

MAINFRAME - COBOL INTERVIEW QUESTIONS

1. Name the divisions in a COBOL program.

IDENTIFICATION DIVISION, ENVIRONMENT DIVISION, DATA DIVISION, PROCEDURE DIVISION.

• What are the different data types available in COBOL?

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

• What does the INITIALIZE verb do? d'ž"

Alphabetic, Alphanumeric fields & alphanumeric edited items are set to SPACES.

Numeric, Numeric edited items set to ZERO.

FILLER , OCCURS DEPENDING ON items left untouched.

• What is 77 level used for ?

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

5. What is 88 level used for ?

For condition names.

6. What is level 66 used for ?

For RENAMEs clause.

7. What does the IS NUMERIC clause establish ?

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 - .

8. How do you define a table/array in COBOL?

01 ARRAYS.

05 ARRAY1 PIC X(9) OCCURS 10 TIMES.

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

9. Can the OCCURS clause be at the 01 level?

No.

10. What is the difference between index and subscript?

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.

11. What is the difference between SEARCH and SEARCH ALL?

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.

12. What should be the sorting order for SEARCH ALL?

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).

13. What is binary search?

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.

14. 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?

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

15. How do you sort in a COBOL program? Give sort file definition, sort statement syntax and meaning.

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.

16. 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.

17. What are the two ways of doing sorting in a COBOL program? Give the formats.

See question 16.

18. Give the format of USING and GIVING in SORT statement. What are the restrictions with it?

See question 16. Restrictions - Cannot message records, cannot select records to be sorted.

19. What is the difference between performing a SECTION and a PARAGRAPH?

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.

20. What is the use of EVALUATE statement?

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.

21. What are the different forms of EVALUATE statement?

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

22. How do you come out of an EVALUATE statement?

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.

23. In an EVALUATE statement, can I give a complex condition on a when clause?

Yes.

24. 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.

25. How do you do in-line PERFORM?

PERFORM

END PERFORM

26. When would you use in-line perform?

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.

27. What is the difference between CONTINUE & NEXT SENTENCE ?

CONTINUE is like a null statement (do nothing) , while NEXT SENTENCE transfers control to the next sentence (!!) (A sentence is terminated by a period)

28. What does EXIT do ?

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

29. Can I redefine an X(100) field with a field of X(200)?

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.

30. Can I redefine an X(200) field with a field of X(100) ?

Yes.

31. What do you do to resolve SOC-7 error?

Basically you need to correcting 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.

Some installation might have batch program debugging tools. Use them.

32. How is sign stored in Packed Decimal fields and Zoned Decimal fields?

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.

33. How is sign stored in a comp-3 field?

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...

34. How is sign stored in a COMP field ?

In the most significant bit. Bit is on if -ve, off if +ve.

35. What is the difference between COMP & COMP-3 ?

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

36. What is COMP-1? COMP-2?

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

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

37. How do you define a variable of COMP-1? COMP-2?

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

38. How many bytes does a S9(7) COMP-3 field occupy ?

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.

39. How many bytes does a S9(7) SIGN TRAILING SEPARATE field occupy ?

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

40. How many bytes will a S9(8) COMP field occupy ?

4 bytes.

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

99999999

42. What is COMP SYNC?

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.

43. What is the maximum size of a 01 level item in COBOL I? in COBOL II?

In COBOL II: 16777215

44. 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 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).

45. What are different file OPEN modes available in COBOL?

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

46. What is the mode in which you will OPEN a file for writing?

OUTPUT, EXTEND

47. In the JCL, how do you define the files referred to in a subroutine ?

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

48. Can you REWRITE a record in an ESDS file? Can you DELETE a record from it?

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

49. What is file status 92?

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

50. What is file status 39 ?

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.

51. What is Static,Dynamic linking ?

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.

52. What is AMODE(24), AMODE(31), RMODE(24) and RMODE(ANY)? (applicable to only

MVS/ESA Enterprise Server).

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.

53. What compiler option would you use for dynamic linking?

DYNAM.

54. What is SSRANGE, NOSSRANGE ?

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.

55. How do you set a return code to the JCL from a COBOL program?

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

56. How can you submit a job from COBOL programs?

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.

57. 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.

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.

EVALUATE is supported only in VS COBOL II.

Scope terminators are supported only in VS 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.

58. What are the steps you go through while creating a COBOL program executable?

DB2 precompiler (if embedded sql used), CICS translator (if CICS pgm), Cobol compiler, Link editor.

If DB2 program, create plan by binding the DBRMs.

59. Can you call an OS VS COBOL pgm from a VS COBOL II pgm ?

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

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11) What is UNION, UNION ALL? –

UNION : eliminates duplicates

UNION ALL: retains duplicates

Both these are used to combine the results of different SELECT statements.

Suppose I have five SQL SELECT statements connected by UNION/UNION ALL, how many times should I specify UNION to eliminate the duplicate rows? -

Once.

12) What is the restriction on using UNION in embedded SQL?

It has to be in a CURSOR.

