test environment from the production environment.

Q28. If the base table underlying a view is restructured, eg. attributes are added, does the application code accessing the view need to be redone?

A28. No. The table and its view are created anew, but the programs accessing the view do not need to be changed if the view and attributes accessed remain the same.

Q29. Under what circumstances will DB2 allow an SQL statement to update more than one primary key value at a time?

A29. Never. Such processing could produce duplicate values violating entity integrity. Primary keys must be updated one at a time.

Q30. What is the cascade rule and how does it relate to deletions made with a subselect.

A30. The cascade rule will not allow deletions based on a subselect that references the same table from which the deletions are being made.

Q31. What is the self-referencing constraint?

A31. The self-referencing constraint limits in a single table the changes to a primary key that the related foreign key defines. The foreign key in a self-referencing table must specify the DELETE CASCADE rule.

Q32. What are delete-connected tables?

A32. Tables related with a foreign key are called delete-connected because a deletion in the primary key table can affect the contents of the foreign key table.

Q33. When can an insert of a new primary key value threaten referential integrity?

A33. Never. New primary key values are not a problem. However, the values of foreign key inserts must have corresponding primary key values in their related tables. And updates of primary key values may require changes in foreign key values to maintain referential integrity.

Q34. In terms of DB2 indexing, what is the root page?

A34. The simplest DB2 index is the B-tree and the B-tree's top page is called the root page. The root page entries represent the upper range limits of the index and are referenced first in a search.

Q35. How does Db2 use multiple table indexes?

A35. DB2 use the multiple indexes to satisfy multiple predicates in a SELECT statement that are joined by an AND or OR.

Q36. What are some characteristics of columns that benefit from indexes?

A36. Primary key and foreign key columns; columns that have unique values; columns that have aggregates computed frequently and columns used to test the existence of a value.

Q37. What is a composite index and how does it differ from a multiple index?

A37. A multiple index is not one index but two indexes for two different columns of a table. A composite index is one index made up of combined values from two columns in a table. If two columns in a table will often be accessed together a composite index will be efficient.

Q38. What is meant by index cardinality?

A38. The number of distinct values for a column is called index cardinality. DB2's RUNSTATS utility analyzes column value redundancy to determine whether to use a tablespace or index scan to search for data.

Q39. What is a clustered index?

A39. For a clustered index DB2 maintains rows in the same sequence as the columns in the index for as long as there is free space. DB2 can then process that table in that order efficiently.

Q40. What keyword does an SQL SELECT statement use for a string search?

A40. The LIKE keyword allows for string searches. The % sign is used as a wildcard.

Q41. What are some sql aggregates and other built-in functions?

A41. The common aggregate, built-in functions are AVG, SUM, MIN, MAX, COUNT and DISTINCT.

Q42. How is the SUBSTR keyword used in sql?

A42. SUBSTR is used for string manipulation with column name, first position and string length used as arguments. Eg. SUBSTR (NAME, 1 3) refers to the first three characters in the column NAME.

Q43. What are the three DB2 date and time data types and their associated functions?

A43. The three data types are DATE, TIME and TIMESTAMP. CHAR can be used to specify the format of each type. The DAYS function calculates the number of days between two dates. (It's Y2K compliant).

Q44. Explain transactions, commits and rollbacks in DB2.

A44. In DB2 a transaction typically requires a series of updates, insertions and deletions that represent a logical unit of work. A transaction puts an implicit lock on the DB2 data. Programmers can use the COMMIT WORK statement to terminate the transaction creating smaller units for recovery. If the transaction fails DB2 uses the log to roll

back values to the start of the transaction or to the preceding commit point.

Q45. What is deadlock?

A45. Deadlock occurs when transactions executing at the same time lock each other out of data that they need to complete their logical units of work.

Q46. What are the four lockable units for DB2?

A46. DB2 imposes locks of four differing sizes: pages, tables, tablespace and for indexes subpage.

Q47. What are the three lock types?

A47. The three types are shared, update and exclusive. Shared locks allow two or more programs to read simultaneously but not change the locked space. An exclusive lock bars all other users from accessing the space. An update lock is less restrictive; it allows other transactions to read or acquire shared locks on the space.

Q48. What is isolation level?

A48. SQL statements may return any number of rows, but most host languages deal with one row at a time by declaring a cursor that presents each row at a unique isolation level.

Q49. What is an intent lock?

A49. An intent lock is at the table level for a segmented tablespace or at the tablespace level for a nonsegmented tablespace. They indicate at the table or tablespace level the kinds of locks at lower levels.

Q50. What is the difference between static and dynamic sql?

A50. Static sql is hard-coded in a program when the programmer knows the statements to be executed. For dynamic sql the program must dynamically allocate memory to receive the query results.

Q51. What is cursor stability?

A51. Cursor stability means that DB2 takes a lock on the page the cursor is accessing and releases the lock when the cursor moves to another page.

Q52. What is the significance of the CURSOR WITH HOLD clause in a cursor declaration?

A52. The clause avoids closing the cursor and repositioning it to the last row processed when the cursor is reopened.

Q53. What is the SQL Communications Area and what are some of its key fields?

A53. It is a data structure that must be included in any host-language program using SQL. It is used to pass feedback about the sql operations to the program. Fields are return codes, error messages, handling codes and warnings.

Q54. What is the purpose of the WHENEVER statement?

A54. The WHENEVER statement is coded once in the host program to control program actions depending on the SQL-CODE returned by each sql statement within the program.

Q55. What is DCLGEN?

A55. DCLGEN stands for declarations generator; it is a facility to generate DB2 sql data structures in COBOL or PL/I programs.

Q56. What is the FREE command?

A56. The FREE command can be used to delete plans and/or packages no longer needed.

Q57. DB2 can implement a join in three ways using a merge join, a nested join or a hybrid join. Explain the differences.

A57. A merge join requires that the tables being joined be in a sequence; the rows are retrieved with a high cluster ratio index or are sorted by DB2. A nested join does not require a sequence and works best on joining a small number of rows. DB2 reads the outer table values and each time scans the inner table for matches. The hybrid join is a nested join that requires the outer table be in sequence.

Q58. Compare a subselect to a join.

A58. Any subselect can be rewritten as a join, but not vice versa. Joins

are usually more efficient as join rows can be returned immediately, subselects require a temporary work area for inner selects results while processing the outer select.

Q59. What is the difference between IN subselects and EXISTS subselect?

A59. If there is an index on the attributes tested an IN is more efficient since DB2 uses the index for the IN. (IN for index is the mnemonic).

Q60. What is a Cartesian product?

A60. A Cartesian product results from a faulty query. It is a row in the results for every combination in the join tables.

Q61. 4/99 Mail from Joseph Howard: 'Q: DB2 What is the difference between a package and a plan? How does one bind 2 versions of a CICS transaction with the same module name in two different CICS regions that share the same DB2 subsystem?

A61. Package and plan are usually used synonymously, as in this site. Both contain optimized code for SQL statements - a package for a single program, module or subroutine contained in the database request module (DBRM) library. A plan may contain multiple packages and pointers to packages. The one CICS module would then exist in a package that could be referenced in two different plans.

Q62. What is an asynchronous write?

A62. It is a write to disk that may occur before or long after a commit. The write is controlled by the buffer manager.

Q63. What is a lock?

A63. A lock is the mechanism that controls access to data pages and tablespaces.

Q64. What is meant by isolation level?

A64. This is a key concept for any relational database. Isolation level is the manner in which locks are applied and released during a transaction. For DB@ a 'repeatable read' holds all locks until the transaction completes or a syncpoint is issued. For transactions using 'cursor stability' the page lock releases are issued as the cursor 'moves', i.e. as the transaction releases addressability to the records.

Q65. What are leaf pages?

A65. They are the opposite of root pages. Leaf pages are the lowest level index pages - the pages that contain index entries and information to the corresponding table rows.

Q66. What is a precompiler?

A66. It is a DB2 facility for static SQL statements - it replaces these statements with calls to the DB2 language interface module.

Q67. What is a root page?

A67. The opposite of a leaf page; it is the highest level index page. An index can contain only the one root page; all other index pages are associated to the root.

Q68. What is a thread?

A68. A thread is the connection between DB2 and some other subsystem, such as CICS or IMS/DC.

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JCL

Q1. What are the kinds of job control statements?

A1. The JOB, EXEC and DD statement.

Q2. What is the meaning of keyword in JCL? What is its opposite?

A2. A keyword in a JCL statement may appear in different places and is recognized by its name, eg. MSGCLASS in the JOB statement. The opposite is positional words, where their meaning is based on their position in the statement, eg. in the DISP keyword the =(NEW,CATLG,DELETE) meanings are based on first, second and third position.

Q3. Describe the JOB statement, its meaning, syntax and significant

keywords.

A3. The JOB statement is the first in a JCL stream. Its format is // jobname, keyword JOB, accounting information in brackets and keywords, MSGCLASS, MSGLEVEL, NOTIFY, CLASS, etc.

Q4. Describe the EXEC statement, its meaning, syntax and keywords.

A4. The EXEC statement identifies the program to be executed via a PGM=program name keyword. Its format is //jobname EXEC PGM=program name. The PARM= keyword can be used to pass external values to the executing program.

Q5. Describe the DD statement, its meaning, syntax and keywords.

A5. The DD statement links the external dataset name (DSN) to the DDNAME coded within the executing program. It links the file names within the program code to the file names known to the MVS operating system. The syntax is // ddname DD DSN=dataset name. Other keywords after DSN are DISP, DCB, SPACE, etc.

Q6. What is a PROC? What is the difference between an instream and a catalogued PROC?

A6. PROC stands for procedure. It is 'canned' JCL invoked by a PROC statement. An instream PROC is presented within the JCL; a catalogued PROC is referenced from a proclib partitioned dataset.

Q7. What is the difference between a symbolic and an override in executing a PROC?

A7. A symbolic is a PROC placeholder; the value for the symbolic is supplied when the PROC is invoked, eg. &symbol=value. An override replaces the PROC's statement with another one; it substitutes for the entire statement.

Q8. What is RESTART? How is it invoked?

A8. RESTART is a JOB statement keyword. It is used to restart the job at a specified step rather than at the beginning.

Q9. What is a GDG? How is it referenced? How is it defined? What is a MODEL DSCB?

A9. GDG stands for generation data group. It is a dataset with versions that can be referenced absolutely or relatively. It is defined by an IDCAMS define generation datagroup execution.

Q10. Explain concatenating datasets.

A10. Datasets can be grouped in a DD statement one after another, eg. in a JOBLIB statement where the load module can exist in one of many datasets.

Q11. What is the difference between specifying DISP=OLD and DISP=SHR for a dataset?

A11. DISP=OLD denotes exclusive control of the dataset; DISP=SHR means there is no exclusivity.

Q12. What is MOD and when would you use it?

A12. DISP=MOD is used when the dataset can be extended, ie, you can add records at the end of an existing dataset.

Q13. What are the keywords associated with DCB? How can you specify DCB information? What is the OS precedence for obtaining that DCB information, ie. where does the system look for it first?

A13. The keywords associated with the DCB parameter are LRECL, RECFM, BLKSIZE and DSORG. The DCB information can be supplied in the DD statement. The system looks for DCB information in the program code first.

Q14. How do you designate a comment in JCL?

A14. The comment statement is /\* followed by the comments.

Q15. What is the meaning of the EXEC statement keyword, COND? What is its syntax?

A15. COND specifies the conditions for executing the subsequent job step. The value after the COND= is compared to the return codes of the preceding steps and if the comparison is true, the step is bypassed. (If this answer confuses you, welcome to the club - memorize it and don't ask questions!)

Q16. What is the improvement to COND= in the latest version of MVS?  
A16. MVS now allows for an IF bracketed by an END IF around any job step to replace the COND= syntax. Again, if the IF statement is true, the step is bypassed.

Q17. What is the purpose of the PARM keyword in the EXEC statement?  
A17. The value after the PARM= specifies control information to be passed to the executing program of the job step.

Q18. What is the purpose and meaning of the REGION keyword and what JCL statement is it associated with?  
A18. REGION specifies the maximum CPU memory allocated for a particular job or job step. If REGION is in the JOB card, it relates to the entire job; if in the EXEC statement, it relates to the job step.

Q19. What is the purpose and meaning of the TIME keyword and what JCL statement is it associated with?  
A19. TIME specifies the maximum CPU time allocated for a particular job or job step. If TIME is in the JOB card, it relates to the entire job; if in the EXEC statement, it relates to the job step.

Q20. What is the meaning of data definition name (ddname) and dataset name (dsname) in the DD statement?  
A20. Data definition name is the eight character designation after the // of the DD statement. It matches the internal name specified in the steps executing program. In COBOL that's the name specified after the ASSIGN in the SELECT ASSIGN statement. Dataset name is the operating system (MVS) name for the file.

Q21. How is the keyword DUMMY used in JCL?  
A21. For an output file DUMMY specifies that the output is to be discarded. For input it specifies that the file is empty.

Q22. What does the keyword DCB mean and what are some of the keywords associated with it?  
A22. DCB stands for data control block; it is a keyword for the DD statement used to describe datasets. Keywords associated with it are BLKSIZE, DEN, LRECL and RECFM.

Q23. What is the difference between BLKSIZE and LRECL?  
A23. BLKSIZE specifies the number of bytes

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Q1. What are the types of VSAM datasets?  
A1. Entry sequenced datasets (ESDS), key sequenced datasets (KSDS) and relative record dataset (RRDS).

Q2. How are records stored in an ESDS, entry sequenced dataset?  
A2. They are stored without respect to the contents of the records and in the order in which they are included in the file.

Q3. What is a CI, control interval?  
A3. A control interval is the unit of information that VSAM transfers between virtual and auxiliary storage.

Q4. What are the distinctive features of a ksdS, key sequenced dataset?  
A4. The index and the distributed free space.

Q5. What is a CA, control area?  
A5. A group of control intervals makes up a control area.

Q6. What is a sequence set?  
A6. This is the part of the index that points to the CA and CI of the record being accessed.

Q7. What is the index set?  
A7. This is the other part of the index. It has multiple levels with pointers that ultimately reach to the sequence set.

Q8. What is a cluster?  
A8. A cluster is the combination of the index, sequence set and data portions of the dataset. The operating system gives program access to the cluster, ie. to all parts of the dataset simultaneously.

Q9. What is the catalog?  
A9. The catalog contains the names of all datasets, VSAM and non-VSAM. It is used to access these datasets.

Q10. What is an alternate index?  
A10. An AIX is a file that allows access to a VSAM dataset by a key other than the primary one.

Q11. What is a path?  
A11. A path is a file that allows you to access a file by alternate index - the path provides an association between the AIX and the base cluster.

Q12. What is the upgrade set?  
A12. The upgrade set is the list of all AIXes that VSAM must maintain for a specific base cluster, so that when data in the base cluster is updated, the AIX files are also updated.

Q13. What is free space?  
A13. Free space is reserved within the data component of a KSDS to accommodate inserting new records.

Q14. What is a VSAM split?  
A14. If there isn't enough space in the control interval VSAM performs a control interval split by moving some records to the free control intervals. If there isn't a free control interval VSAM performs a control area split by allocating a new control area and moving half of the control intervals to it.

Q15. What is the base cluster?  
A15. The base cluster consists of the data component and the index component for the primary index of a KSDS.

Q16. Do primary key values have to be unique? Do alternate key values have to be unique?  
A16. Primary key values must be unique; alternate key values need not be.

Q17. In the COBOL SELECT statement what is the ORGANIZATION for a KSDS?  
A17. The ORGANIZATION is INDEXED.

Q18. In the COBOL SELECT statement for a KSDS what are the three possibilities for ACCESS?  
A18. ACCESS can be SEQUENTIAL, RANDOM or DYNAMIC.

Q19. What is the COBOL RECORD KEY clause?  
A19. The RECORD KEY in the SELECT clause identifies the files primary key as it will be known to the program.

Q20. What is the purpose of the FILE STATUS clause in the SELECT statement?  
A20. The FILE STATUS field identifies the field that VSAM uses to provide information about each I/O operation for the file.

Q21. If you wish to use the REWRITE command how must the VSAM file be opened?  
A21. It must be opened as I/O.

Q22. Explain the meaning and syntax for the START command.  
A22. The START command is used read other than the next VSAM record. A value must be moved into the RECORD KEY. The KEY clause is optional, but it can be used to specify a relational (equal, less than, etc.) operator.

Q23. What is the meaning of dynamic processing?  
A23. It's rarely used. It means one program uses both sequential and random processing for a VSAM KSDS file.

Q24. Name some common VSAM error conditions and codes.  
A24. They are end of file (10), duplicate key (22), record not found (23), VSAM logic error (90), open problem (92) and space problem (93).

Q25. What is the VSAM-code field?  
A25. It is a COBOL II enhancement to VSAM batch processing expanding the FILE STATUS field. It is defined in WORKING-STORAGE as a six byte group item with three two byte elements, the normal return code, the function code and the feedback code.

Q26. What is a VSAM slot?

A26. A relative record dataset (RRDS) consists of a specified number of areas called slots. Each slot is identified by a relative record number (RRN) which indicates its relative position in the file.

Q27. What is the utility program closely associated with VSAM?

A27. IDCAMS, the access method services utility.

Q28. There are at least seven IDCAMS commands; name and explain each of them.

A28. ALTER modifies information for a catalog, alternate index, cluster or path. BLDINDEX builds the alternate index, ofcourse. DEFINE is used for ALTERNATEINDEX, CLUSTER or PATH. DELETE removes the catalog entry for a catalog, cluster, alternate index or path. LISTCAT lists information about the dataset. PRINT prints the dataset contents. REPRO copies records from one file to another.

Q29. What are the three levels of definition for the VSAM DEFINE?

A29. They are DEFINE CLUSTER, DATA and INDEX.

Q30. What is the significance of the SHAREOPTIONS parameter?

A30. It specifies how the file may be shared between jobs and between batch and CICS environments.

Q31. What is the meaning of the DEFINE MODEL parameter?

A31. It specifies whether Daniela Pestova or Yamila - oops! Wrong models! The MODEL parameter allows you to model your cluster by modelling it after an existing cluster.

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#### IDMS

Q1. What is the difference between a schema and a subschema?

A1. The schema is the physical arrangement of the data as it appears in the DBMS. The subschema is the logical view of the data as it appears to the application program.

Q2. What is a region?

A2. Region is used synonymously with area. It is a group of logically contiguous pages.

Q3. What is a page?

A3. A page is the smallest unit of storage in an IDMS database.

Q4. Explain the difference between record occurrence and record type.

A4. A record occurrence is the instances of a record; it is the smallest addressable unit of data. A type is the description of a record; there needn't be any occurrences.

Q5. What is the difference between local and central version operating modes?

A5. In local there is no IDMS System running above the DBMS. It's the more efficient mode but lacks the recovery and integrity facilities of the central version (CV) control program. In CV many application programs access the database through a single copy of the DBMS.

Q6. What is a run unit?

A6. A run-unit is a logical unit of work; it is analogous to a CICS task.

Q7. What is an OOK-Rec?

A7. An OOK-Rec is a one of a kind record set, used to get to another record set. 5/4/99: Sihab: 'I have one doubt in IDMS regarding the OOK records. In this FAQ it is saying that "A OOK-Rec is a one of a kind record set, used to get to another record set". Can you please elaborate it little more? What is it mean by 'a kind of record set'. If possible give me a small example also. Please send reply to <<mailto:kpsihab@wipsys.ge.com>>' Web note: Sorry, but my recollection is vague on this one. I think the example was a system date - just the one record, not a set, that pointed to other sets. Hopefully, someone else will fill in the blanks. Or perhaps a call to Computer Associates.

Q8. What is a junction record?

A8. A junction record is a member record type that allows for many-to-many relationship between its two owner records. For a school database the CLASS record is a junction for the TEACHER and SUBJECT record types. Q9. Name and explain the three location modes.

A9. Calc is based on a symbolic value which is used to determine the target page. Via mode is for members only. Via records are stored near to their owners. In direct mode the target is specified by the user and is stored as close as possible to that page.

Q10. What is a set? What pointers are required, what are possible? How may sets be ordered?

A10. A set is an owner record and, optionally, its member records. There are three types of pointers: next, prior and owner, but only next is required. There are five possible orders for arrangements of sets; they are: first - insert at beginning, last - insert at end of set, next - insert after current of set, prior - insert prior to current of set and sorted - insert according to sort value.

Q11. What is the purpose of a READY?

A11. The READY prepares a database area for access by DML functions.