13) In the WHERE clause what is BETWEEN and IN? –

BETWEEN supplies a range of values while IN supplies a list of values.

14) Is BETWEEN inclusive of the range values specified? –

Yes.

15) What is 'LIKE' used for in WHERE clause? What are the wildcard characters? –

LIKE is used for partial string matches. '%' (for a string of any character) and '_' (for any single character) are the two wild card characters.

16) When do you use a LIKE statement?

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.

17) What is the meaning of underscore ('_') in the LIKE statement? –

Match for any single character.

18) What do you accomplish by GROUP BY ... HAVING clause? –

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

19) Consider the employee table with column PROJECT nullable. How can you get a list of employees who are not assigned to any project?

```
SELECT EMPNO
```

```
FROM EMP
```

```
WHERE PROJECT IS NULL;
```

20) What is the result of this query if no rows are selected:

```
SELECT SUM(SALARY)
```

```
FROM EMP
```

```
WHERE QUAL='MSC';
```

```
NULL
```

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<http://www.mainframegurukul.com/srcsinc/DB2-SQL-interview-questions-5.html>

May 2, 2012

21) 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.

What are correlated subqueries? -

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.

22) What are the issues related with correlated subqueries? –

???

23) What is a cursor? why should it be used? –

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.

24) How would you retrieve rows from a DB2 table in embedded SQL? –

Either by using the single row SELECT statements, or by using the CURSOR.

Apart from cursor, what other ways are available to you to retrieve a row from a table in embedded SQL? -

Single row SELECTs.

25) Where would you specify the DECLARE CURSOR statement? –

See answer to next question.

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26) How do you specify and use a cursor in a COBOL program? –

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.

27) 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.

28) Is DECLARE CURSOR executable?

No.

29) Can you have more than one cursor open at any one time in a program ? –

Yes.

30) When you COMMIT, is the cursor closed? - drona questions

Yes.

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31) How do you leave the cursor open after issuing a COMMIT? (for DB2 2.3 or above only)

Use WITH HOLD option in DECLARE CURSOR statement. But, it has not effect in psuedo-conversational CICS programs.

32) Give the COBOL definition of a VARCHAR field.

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).

33) What is the physical storage length of each of the following DB2 data types:

DATE, TIME, TIMESTAMP?

DATE: 4bytes

TIME: 3bytes

TIMESTAMP: 10bytes

34) What is the COBOL picture clause of the following DB2 data types:

DATE, TIME, TIMESTAMP?

DATE: PIC X(10)

TIME : PIC X(08)

TIMESTAMP: PIC X(26)

35) What is the COBOL picture clause for a DB2 column defined as DECIMAL(11,2)? - Ramesh

PIC S9(9)V99 COMP-3.

Note: In DECIMAL(11,2), 11 indicates the size of the data type and 2 indicates the precision.

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36) What is DCLGEN ? -

DeCLarations GENerator: used to create the host language copy books for the table definitions. Also creates the DECLARE table.

37) What are the contents of a DCLGEN? -

1. EXEC SQL DECLARE TABLE statement which gives the layout of the table/view in terms of DB2 datatypes.

2. A host language copy book that gives the host variable definitions for the column names.

38) Is it mandatory to use DCLGEN? If not, why would you use it at all? -

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.

39) Is DECLARE TABLE in DCLGEN necessary? Why it used?

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.

40) Will precompile of an DB2-COBOL program bomb, if DB2 is down?

No. Because the precompiler does not refer to the DB2 catalogue tables.

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41) How is a typical DB2 batch pgm executed ?

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('ED 01T.OBJ.LOADLIB')
```

```
END
```

2. Use IKJEFT01 utility program to run the above DSN command in a JCL.

Assuming that a site's standard is that pgm name = plan name, what is the easiest way to find out which pgms are affected by change in a table's structure ?

Query the catalogue tables SYSPLANDEP and SYSPACKDEP.

42) Name some fields from SQLCA.

SQLCODE, SQLERRM, SQLERRD

43) How can you quickly find out the # of rows updated after an update statement?

Check the value stored in SQLERRD(3).

44) What is EXPLAIN? – drona questions

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).

45) What do you need to do before you do EXPLAIN?

Make sure that the PLAN_TABLE is created under the AUTHID.

46) Where is the output of EXPLAIN stored? –

In userid.PLAN_TABLE

47) EXPLAIN has output with MATCHCOLS = 0. What does it mean? –

a nonmatching index scan if ACESSTYPE = I.

48) How do you do the EXPLAIN of a dynamic SQL statement?

1. Use SPUFI or QMF to EXPLAIN the dynamic SQL statement
2. Include EXPLAIN command in the embedded dynamic SQL statements

49) How do you simulate the EXPLAIN of an embedded SQL statement in SPUFI/QMF? Give an example with a host variable in WHERE clause.)

Use a question mark in place of a host variable (or an unknown value). e.g.