Q12. What does a COMMIT statement do?

A12. It writes a checkpoint to the Journal File and releases any record locks.

Q13. What does a ROLLBACK do?

A13. It rolls back (reverses) all database updates to the point of the last rollback or to the beginning of the run-unit.

Q14. What does a FINISH do?

A14. It releases all database resources, terminates database processes, writes statistical information to IDMS and logs the checkpoint.

Q15. What is the IDD?

A15. IDD is the Integrated Data Dictionary. It contains information about the elements, record types, sets, maps and dialogues within the database.

Q16. What is the meaning of the return codes 0307 and 0326?

A16. 0307 is end-of-set and 0326 is record not found.

Q17. What is the meaning of 'Copy IDMS Subschema-Binds'?

A17. It generates a bind run-unit and binds all the records for the subschema the program is referencing.

Q18. What is autostatus?

A18. Autostatus is a protocol mode which causes the expansion of each DML statement to include a 'perform IDMS-Status' statement.

Q19. What does a store statement do?

A19. It places a record in the database based on the location mode specified.

Q20. What sets will the stored record connect to?

A20. It will connect to all sets where it is defined as an automatic member. The store requires that currency be established for all these set occurrences.

Q21. What is currency?

A21. The old joke - where the programmer thinks he is, but the DBMS knows he isn't. Currency is the location within the database during run-unit execution. There are four levels of currency: current of run-unit is the record occurrence of the last successful find or obtain; current of record type is for the most recent of each record type; current of record set is the most recent within each set and current of area is within each area.

Q22. If the stored record is not defined as automatic of a set, how can it be stored as a member of the set.

A22. Store the record then connect it to each set where it is a manual member.

Q23. So manual and automatic are the connect options for a set. What are the disconnect options.

A23. Mandatory and optional.

Q24. Distinguish among erase, erase permanent, erase selective and erase all.

A24. Erase cancels the membership of a record in specific set occurrences and removes only the named record. Erase permanent removes the specific record and all mandatory occurrences it owns. It disconnects all optional members. Erase selective removes the record, all mandatory members and all optional members not connected to other sets. It disconnects those that are connected. Erase all removes the specified record and all the mandatory and optional records it owns.

Q25. How does IDMS insure data integrity?

A25. IDMS uses record locks to prevent another run-unit from updating the same record.

Q26. What are the types of record locks and how are they set?

A26. Locks may be shared or exclusive. Shared means that other run units can retrieve the record but can not modify it. Exclusive means that other run units can neither retrieve nor modify it. Record locks may be implicit or explicit. Implicit locks are set in the ready statement usage clause. Explicit locks are set using either the keep statement or keep option of the find/obtain command.

Q27. How are record locks released?

A27. Locks are released by a change in currency or by a commit, rollback or finish command.

Q28. What does a status return code of nn29 mean in relation to record locks.

A28. nn29 means that two run units are waiting to set locks on the same record and are in deadlock.

Q29. What is an area sweep and when is it used?

A29. An area sweep accesses records on the basis of the physical location in a database area. It can be total, meaning a record by record search of the area, or it can be of occurrences of records of a specific type.

Q30. Why would you use find and get rather than an obtain?

A30. Find tells you whether the record is actually in the database. If it is not found you save the overhead of an obtain.

Q31. When you are obtaining next within a set and get a end of set return code, on what record are you now current?

A31. You are current on the owner.

Q32. What is a bind?

A32. A bind associates record types with the program work area; for run unit and records it is the first command issued in the program.

Q33. How does IDMS communicate with CICS?

A33. They communicate via service MVS request calls.

Q34. Is there an application program coding difference between local and central version mode?

A34. No. The mode is specified via the SYSCTL DD card in the JCL.

Q35. If you are current on the owner of a set, what is the difference between an obtain next and obtain first?

A35. No difference. There is a difference between obtain first and obtain next for an area sweep, but not when current on the owner in a set.

1. What is the physical nature of a database called?

A. DBD

2. Is it necessary that all the segments in a D1/i database have key fields ?

A. It is not necessary that all the segments in the database should have key field, except for the database.

3. How many key fields and search fields can a segment have?

A. One key field and as many search fields in the segment can be declared.

4. Is it necessary that the key field in a DL/I database be unique?  
 A. No, it is not necessary.
5. What is a key field in an IMS database?  
 A. A Field that DL/I uses to maintain the segments in the ascending order is called the key field
6. What is a database record?  
 A. A single occurrence of the root along with all its dependents is called the database record.
7. What is PSB & ACB?  
 A. PSB : Program specification block. Information about how a specific program is to be access one or more IMS DB. It consist of PCB(Program Communication Block). Information to which a segment in DB can be accessed, what the program is allowed to do with those segment and how the DB is to be accessed. ACB : Access Control Blocks are generated by IMS as an expansion of information contained in the PSB in order to speed up the access to the applicable DBD's.
8. What is a Hierarchy path?  
 A. A line that starts at the root and passes through the inter mediate levels in the hierarchy and ends at the a segment at the bottom of the hierarchy is called the Hierarchy path.
9. What is a Root?  
 A. The segment at the top of the Hierarchy, which is not a child to a segment is called the Root.
10. What are Twins?  
 A. Occurrences of all the segment types under a single parent segment occurrence is called a Twin.
11. Define the terms Parent & Child.  
 A. Parent-Any segment that has one or more segments directly below it is a Parent. Child-Any segment that has segment directly above it is called the Child.
- What is the limitation on the no. of levels in a DL/I database?  
 A. You can have 15 levels in a DL/I database
13. How many segment types can u have in a DL/I database?  
 A. A DL/I database can have 255 segment types
14. What is a Segment type?  
 A. Loosely speaking a segment type is a segment in a DL/I hierarchy chart.
15. What is a segment?  
 A. A segment is the smallest unit of information that DL/I uses when working with information in the database.
16. What is Hierarchy Chart?  
 A. A Hierarchy chart is a pictorial representation of the total of a DL/I database starting from the root, giving all the parent child relationships that exist within the database
17. What are the control blocks in IMS?  
 A. There are two control block. 1. DBD (database descriptor) 2. PSB (program specification block)
18. Which is the first statement in cobol-ims programs?  
 A. Entry statement is the first statement after procedure division i.e  
 ENTRY 'DLITCBL' USING .....
19. What is the return code you get after a successful IMS call?  
 A. Spaces.
20. Define DBD?  
 A. DBD : Database Descriptor. IMS Controls the Structure of DB and access to the DB via DBD. The DBD contains information like, Segment types, their location in hiearchy and Sequence keys.
21. How can we distinguish between an Online and a Batch program environment?  
 A. By checking for IO-PCB in the Application program. Or By checking for COPY DLIUIB in linkage section.  
 Which is the DLI function used in CICS-IMS program?

A. 'PCB ' (PROGRAM COMMUNICATION BLOCK) to initiate and 'TERM' to terminate.

23. How does one REORG an HDAM IMS database when changing RAPS (Root Anchor Points)?

1. Unload data using current DBD. 2. Delete/define the underlying VSAM dataset(s). 3. Re-load data using newly-defined DBD with new RAPS. 4. Re-build any secondary indexes.

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undefined <>  
undefined <>More... <>  
undefined[Close] <>  
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undefinedSECTION 1. MVS
```

What is an Operating System? What are its functions?

An operating system consists of two sets of programs designed to facilitate the operation of computer. The 1st set called the control programs are used to schedule and supervise work done by computer and the 2nd set called processing programs consisting of language translators, service programs, and utility programs. The heart of the OS is the Resident Supervisor module, which acts as the main control module. The functions of OS are (1) To manage various devices, (2) Control program execution, (3) Interpreting and executing the commands entered at the prompt, (4) Maximize throughput and minimize turnaround time resulting in increase of efficiency. The control programs can't be accessed directly by users. Instead the user codes JCL statements that provides the necessary specifications to process a Job. The set of cards punched on JCL statements are referred as Program control cards.

What are the functions of the major components of the Computer?

(1) Central Processing Unit is used to execute all the instructions of the system. (2) Main Storage unit is used for storing the data and programs, while they are being processed. (3) Programs and Data are permanently stored in Auxiliary Storage such as magnetic tape or magnetic disks called DASD. (4) Card readers, Punches and printers are called as Unit Record Devices. (5) The Unit Record devices located at far away distances and connected to the Computer System by communication lines make a Remote Job Entry. (6) The RJE can be replaced by terminals at remote locations by a display screen and keyboard. (7) Multiple terminals using the same System at the same time is known as Time sharing. (8) A device such as an RJE or a terminal, which can be used to submit programs and data and receive the results are called as work stations.

Explain Virtual Storage Operating System.

Virtual Storage is a technique that lets the system processor to simulate a large amount of Main (Real) Storage, which actually has a smaller amount of real storage. To do so the Computer uses the Auxiliary Storage (DASD) as an extension of the Real storage. VS OS is used to efficiently use the Virtual Storage technique, by well controlled Paging and Swapping process by the System, which is transparent to the user. An address space can provide the entire 16M range of address for 24-bit processing and 2G range for XA mode using the 31-bit processing, for each user under MVS. MVS not only simulates the main (real) storage than is actually present, but also uses the (main) real storage to simulate multiple address spaces, each of which are independent of the other.

What is meant by Paging and Swapping?

Each 4K section of VS are called as Pages. 4K section of Main storage are called as Page Frames. DASD areas of VS of 4k size are called as Page Slots. If a required storage location for a program is not in the Main (real) storage, a Page fault occurs. Data is then transferred from auxiliary storage to main storage is called as Page In, vice-versa is Page out process. Either way of processing Page-in and Page-out is called as Paging.

The transfer of entire address space from Main storage to auxiliary storage to provide space for other program process is called as Swapping. Swapped out pages are stored on special datasets on DASD called Swap datasets.

Explain Multiprogramming.

The concept of more than one program running at the same time on a Computer system is called as multi-programming. The system does it by simply reclaiming the CPU during the idle period of a processor to let other programs use it. It is also transparent to users.

Explain Spooling.

It is managed by JES, and is the process used to provide shared access to devices such as printers, which can not be accessed by multiple programs at the same time. It manages the applications output by interpreting it and directing it to a DASD and send it for processing by that device when ever it is free.

Explain the use of file directory, Control Interval and Control Area under MVS.

File directory maintains the Relative Block Address and Physical Block address of a file. CI is the unit of data movement between Main and Auxiliary storage's (equal to page size). Control area is a fixed length area on the DASD aside by VSAM to accommodate the CI for a particular file, it's the unit of file allocation during the file extension.

Explain the differences between VSAM and Non-VSAM files.

(i) The ISPF panel or a standard JCL is used for creation of a NON VSAM dataset. The AMS program is used to create the VSAM files. (ii) The information about the Non-VSAM files is stored as dataset labels in the VTOC, while the information of VSAM files is stored in Catalogs. (iii)The dataset organization's in Non-VSAM files are sequential (physical), Indexed Sequential, Direct and partitioned. The dataset organization's in VSAM files are Key sequenced, Entry sequenced and Relative record datasets. A dataset is a named collection of physical records stored on a disk or tape, and are normally identified by MVS with special records called labels. In JCL statements we need to supply the label information.

What are the Features of MVS.

(i) It is a Virtual Storage Operating system that support uni-processor, multi-processor, and attached processors. (ii) It is provided with integrated Time Sharing facilities with individual address spaces. (iii) Provides System resource manager for dynamic work load management. (iv) Provides Virtual I/O for temporary datasets. (v) Functional recovery routine for system component. (vi) Provides cross memory services for inter-address space communication , that reduces the assigned for common virtual storage and sub-system overhead.

Explain VTOC and the various catalogs used to store information about the VSAM and Non-VSAM files.

A. Volume table of Contents is a special file that contains the File Labels of the datasets on the volumes, also called as Dataset Control Blocks. The volume label is always in the same place of the disk, the third record of Track 0 on Cylinder 0, containing the volser id number and disk address of VTOC.

Types of catalogs are OS catalogs or CVOLS and VSAM catalogs and Integrated catalog facility catalogs, they can be further classified as Master and User catalog. An access method is an interface between application program and physical operation of storage device. To issue a Open instruction to a dataset, appropriate methods are to be used. For Non-VSAM files the connection is made through Data Control Blocks and VSAM files through Access Method Control blocks. Both are simply tables in storage that contain vital information of a dataset as it is processed.

Explain Batch Process.

The processing involved, when a series of commands are to be processed

together is called batch processing. A JCL describes a job by providing information that identifies programs to be executed and data to be processed.

What is meant by Structured Programming?

Structured programming means the collection of principles and practices that are directed towards developing a program, which are easy to understand and maintain. The programs are build by using three structures - Simple (imperative statements), IF - THEN - ELSE and DO-WHILE (through PERFORM in COBOL) structures.

What are the various steps in Programming process?

A. Task Analysis, Flow charting, Program Coding, Program testing, Documentation of program and finally preparation for production run.

14.

A.

15.

A.

Section 2. JCL

What are the features of JCL.

A. JCL consists of control statements that introduces a computer job to an OS. JCL contains a set of statements referred to as Program control cards, provides necessary specifications such I/O resource requirements to process a Job. JCL is used for submitting batch jobs. JCL is not a procedural language like COBOL and is also not used to write Programs.

Briefly describe the Format of JCL statement.

A. //name operation operand comment

Name field identifies the statement. It should be of a maximum of 8 characters long, should start from 3rd column, The first character must be an alphabet.

Operation field specifies the type of statement, viz. JOB - makes the beginning of the JOB, or EXEC - follows JOB statement, and names the Program / Procedure to be executed, or DD - defines the file and requests the allocation of I/O devices. PROC begins a catalogued or instreamed procedures, while PEND marks the end of in-stream procedure. JCLLIB/STEPLIB specifies the private libraries containing the catalogued procedures and JCL referred to by Include statements. SET assigns values to symbolic parameters in catalog procedures, INCLUDE allows JCL stored in partitioned dataset to be included in the job stream. IF/THEN/ELSE/END allows selective execution of Job steps. CNTL and ENDCNTL marks the start and end of control statements in the input stream. OUTPUT Supplies options for SYSOUT processing. /\* indicates the end of data. /\*\* marks as comment line. // Marks the end of Job.

Operand field supplies information to JCL in the form of parameters (positional and key-word).

Positional parameters are characterized by their position in relation to other parameters. The Key-word parameters are independent of their position and characterized by key-word and '='.

Key-word and positional parameters may have sub-parameters enclosed in parenthesis that may be positional or key-word parameters, following their corresponding rules.

The various parameters are separated by Commas, The absence of positional parameters are indicated by coding a coma in it's place. Comma's need be provided, if all subsequent positional parameters are absent. The enclosing parameters can be omitted, if there is only one value.

Nothing needs to be coded if all positional parameters are absent. Key word parameters can be coded in any order after any positional parameters. Comments field is optional.

What are the general rules in coding a JCL?

Start all statements in column 1 with appropriate // or /\* or space. An entry in the name field must begin in column 3 and be followed by atleast one space. There must not be any embedded blanks within fields,

parameters must be separated by commas. Column 1 to 71 contains the JCL information. Use '-' for continuation. Comments may be written on comment line or by leaving a blank after all the operands.

Explain JOB statement.

Jobname, (acctnum,acctname) (positional parms),'Name' (positional parm), CLASS= , PRTY= , MSGCLASS= , MSGLEVEL= , TYPRUN= , NOTIFY= . CLASS and MSGCLASS can have one of the 36 values, A-Z and 0-9. Class depends on the amount of CPU time required and use of tapes by the job. MSGCLASS specifies the job scheduler message output class. TYPRUN can be SCAN or HOLD. PRTY is used to specify the priority of the job, smaller number indicates higher priority (allowed values are 0-15 for JES2 and 0-14 for JES3). MSGLEVEL have two positional parameters stmts, mesgs; Stmt of '0' indicates print only Job statements, '2'-print all JCL and JES statements and Messages, '3'-only JCL & JES statements print; Mesgs of '0' only JCL messages print; if the job ABENDs, then JES messages too, '1'- JCL and JES messages print. NOTIFY is used to notify the user about the completion of Job.

Explain EXEC statement with the various parameters used.

The PGM parameter specifies the Program to be executed. ACCT parameter is used to specify the accounting number of the Step, if it is different from the Job accounting number. PARM is used to send values to the program, when it is executed. REGION specifies the amount of storage a Job step can use. DPRTY is used to specify priority to the step. COND specifies the condition for executing subsequent Job step. TIME sets a CPU time limit for a Job step. Ex. //step1 exec  
pgm=progl,parm='aa',region=64k

What are the DD statements used for Peripheral I/O devices?

A. For Input stream datasets SYSIN is traditionally used as ddname. Use SYSOUT parameter to indicate the Output stream dataset.

7. Explain the DD statement.

ddname - specifies the name of the DD statement. DSN= is used to specify the dataset name to OS, &name is used to specify a temporary dataset. DISP=(status,norm,abnorm) is used to specify the Disposition of the DS, with the status at beginning and norm,abend after execution, valid options are new, old, shr, mod for status, keep,catalog,uncatalog,delete for normal & abnormal run's, In addition Pass is also used for normal run. UNIT specifies the I/O devices. VOL, SPACE and DCB are others.

8. Explain Job Entry System. What are the differences between JES2 & JES3 ? Allstate uses JES2.

JES is used to accept jobs and run them on one of several computers connected together in a network. JES consists of statements placed before or after the JOB statement to direct Jobs to the computer in a network. (i) In JES2 computers are connected in a network, and each computer is termed as a node. In JES3 several computers are connected closely together and all of the scheduling is done by a single computer that is called a global processor. (ii) In JES2 each computer in a network can select jobs from it's queue (decentralized system), while in JES3 the global processor schedules the jobs in queue to itself or to the other computers connected to it (centralized system). (iii) JES3 allocates datasets for all the steps before the job is scheduled. In JES2, allocation of datasets required by a step are done only just before the step executes. (iv) All the jobs are placed in single Job Queue in JES2 & JES3. They can also route the output to some destination. JES2 statements can not be placed in a cataloged Procedure. Explain Cataloged Procedures.

The JCL statements that have potential use by several users are often placed in a cataloged procedure, which can be invoked by a single exec statement. They are stored in a PDS (need to be specified by JCLLIB ORDER=(dsn,dsn,...) statement) or SYS1.PROCLIB system library. It begins with PROC statement and followed by JCL statements that constitute the procedure.

Explain In-stream Procedure.

In-stream procedure starts with a PROC statement and end with PEND statement. In-stream procedure's can be included after the JOB statement but before the first EXEC statement. Up to 15 in-stream procedures are allowed in a JOB, with each in-stream procedure allowed to be executed several times.

Explain Symbolic Parameters.

A. To run a procedure for various jobs, we may have the need to modify the DD statements every time in the procedure, for that we can use Symbolic parameters which provides the means to modify procedures for execution. Symbolic parameters are preceded with ampersand (&) and may be 1 to 7 alphanumeric characters long, which must be coded in the operand field of JCL statements. Key words on EXEC statement such as COND, PARM, PGM cannot be coded as symbolic parameter names. Values can be assigned to EXEC or SET statement on the PROC statement for duration of the run.

How do you assign values to Symbolic parameters?

Values can be assigned to symbolic parameters on PROC, EXEC and SET statements of a JCL. Values containing special characters other than blank, . ' \* must be coded in apostrophes '. Values assigned to symbolic parameters can be of any length but cant be continued on next line. Symbolic parameters can be concatenated with other symbolic parameters. Nullify the symbolic parameter value by coding the key word followed equal sign without a value, either on PROC or EXEC statement. Delimiter such as leading or trailing commas next to Symbolic parameters are not removed.

Explain the SET command.

A SET statement is used to assign values to symbolic parameters. Any number of SET statements can be can be included in a JCL. SET can be placed in a catalog procedure to assign default values rather than to assign values on the PROC statement. SET can be placed in JOBSTREAM to assign default values rather than assign values on EXEC statement. A new SET statement can change the value of previous SET statement. A value of SET by PROC statement is changed, if a SET statement appears with in the procedure. SET statement can be placed anywhere following the Job statement. SET is conditional and is not affected by condition execution of the IF-THEN-ELSE-ENDIF. SET statement can replace setting symbolic parameter values on both EXEC and PROC statement, they also allow to create symbolic values in JCL and assign them without having to create a cataloged or in-stream procedures.

Explain Nesting Procedure.

In-stream procedures can be nested to a maximum of 15 levels (i.e. one proc invoking other and so on). We can not make backward reference between nested procedure. Up to only one over ridding statement is possible. All step-names should be unique So that we can override them correctly.

Explain Include statement.

A. It is used to copy in JCL stored as a member of a PDS using the JCLLIB statement to name the PDS and placing INCLUDE statements in the JCL, where we want the members to be copied. //INCLUDE MEMBER=member-name . PDS must be named with JCLLIB statement. PDS must be cataloged and have DCB attributes of LRECL=80 and RECFM=F or FB. It can be place anywhere after JOB statement. Placed in Cataloged and In-stream procedures. Include group can be nested up to 15 levels. Include can not Contain JOB, PROC/PEND, JCLLIB, DD \*, JES2 & JES3 statements.

What is primary allocation for a dataset?

A. The space allocated when the dataset is first created.

What is the difference between primary and secondary allocations for a dataset?

A. Secondary allocation is done when more space is required than what has already been allocated.

How many extents are possible for a sequential file ? For a VSAM file ?  
A. 16 extents on a volume for a sequential file and 123 for a VSAM file.

What does a disposition of (NEW,CATLG,DELETE) mean?

A. That this is a new dataset and needs to be allocated, to CATLG the dataset if the step is successful and to delete the dataset if the step abends.

What does a disposition of (NEW,CATLG,KEEP) mean?

A. That this is a new dataset and needs to be allocated, to CATLG the dataset if the step is successful and to KEEP but not CATLG the dataset if the step abends. Thus if the step abends, the dataset would not be catalogued and we would need to supply the vol. ser the next time we refer to it.

How do you access a file that had a disposition of KEEP?

Need to supply volume serial no. VOL=SER=xxxx.

What does a disposition of (MOD,DELETE,DELETE) mean ?

The MOD will cause the dataset to be created (if it does not exist), and then the two DELETE 's will cause the dataset to be deleted whether the step abends or not. This disposition is used to clear out a dataset at the beginning of a job.

What is the DD statement for a output file?

A. Unless allocated earlier, will have the following parameters: DISP=(NEW,CATLG,DELETE), UNIT , SPACE & DCB .

What do you do if you do not want to keep all the space allocated to a dataset?

A. Specify the parameter RLSE ( release ) in the SPACE e.g. SPACE=(CYL,(50,50),RLSE)

What is DISP=(NEW,PASS,DELETE)?

A. This is a new file and create it, if the step terminates normally, pass it to the subsequent steps and if step abends, delete it. This dataset will not exist beyond the JCL.

How do you create a temporary dataset? Where will you use them?

A. Temporary datasets can be created either by not specifying any DSN or by specifying the temporary file indicator as in DSN=\*&TEMP. We use them to carry the output of one step to another step in the same job. The dataset will not be retained once the job completes.

How do you restart a proc from a particular step?

A. In job card, specify RESTART=procstep.stepname. where procstep = name of the JCL step that invoked the procedure and stepname = name of the procedure step where you want execution to start

How do you skip a particular step in a proc/JOB?

A. Can use either condition codes or use the jcl control statement IF (only in ESA JCL)

A PROC has five steps. Step 3 has a condition code. How can you override/nullify this condition code?

A. Provide the override on the EXEC stmt in the JCL as follows:

```
//STEP001 EXEC procname,COND.stepname=value
```

All parameters on an EXEC stmt in the proc such as COND, PARM have to be overridden like this.

How do you override a specific DDNAME/SYSIN in PROC from a JCL?

```
//<stepname.dd> DSN=...
```

What is NOTCAT 2

A. This is an MVS message indicating that a duplicate catalog entry exists. E.g., if you already have a dataset with dsn = 'xxxx.yyyy' and you try to create one with disp=new,catlg, you would get this error. The program open and write would go through and at the end of the step the system would try to put it in the system catalog. At this point since an entry already exists the catlg would fail and give this message. You can fix the problem by deleting/uncataloging the first dataset and going to the volume where the new dataset exists (this info is in msglog of job) and cataloging.

What is 'S0C7' abend? What is a S0C4 error ?

SOC7 is Caused by invalid data in a numeric field. SOC4 is a Storage violation error - can be due to various reasons. e.g.: READING a file that is not open, invalid address referenced due to subscript error. What are SD37, SB37, SE37 abends?

A. All indicate dataset out of space. SD37 - no secondary allocation was specified. SB37 - end of vol. and no further volumes specified. SE37 - Max. of 16 extents already allocated.

34. What is S322 abend ?

A. Indicates a time out abend. Your program has taken more CPU time than the default limit for the job class. Could indicate an infinite loop.

Why do you want to specify the REGION parameter in a JCL step?

A. To override the REGION defined at the JOB card level. REGION specifies the max region size. REGION=0K or 0M or omitting REGION means no limit will be applied.

What does the TIME parameter signify ? What does TIME=1440 mean ?

A. TIME parameter can be used to overcome S322 abends for programs that genuinely need more CPU time. TIME=1440 means no CPU time limit is to be applied to this step.

What is COND=EVEN ? What is COND=ONLY ?

A. COND=EVEN Means execute this step even if any of the previous steps, terminated abnormally.

COND=ONLY Means execute this step only if any of the previous steps, terminated abnormally.

How do you check the syntax of a JCL without running it?

A. TYPERUN=SCAN on the JOB card or use JSCAN.

What does IEBGENER do?

A. Used to copy one QSAM file to another. Source dataset should be described using SYSUT1 ddname. Destination dataset should be described using SYSUT2. IEBGENR can also do some reformatting of data by supplying control cards via SYSIN.

How do you send the output of a COBOL program to a member of a PDS?

A. Code the DSN as PDS(member) with a DISP of SHR. The disp applies to the PDS and not to a specific member.

I have multiple jobs ( JCL 's with several JOB cards ) in a member. What happens if I submit it?

A. Multiple jobs are submitted (as many jobs as the number of JOB cards).

41. I have a COBOL program that ACCEPT 's some input data. How do you code the JCL statement for this? (How do you code in-stream data in a JCL?)

A. //SYSIN DD\*  
input data  
/\*

Can you code in-stream data in a PROC? How do you overcome this limitation?

A. No. One way is to code SYSIN DD DUMMY in PROC, and then override it in JCL with in-stream data.

How do you run a COBOL batch program from a JCL? How do you run a COBOL/DB2 program?

A. To run a non DB2 COBOL program: //STEP001 EXEC PGM=MYPROG

To run a DB2 COBOL program:

//STEP001 EXEC PGM=IKJEFT01

//SYSTSIN DD \*

DSN SYSTEM(.....)

RUN PROGRAM(MYPROG)

PLAN(.....) LIB(.....) PARMs(...)

/\*

What is STEPLIB, JOBLIB? What is it used for?

A. Specifies that the private library (or libraries) specified should be searched before the default system libraries in order to locate a program to be executed. STEPLIB applies only to the particular step,

JOBLIB to all steps in the job.

What is order of searching of the libraries in a JCL?

First any private libraries as specified in the STEPLIB or JOBLIB, then the system libraries such as SYS1.LINKLIB. The system libraries are specified in the linklist.

What happens if both JOBLIB & STEPLIB is specified ?

A. JOBLIB is ignored.

When you specify multiple datasets in a JOBLIB or STEPLIB, what factor determines the order?

A. The library with the largest block size should be the first one.

How to change default proclib ?

A. //ABCD JCLLIB ORDER=(ME.MYPROCLIB,SYS1.PROCLIB)

The disp in the JCL is MOD and the program opens the file in OUTPUT mode. What happens ? The disp in the JCL is SHR and the pgm opens the file in EXTEND mode. What happens ?

A. Records will be written to end of file (append) when a WRITE is done in both cases.

What are the valid DSORG values?

A. PS - QSAM, PO - Partitioned, IS - ISAM

51. What will happen if you attempt to restart a job in the middle of a JCL // IF .... // ENDIF?

A. Job will fall through to the ENDIF (not executing any steps), then resume execution with the first step AFTER the // ENDIF.

52. How many positional Parameters are there in a JOB statement?

There are TWO position parameters in a JOB statement.

53. What are three parameters you can specify on Job statement as well as on exec stmt ?

A. Time, Region and Cond parameters

54. How can you trap abends in the JCL?

A. Use IF ABEND statement in the JCL.

55. How do you restart a step in JCL?

A. Use RESTART=step name.

56. How do you pass parameters to the programs the job is being executed ?

A. By using 'PARM' parameter in EXEC statement. The values mentioned here should be declared in linkage section in the program and process through Procedure division. This technique is very useful when you do not know the parameters at the time of coding the programs.

57. Why do you use a control card?

A. A control card can be a member of a PDS or a Sequential Dataset and is used for storing the date fields, Definitions of VSAM files....etc. You use control-card because you cannot use a in-stream procedure in a procedure. Generally you will be calling a Proc from your Jcl and you cannot code in-stream procedure in the Proc and so you will point to the dataset, which is called control-card.

58. How do you submit JCL via a Cobol program? For the above question the solution is as follows..

A. In your JCL define as//JOBA JOB 1111,JOB1//STEP01 EXEC PGM=PROG1//ddname DD SYSOUT=(\*,INTRDR)...and your COBOL(PROG1) should look like this SELECT JCL-FILE ASSIGN TO ddname. Open this file and write the JCL statements into this file. Example. MOVE '//TESTJOB JOB 1111,VISVEISH' TO JCL-REC. MOVE '//STEP01 EXEC PGM=IEFBR14' TO JCL-REC. and close this file. Then TEST JOB will be submitted.

59. How do you submit a JCL under CICS environment ?

A. Pass all the JCL codes to a COBOL variable (should be declare using OCCURS clause) and the write the line one by one to the spool using CICS commands like SPOOLClose SPOOLOpen SPOOLWrite . For more help refer it CECI of CICS or CICS manual.

60. What is the parameter to be passed in the job card for the unlimited time, irrespective of the job class

A. TIME=1440

61. What is a COND parameter in JCL?  
 A. COND means condition parameter, consists of 2 sub-parameters, 1st - return code from the previous step, 2nd - condition.. It is compared with system return code of previous step. //step1 exec pgm=abcd //step2 exec pgm=xyz, cond=(4,lt). Step2 will be executed only if system return code of step1 is less than 4, else it is bypassed.
62. Write a JCL to execute a Job by 7 a.m. on JAN 20,1986 ?  
 A. THE code IS : //\*MAIN DEADLINE=(0700,B,012086)
63. HOW MANY TYPES OF LIBRARIES ARE THERE IN JCL ?  
 A. Libraries are of three types.1.Sytem libraries: such as sys1.linklib. 2.Private libraries: specified in a Joblib or Steplib DD statements. 3. Temporary Libraries: Created in a previous step of the job.  
 What you mean by skeleton JCL?  
 A. Jcl which changes during run time i.e. the values for the JCL such as Pgm name ,DD name will change .i.e. same JCL can be used for various jobs, equivalent to dynamic SQL ...
65. What is the max block-size for a Tape file?  
 A. It is 32,760.Based on that we can calculate efficient number of Records in a Block
66. What is the purpose of include statement in a JCL?  
 A. It is used as an alternative for steplib. When we specify the dataset name in include ,it will search in all the datasets specified in the include dataset.
67. Is it possible to know the remaining free space in control interval/control area, once an insertion is made.  
 A. Not Possible  
 Explain GDG?  
 A. Generation Data Group is a group of datasets that are logically or chronologically related and referred by a name and relative generation number - an integer which identifies the generation of a dataset and is coded in parentheses after dataset name. Absolute GDG name - GxxxxVyy, where xxxx-absolute gen.number, yy-version number. Can be sequential, direct, partitioned. (VSAM - no). Must always be cataloged. Advantage - all datasets have the same name and system keeps track of adding new and retaining previous generations and deleting oldest successive generation. To create a GDG we create a GDG index in the system catalog with IDCAMS utility and then a model (prototype, DSCB) on the same volume to supply DCB information. Empty - when limit is reached all members are removed from the index, otherwise-only oldest. Scratch-removed members are uncataloged & deleted, otherwise - removed & uncataloged, but remain in the system (not members of GDG any more). GDG number is updated at the end of the job. If number is not specified all generations will be processed from the beginning.
69. For how long a job can be executed continuously in a Mainframe  
 A. 248 Days.  
 What is the Maximum number of DD statements allowed in a JCL.  
 A. 3273
71. How much space does OS allocate, when you create a PS or PDS?  
 A. 56 KB
72. What is the minimum number of dataset names (PDS) in one Directory Block?  
 A. SIX
73. What is the maximum number of Steps allowed in a JOB?  
 A. 255
74. How much is memory space involved, when we code BLOCKSIZE,TRK & CYL
1. What are the different types of VSAM files available?  
 A. ESDS: Entry Sequence Data Set, KSDS: Key Sequence Data Set, RRDS: Relative Data Set
2. What is IDCAMS ?  
 A. IDCAMS is the Access Method Services program. You run the IDCAMS

program and supply AMS commands through SYSIN. (examples of AMS commands are DELETE, DEFINE, REPRO etc..).

3. Syntax of AMS modal commands ? Note: these can be used only under IDCAMS and not from the TSO prompt.

A. IF LASTCC(or MAXCC) >(or < , = etc..) value -

THEN -

DO -

command set (such as DELETE, DEFINE etc..)

ELSE -

DO -

command set

LASTCC - Condition code from the last function(such as delete) executed

MAXCC - Max condition code that was returned by any of the previous functions

SET is also a valid AMS command. SET LASTCC (or MAXCC) = value

The maximum condition code is 16. A condition code of 4 indicates a warning. A condition code of 8 is usually Encountered on a DELETE of a dataset that is not present.

4. Under IDCAMS , multiple functions can be executed, each of which returns a condition code. What will be the condition code returned to the operating system?

A. The maximum condition code generated is returned as the condition code of the IDCAMS step.

5. What is Control Interval, Control Area?

A. Control Interval is analogous to a physical block for QSAM files. It is the unit of i/o. Must be between 512 bytes to 32 k. Usually either 2K or 4K. A larger control interval increases performance for sequential processing while the reverse is true for random access. Under CICS when a record is locked, the entire CI gets locked. Control area is a group of control intervals. CA is used during allocation. CA size is calculated based on the allocation type (cyl, tracks or records) and can be max of 1 cylinder.

6. What is FREESPACE ?

A. Coded in the DEFINE as FREESPACE(ci ca) where ci is the percentage of each control interval to be left free for insertions, ca is the percentage of control intervals in each control area to be left empty.

7. How do you decide on optimum values for CI, FREESPACE etc...

A. CI size should be based on record length, type of processing. Usually CI is 4K. If record length is larger(>1K), chose 6K or 8K.

FREESPACE should be large if more number of insertions are envisaged. Usual values are (20 20) when heavy updates are expected. CI size can be calculated.

8. Would you specify FREESPACE for an ESDS?

A. No. Because you cannot insert records in an ESDS, also when you rewrite a record, it must be of the same length. Thus putting any value for freespace does not make any sense.

9. What is SHAREOPTS ?

A. SHAREOPTS is a parameter in the DEFINE and specifies how an object can be shared among users. It is coded as SHAREOPTS(a b), where a is the cross region share option ie how two or more jobs on a single system can share the file, while b is the cross system share option ie how two or more jobs on different MVS 's can share the file. Usual value is (2 3).

10. What is the meaning of each of the values in SHAREOPTS(2 3)?

A. Value of 2 for cross region means that the file can be processed simultaneously by multiple users provided only one of them is an updater. Value of 3 for cross system means that any number of jobs can process the file for input or output (VSAM does nothing to ensure integrity).

11. How do you define a KSDS ?

A. DEFINE CLUSTER(cluster name) with the INDEXED parameter. Also specify the ds-name for the DATA component & the dataset INDEX component. Other

important parameters are RECORDSIZE, KEYS, SHAREOPTIONS.

12. Can AMS commands be run from the TSO prompt?

A. Yes

13. How do you define an ALTINDX ? How do you use ALTINDXs in batch, CICS programs ?

DEFINE ALTERNATEINDEX. Important parameters are RELATE where you specify the base cluster name, KEYS, RECORDSIZE, SHAREOPTIONS, UNIQUEKEY (or NONUNIQUEKEY), DATA(ds-name for the data component), INDEX(ds-name for the index component).

Then DEFINE PATH. Important parameters are NAME (ds-name for the path), PATHENTRY (ds-name of the alternate index name), UPDATE (or NOUPDATE) which specifies whether an alt index is updated when a update to the base cluster takes place.

Then BLDINDEX. Parameters are INDATASET(ds-name of base cluster), OUTDATASET(ds-name of AIX). If you use INFILE or OUTFILE specify the dd-name after declaring it in JCL.

Using alternate indexes in batch programs:

In the JCL, you must have DD statements for the cluster and for the path(s). In the Cobol program, SELECT .. ASSIGN TO dd-name for base cluster RECORD KEY IS... ALTERNATE RECORD KEY IS..

Using alternate indexes in CICS programs:

FCT entries must be created for both base cluster & the path. To read using the alternate index, use the dd-name of the path in CICS file control commands.

14. What happens when you open an empty VSAM file in a COBOL program for input?

A. VSAM file that has never contained a record is treated as unavailable. Attempting to open for input will fail. An empty file can be opened for output only. When you open for output, COBOL will write a dummy record to the file & then delete it out.

15. How do you initialize a VSAM file before any operation? a VSAM with alternate index?

A. Can write a dummy program that just opens the file for output & then closes it.

16. What does a file status of 02 on a VSAM indicate?

A. Duplicate alternate key . Happens on both input and output operation

17. How do you calculate record size of an alternate cluster? Give your values for both unique and non-unique?

A. Unique Case:  $5 + (\text{alt-key-length} + \text{primary-key})$ . Nonunique Case:  $5 + (\text{alt-key-length} + n * \text{primary-key})$ . Where  $n = \#$  of duplicate records for the alternate key

18. What is the difference between sequential files and ESDS files?

A. Sequential (QSAM) files can be created on tape while ESDS files cannot. Also, you can have ALTINDEX for an ESDS while no such facility exists for QSAM files.

19. How do you load a VSAM data set with records?

A. Using the REPRO command.

20. How do you define a GDG ?

A. Use the DEFINE GENERATIONDATAGROUP command. In the same IDCAMS step, another dataset must be defined whose DCB parameters are used when new generations of the GDG are created. This dataset is known as the model dataset. The ds-name of this model dataset must be the same as that of the GDG, so use a DISP of KEEP rather than CATLG and also specify SPACE=(trk,0)

21. Do all versions of the GDG have to be of the same record length ?

A. No, the DCB of the model dataset can be overridden when you allocate new versions.

22. How are different versions of GDG named?

A. Base-file-name.GnnnnnV00 where nnnn= generation number (upto 255). nnnn will be 0000 for the 1st generation. This format is also called as Absolute GDG naming format.

23. Suppose 3 generations of a GDG exist. How would you reference the 1st generation in the JCL?  
 A. Use GDG name(-2). It is relative naming format.

24. Suppose a generation of GDG gets created in a particular step of a PROC. How would you refer the current generation in a subsequent step? What would be the disposition of this generation now?  
 A. Relative generation numbers are updated only at the end of the job, not at the end of a step. To allocate a new generation, we would be using (+1) with a DISP of (NEW,CATLG,DELETE). To refer to this in a subsequent step in the same job, we would again use (+1) but with a DISP of SHR or OLD.

25. What more info you should give in the DD statement while defining the next generation of a GDG?  
 A. Give (+1) as the generation number, give (new,catlg) for DISP, give space parameter, can give the Dataset Control Block parameter if you want to override the DCB of the model dataset.

26. Assuming that the DEFINE JCL is not available, how do you get info about a VSAM file's organization ?  
 A, Use the LISTCAT command.

27. During processing of a VSAM file, some system error occurs and it's subsequently unusable. What do you do?  
 A. Run VERIFY.

28. How do you fix the problem associated with VSAM out of space condition?  
 Answer: 1. Define new VSAM dataset allocated with more space. 2. Use IDCAMS to REPRO the old VSAM file to new VSAM dataset. 3. Use IDCAMS to ALTER / rename the old VSAM dataset or se IDCAMS to DELETE the old VSAM dataset. 4. Use IDCAMS to ALTER / rename the new VSAM dataset to the name of the original VSAM dataset.

29. What is the meaning of VSAM RETURN-CODE 28?  
 A. Out of space condition is raised.

30. How many Alternate Indexes you can have on a dataset? - Remember ALT INDEX is possible only on KSDS and RRDS.  
 A. 255 - but you must be a nut to have so many ALT Indexes on a dataset!

31. Is it slower if you access a record through ALT INDEX as compared to Primary INDEX? Why?  
 A. Yes. Because the alternate key would first locate the primary key, which in turn locates the actual record. Needs twice the number of I/Os.

32. What is RECOVERY and SPEED parameters in DEFINE CLUSTER command? RECOVERY (default) and SPEED are mutually exclusive. Recovery pre-formats the control areas during the initial dataset load, if the job fails, you can restart but you must have a recovery routine already written to restart the job. SPEED does not pre-format the CAs. It is recommended that you specify SPEED to speed up your initial data load.

33. What is a Base Cluser?  
 A. The Index and data components of a KSDS

34. Describe SHAREOPTIONS parameter (SHR) in Define Cluster command.  
 A. It defines the cross-region and cross-system sharing capabilities of the dataset. Syntax is SHR(CRvalue CSvalue) value 1 means multiple read OR single write (read integrity) 2 means multiple read AND single write (Write integrity) 3 means Multiple read AND multiple write 4 is same as 3, which refreshes the buffer with every random access. default is SHR(1 3).

35. What does the KEYRANGES parameter in Define Cluster commend do?  
 A. It divides a large dataset into several volumes according to the Key-ranges specified. e.g., KEYRANGES ((0000001 2999999) (3000000 5999999)). if the activity on the key ranges are evenly distributed, concurrent access is possible, which is a performance improvement.

36. What are the optional parameters to the input dataset While loading the empty cluster with the data records?  
 A. 1)FROMADDRESS(address) 2)TOADDRESS(address) where 'address' specifies

the RBA value of the key of the input record. 3)FROMNUMBER(rrn)  
4)TONUMBER(rrn) where 'rrn' specifies the relative record number of the  
RRDS record 5)FROMKEY(key) 6)TOKEY(key) where 'key' specifies the key of  
the input record 7)SKIP(number) 8)COUNT(number) where 'number' specifies  
the number of records to skip or copy Ex: REPRO INFILE(DD1) OUTFILE(DD2)  
SKIP(9000) COUNT(700) - Skips the first 9000 records and begins copying  
at 9001 and copies 700 records from DD1 to DD2.

37. What is IDCAMS? What is the purpose of it?.

A. IDCAMS is an access method services utility used for creating,  
deleting, altering VSAM files and copying sequential file to a VSAM  
file, etc.

38. How to delete a member using JCL.

A. Using IDCAMS a member can be deleted. DELETE 'XXX.YYY(member)

39. What is the Difference between LDS & ESDS ?

A. These two datasets are VSAM datasets. ESDS maintains control  
information. But LDS does not maintains the control information.

40. A) Is a delete operation possible in an ESDS? B) Is rewrite  
operation possible in ESDS ?

A. A. No delete operation is not possible in VSAM ESDS. B. Yes rewrite  
operation is possible in an ESDS.

41. What is an alternate index and path ?

A. An alternate index is another way of accessing key sequenced data  
record stored in a base cluster and path is the linkage which connect  
alternate index to its base cluster.

42. How many buffers are allocated to VSAM KSDS and ESDS?

A. 2 data buffers by default for ESDS. For KSDS it allots 2 data buffers  
and 1 index buffers. each buffer is about 4k.

43. What's the biggest disadvantage of using a VSAM dataset?

A. FREE SPACE(FPSC)

44. What's the device independent method to indicate where a Record is  
Stored?

A. By USING RBA(Relative Byte Address).

45. How many times Secondary Space Allocated?

A. 122 TIMES

46. What is the RRN for the first record in RRDS?

A. 1

47. If FSPC(100 100) is specified does it mean that both the control  
interval and control area will be left empty because 100 % of both CI  
and CA are specified to be empty?

No, they would not be left empty. One record will be written in each CI  
and 1 CI will be written for each CA.

undefined <>

undefined <>More... <>

undefined[Close] <>

undefined[Close] <>

undefined1. What are the different types of VSAM files available?

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SET is also a valid AMS command. SET LASTCC (or MAXCC) = value

The maximum condition code is 16. A condition code of 4 indicates a warning. A condition code of 8 is usually Encountered on a DELETE of a dataset that is not present.

4. Under IDCAMS , multiple functions can be executed, each of which returns a condition code. What will be the condition code returned to the operating system?

A. The maximum condition code generated is returned as the condition code of the IDCAMS step.

5. What is Control Interval, Control Area?

A. Control Interval is analogous to a physical block for QSAM files. It is the unit of i/o. Must be between 512 bytes to 32 k. Usually either 2K or 4K. A larger control interval increases performance for sequential processing while the reverse is true for random access. Under CICS when a record is locked, the entire CI gets locked. Control area is a group of control intervals. CA is used during allocation. CA size is calculated based on the allocation type (cyl, tracks or records) and can be max of 1 cylinder.

6. What is FREESPACE ?

A. Coded in the DEFINE as FREESPACE(ci ca) where ci is the percentage of each control interval to be left free for insertions, ca is the percentage of control intervals in each control area to be left empty.

7. How do you decide on optimum values for CI, FREESPACE etc...

A. CI size should be based on record length, type of processing. Usually CI is 4K. If record length is larger(>1K), chose 6K or 8K.

FREESPACE should be large if more number of insertions are envisaged. Usual values are (20 20) when heavy updates are expected. CI size can be calculated.

8. Would you specify FREESPACE for an ESDS?

A. No. Because you cannot insert records in an ESDS, also when you rewrite a record, it must be of the same length. Thus putting any value for freespace does not make any sense.

9. What is SHAREOPTS ?

A. SHAREOPTS is a parameter in the DEFINE and specifies how an object can be shared among users. It is coded as SHAREOPTS(a b), where a is the cross region share option ie how two or more jobs on a single system can share the file, while b is the cross system share option ie how two or more jobs on different MVS 's can share the file. Usual value is (2 3).

10. What is the meaning of each of the values in SHAREOPTS(2 3)?

A. Value of 2 for cross region means that the file can be processed simultaneously by multiple users provided only one of them is an updater. Value of 3 for cross system means that any number of jobs can process the file for input or output (VSAM does nothing to ensure integrity).

11. How do you define a KSDS ?

A. DEFINE CLUSTER(cluster name) with the INDEXED parameter. Also specify the ds-name for the DATA component & the dataset INDEX component. Other important parameters are RECORDSIZE, KEYS, SHAREOPTIONS.

12. Can AMS commands be run from the TSO prompt?

A. Yes

13. How do you define an ALTINDX ? How do you use ALTINDXs in batch, CICS programs ?

DEFINE ALTERNATEINDEX. Important parameters are RELATE where you specify the base cluster name, KEYS, RECORDSIZE, SHAREOPTIONS, UNIQUEKEY(or NONUNIQUEKEY), DATA(ds-name for the data component), INDEX(ds-name for the index component).

Then DEFINE PATH. Important parameters are NAME (ds-name for the path),

PATHENTRY (ds-name of the alternate index name), UPDATE(or NOUPDATE) which specifies whether an alt index is updated when a update to the base cluster takes place.

Then BLDINDEX. Parameters are INDATASET(ds-name of base cluster), OUTDATASET(ds-name of AIX). If you use INFILE or OUTFILE specify the dd-name after declaring it in JCL.

Using alternate indexes in batch programs:

In the JCL, you must have DD statements for the cluster and for the path(s). In the Cobol program, SELECT .. ASSIGN TO dd-name for base cluster RECORD KEY IS... ALTERNATE RECORD KEY IS..

Using alternate indexes in CICS programs:

FCT entries must be created for both base cluster & the path. To read using the alternate index, use the dd-name of the path in CICS file control commands.

14. What happens when you open an empty VSAM file in a COBOL program for input?

A. VSAM file that has never contained a record is treated as unavailable. Attempting to open for input will fail. An empty file can be opened for output only. When you open for output, COBOL will write a dummy record to the file & then delete it out.

15. How do you initialize a VSAM file before any operation? a VSAM with alternate index?

A. Can write a dummy program that just opens the file for output & then closes it.

16. What does a file status of 02 on a VSAM indicate?

A. Duplicate alternate key . Happens on both input and output operation

17. How do you calculate record size of an alternate cluster? Give your values for both unique and non-unique?

A. Unique Case:  $5 + (\text{alt-key-length} + \text{primary-key})$ . Nonunique Case:  $5 + (\text{alt-key-length} + n * \text{primary-key})$ . Where  $n = \#$  of duplicate records for the alternate key

18. What is the difference between sequential files and ESDS files?

A. Sequential (QSAM) files can be created on tape while ESDS files cannot. Also, you can have ALTINDEX for an ESDS while no such facility exists for QSAM files.

19. How do you load a VSAM data set with records?

A. Using the REPRO command.

20. How do you define a GDG ?

A. Use the DEFINE GENERATIONDATAGROUP command. In the same IDCAMS step, another dataset must be defined whose DCB parameters are used when new generations of the GDG are created. This dataset is known as the model dataset. The ds-name of this model dataset must be the same as that of the GDG, so use a DISP of KEEP rather than CATLG and also specify SPACE=(trk,0)

21. Do all versions of the GDG have to be of the same record length ?

A. No, the DCB of the model dataset can be overridden when you allocate new versions.

22. How are different versions of GDG named?

A. Base-file-name.GnnnnnV00 where nnnn= generation number (upto 255). nnnn will be 0000 for the 1st generation. This format is also called as Absolute GDG naming format.

23. Suppose 3 generations of a GDG exist. How would you reference the 1st generation in the JCL?

A. Use GDG name(-2). It is relative naming format.

24. Suppose a generation of GDG gets created in a particular step of a PROC. How would you refer the current generation in a subsequent step? What would be the disposition of this generation now?

A. Relative generation numbers are updated only at the end of the job, not at the end of a step. To allocate a new generation, we would be using (+1) with a DISP of (NEW,CATLG,DELETE). To refer to this in a subsequent step in the same job, we would again use (+1) but with a DISP

of SHR or OLD.

25. What more info you should give in the DD statement while defining the next generation of a GDG?

A. Give (+1) as the generation number, give (new,catlg) for DISP, give space parameter, can give the Dataset Control Block parameter if you want to override the DCB of the model dataset.

26. Assuming that the DEFINE JCL is not available, how do you get info about a VSAM file's organization ?

A, Use the LISTCAT command.

27. During processing of a VSAM file, some system error occurs and it's subsequently unusable. What do you do?

A. Run VERIFY.

28. How do you fix the problem associated with VSAM out of space condition?

Answer: 1. Define new VSAM dataset allocated with more space. 2. Use IDCAMS to REPRO the old VSAM file to new VSAM dataset. 3. Use IDCAMS to ALTER / rename the old VSAM dataset or se IDCAMS to DELETE the old VSAM dataset. 4. Use IDCAMS to ALTER / rename the new VSAM dataset to the name of the original VSAM dataset.

29. What is the meaning of VSAM RETURN-CODE 28?

A. Out of space condition is raised.

30. How many Alternate Indexes you can have on a dataset? - Remember ALT INDEX is possible only on KSDS and RRDS.

A. 255 - but you must be a nut to have so many ALT Indexes on a dataset!

31. Is it slower if you access a record through ALT INDEX as compared to Primary INDEX? Why?

A. Yes. Because the alternate key would first locate the primary key, which in turn locates the actual record. Needs twice the number of I/Os.

32. What is RECOVERY and SPEED parameters in DEFINE CLUSTER command?

RECOVERY (default) and SPEED are mutually exclusive. Recovery pre-formats the control areas during the initial dataset load, if the job fails, you can restart but you must have a recovery routine already written to restart the job. SPEED does not pre-format the CAs. It is recommended that you specify SPEED to speed up your initial data load.

33. What is a Base Cluser?

A. The Index and data components of a KSDS

34. Describe SHAREOPTIONS parameter (SHR) in Define Cluster command.

A. It defines the cross-region and cross-system sharing capabilities of the dataset. Syntax is SHR(CRvalue CSvalue) value 1 means multiple read OR single write (read integrity) 2 means multiple read AND single write (Write integrity) 3 means Multiple read AND multiple write 4 is same as 3, which refreshes the buffer with every random access. default is SHR(1 3).

35. What does the KEYRANGES parameter in Define Cluster commend do?

A. It divides a large dataset into several volumes according to the Key-ranges specified. e.g., KEYRANGES ((0000001 2999999) (3000000 5999999)). if the activity on the key ranges are evenly distributed, cuncurrent access is possible, which is a performance improvement.

36. What are the optional parameters to the input dataset While loading the empty cluster with the data records?

A. 1)FROMADDRESS(address) 2)TOADDRESS(address) where 'address' specifies the RBA value of the key of the input record. 3)FROMNUMBER(rrn) 4)TONUMBER(rrn) where 'rrn' specifies the relative record number of the RRDS record 5)FROMKEY(key) 6)TOKEY(key) where 'key' specifies the key of the input record 7)SKIP(number) 8)COUNT(number) where 'number' specifies the number of records to skip or copy Ex: REPRO INFILE(DD1) OUTFILE(DD2) SKIP(9000) COUNT(700) - Skips the first 9000 records and begins copying at 9001 and copies 700 records from DD1 to DD2.

37. What is IDCAMS? What is the purpose of it?.

A. IDCAMS is an access method services utility used for creating, deleting, altering VSAM files and copying sequential file to a VSAM

file, etc.

38. How to delete a member using JCL.

A. Using IDCAMS a member can be deleted. DELETE 'XXX.YYY(member)

39. What is the Difference between LDS & ESDS ?

A. These two datasets are VSAM datasets. ESDS maintains control information. But LDS does not maintains the control information.

40. A) Is a delete operation possible in an ESDS? B) Is rewrite operation possible in ESDS ?

A. A. No delete operation is not possible in VSAM ESDS. B. Yes rewrite operation is possible in an ESDS.

41. What is an alternate index and path ?

A. An alternate index is an another way of accessing key sequenced data record stored in a base cluster and path is the linkage which connect alternate index to its base cluster.

42. How many buffers are allocated to VSAM KSDS and ESDS?

A. 2 data buffers by default for ESDS. For KSDS it allots 2 data buffers and 1 index buffers. each buffer is about 4k.

43. What's the biggest disadvantage of using a VSAM dataset?

A. FREE SPACE(FPSC)

44. What's the device independent method to indicate where a Record is Stored?

A. By USING RBA(Relative Byte Address).

45. How many times Secondary Space Allocated?

A. 122 TIMES

46. What is the RRN for the first record in RRDS?

A. 1

47. If FSPC(100 100) is specified does it mean that both the control interval and control area will be left empty because 100 % of both CI and CA are specified to be empty?

No, they would not be left empty. One record will be written in each CI and 1 CI will be written for each CA.

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Question: How do you fix the problem associated with VSAM out of space condition?

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Question: Correction to the previous question - Yor can have ALT INDEX only on KSDS and ESDS - not RRDS.

Answer: See the question for correction - you cannot have ALT INDEX for RRDS.

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Answer: 255 - but you must be a nut to have so many ALT Indexes on a dataset!

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Answer: Generation Data Group

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Answer: FREE SPACE(FPSC)

Question: what's the device independent method to indicate where a Record is Stored?

Answer: The answer is : By USING RBA(Relative Byte Address).

Question: Q: HOW MANY TIMES SECONDARY SPACE ALLOCATED?

Answer: A: 122 TIMES

Question: what is the RRN for the first record in RRDS?

Answer: The answer is : 1

Question: what is a Base Cluser?

Answer: The Index and data components of a KSDS

Question: If fspc(100 100) is specified does it mean that both the control interval and control area will be left empty because 100 % of both ci and ca are specified to be empty?

Answer: no,they would not be left empty.one record will be written in each ci and 1 ci will be written for each ca.

## VSAM

Q1. What are the types of VSAM datasets?

A1. Entry sequenced datasets (ESDS), key sequenced datasets (KSDS) and relative record dataset (RRDS).

Q2. How are records stored in an ESDS, entry sequenced dataset?

A2. They are stored without respect to the contents of the records and in the order in which they are included in the file.

Q3. What is a CI, control interval?

A3. A control interval is the unit of information that VSAM transfers between virtual and auxiliary storage.

Q4. What are the distinctive features of a ksds, key sequenced dataset?

A4. The index and the distributed free space.

Q5. What is a CA, control area?

A5. A group of control intervals makes up a control area.

Q6. What is a sequence set?

A6. This is the part of the index that points to the CA and CI of the record being accessed.

Q7. What is the index set?

A7. This is the other part of the index. It has multiple levels with pointers that ultimately reach to the sequence set.

Q8. What is a cluster?

A8. A cluster is the combination of the index, sequence set and data portions of the dataset. The operating system gives program access to the cluster, ie. to all parts of the dataset simultaneously.

Q9. What is the catalog?

A9. The catalog contains the names of all datasets, VSAM and non-VSAM. It is used to access these datasets.

Q10. What is an alternate index?

A10. An AIX is a file that allows access to a VSAM dataset by a key other than the primary one.

Q11. What is a path?

A11. A path is a file that allows you to access a file by alternate index - the path provides an association between the AIX and the base cluster.

Q12. What is the upgrade set?

A12. The upgrade set is the list of all AIXes that VSAM must maintain for a specific base cluster, so that when data in the base cluster is updated, the AIX files are also updated.

Q13. What is free space?

A13. Free space is reserved within the data component of a KSDS to accommodate inserting new records.

Q14. What is a VSAM split?

A14. If there isn't enough space in the control interval VSAM performs a control interval split by moving some records to the free control intervals. If there isn't a free control interval VSAM performs a control area split by allocating a new control area and moving half of the control intervals to it.

Q15. What is the base cluster?

A15. The base cluster consists of the data component and the index component for the primary index of a KSDS.

Q16. Do primary key values have to be unique? Do alternate key values have to be unique?

A16. Primary key values must be unique; alternate key values need not be.

Q17. In the COBOL SELECT statement what is the ORGANIZATION for a KSDS?

A17. The ORGANIZATION is INDEXED.

Q18. In the COBOL SELECT statement for a KSDS what are the three

possibilities for ACCESS?

A18. ACCESS can be SEQUENTIAL, RANDOM or DYNAMIC.

Q19. What is the COBOL RECORD KEY clause?

A19. The RECORD KEY in the SELECT clause identifies the files primary key as it will be known to the program.

Q20. What is the purpose of the FILE STATUS clause in the SELECT statement?

A20. The FILE STATUS field identifies the field that VSAM uses to provide information about each I/O operation for the file.

Q21. If you wish to use the REWRITE command how must the VSAM file be opened?

A21. It must be opened as I/O.

Q22. Explain the meaning and syntax for the START command.

A22. The START command is used read other than the next VSAM record. A value must be moved into the RECORD KEY. The KEY clause is optional, but it can be used to specify a relational (equal, less than, etc.) operator.

Q23. What is the meaning of dynamic processing?

A23. It's rarely used. It means one program uses both sequential and random processing for a VSAM KSDS file.

Q24. Name some common VSAM error conditions and codes.

A24. They are end of file (10), duplicate key (22), record not found (23), VSAM logic error (90), open problem (92) and space problem (93).

Q25. What is the VSAM-code field?

A25. It is a COBOL II enhancement to VSAM batch processing expanding the FILE STATUS field. It is defined in WORKING-STORAGE as a six byte group item with three two byte elements, the normal return code, the function code and the feedback code.

Q26. What is a VSAM slot?

A26. A relative record dataset (RRDS) consists of a specified number of areas called slots. Each slot is identified by a relative record number (RRN) which indicates its relative position in the file.

Q27. What is the utility program closely associated with VSAM?

A27. IDCAMS, the access method services utility.

Q28. There are at least seven IDCAMS commands; name and explain each of them.

A28. ALTER modifies information for a catalog, alternate index, cluster or path. BLDINDEX builds the alternate index, ofcourse. DEFINE is used for ALTERNATEINDEX, CLUSTER or PATH. DELETE removes the catalog entry for a catalog, cluster, alternate index or path. LISTCAT lists information about the dataset. PRINT prints the dataset contents. REPRO copies records from one file to another.

Q29. What are the three levels of definition for the VSAM DEFINE?

A29. They are DEFINE CLUSTER, DATA and INDEX.

Q30. What is the significance of the SHAREOPTIONS parameter?

A30. It specifies how the file may be shared between jobs and between batch and CICS environments.

Q31. What is the meaning of the DEFINE MODEL parameter?

A31. It specifies whether Daniela Pestova or Yamila - oops! Wrong models! The MODEL parameter allows you to model your cluster by modelling it after an existing cluster.