```
SELECT EMP_NAME
```

```
FROM EMP
```

```
WHERE EMP_SALARY > ?
```

50) What are the isolation levels possible ? –

CS: Cursor Stability

RR: Repeatable Read

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51) What is the difference between CS and RR isolation levels?

CS: Releases the lock on a page after use

RR: Retains all locks acquired till end of transaction

52) Where do you specify them ?

ISOLATION LEVEL is a parameter for the bind process.

53) When do you specify the isolation level? How?

During the BIND process. ISOLATION (CS/RR)...

I use CS and update a page. Will the lock be released after I am done with that page?

No.

54) What are the various locking levels available?

PAGE, TABLE, TABLESPACE

55) How does DB2 determine what lock-size to use?

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

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56) What are the disadvantages of PAGE level lock? - RAMESH
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High resource utilization if large updates are to be done

57) What is lock escalation?

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.

58) What are the various locks available?

SHARE, EXCLUSIVE, UPDATE

59) Can I use LOCK TABLE on a view?

No. To lock a view, take lock on the underlying tables.

60) What is ALTER ? –

SQL command used to change the definition of DB2 objects.

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61) What is a DBRM, PLAN ?

DBRM: DataBase 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.

62) What is ACQUIRE/RELEASE in BIND?

Determine the point at which DB2 acquires or releases locks against table and tablespaces, including intent locks.

63) What else is there in the PLAN apart from the access path? –

PLAN has the executable code for the SQL statements in the host program

64) What happens to the PLAN if index used by it is dropped?

Plan is marked as invalid. The next time the plan is accessed, it is rebound.

65) What are PACKAGES ? –

They contain executable code for SQL statements for one DBRM.

66) What are the advantages of using a PACKAGE?

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 rebind of a plan
4. Minimize fallback complexities if changes result in an error.

67) What is a collection?

a user defined name that is the anchor for packages. It has not physical existence. Main usage is to group packages.

In SPUFI suppose you want to select max. of 1000 rows , but the select returns only 200 rows.

68) What are the 2 sqlcodes that are returned? –

100 (for successful completion of the query), 0 (for successful COMMIT if AUTOCOMMIT is set to Yes).

69) How would you print the output of an SQL statement from SPUFI? –

Print the output dataset.

70) How do you pull up a query which was previously saved in QMF ? –

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71) Lot of updates have been done on a table due to which indexes have gone haywire. What do you do? –

Looks like index page split has occurred. DO a REORG of the indexes.

72) What is dynamic SQL? –

Dynamic SQL is a SQL statement created at program execution time.

73) When is the access path determined for dynamic SQL? –

At run time, when the PREPARE statement is issued.

74) 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? –

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.

75) How does DB2 store NULL physically?

as an extra-byte prefix to the column value. physically, the nul prefix is Hex '00' if the value is present and Hex 'FF' if it is not.

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76) How do you retrieve the data from a nullable column? –

Use null indicators. Syntax ... INTO :HOSTVAR:NULLIND

77) What is the picture clause of the null indicator variable? –

S9(4) COMP.

78) What does it mean if the null indicator has -1, 0, -2? –

-1 : the field is null

0 : the field is not null

-2 : the field value is truncated

79) How do you insert a record with a nullable column?

To insert a NULL, move -1 to the null indicator

To insert a valid value, move 0 to the null indicator

80) What is RUNSTATS? –

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.

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81) When will you chose to run RUNSTATS?

After a load, or after mass updates, inserts, deletes, or after REORG.

82) Give some example of statistics collected during RUNSTATS?

of rows in the table

Percent of rows in clustering sequence

of distinct values of indexed column

of rows moved to a nearby/farway page due to row length increase

83) What is REORG? When is it used?

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.

84) What is IMAGECOPY ? –

It is full backup of a DB2 table which can be used in recovery.

85) When do you use the IMAGECOPY? –

To take routine backup of tables

After a LOAD with LOG NO

After REORG with LOG NO

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86) What is COPY PENDING status?

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.

87) What is CHECK PENDING ?

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.

88) What is QUIESCE?

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.

89) What is a clustering index ? –

Causes the data rows to be stored in the order specified in the index. A mandatory index defined on a partitioned table space.

90) How many clustering indexes can be defined for a table?

Only one.

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91) What is the difference between primary key & unique index ?

Primary : 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.

92) What is sqlcode -922 ?

Authorization failure

93) What is sqlcode -811?

SELECT statement has resulted in retrieval of more than one row.

94) What does the sqlcode of -818 pertain to? –

This is generated when the consistency tokens in the DBRM and the load module are different.

95) Are views updateable ?

Not all of them. Some views are updateable e.g. single table view with all the fields or mandatory fields. Examples of non-updateable views are views which are joins, views that contain aggregate functions(such as MIN), and views that have GROUP BY clause.

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96) If I have a view which is a join of two or more tables, can this view be updateable? –

No.

97) What are the 4 environments which can access DB2 ?

TSO, CICS, IMS and BATCH

98) What is an inner join, and an outer join ?

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 clause 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.

99) What is FREEPAGE and PCTFREE in TABLESPACE creation?

PCTFREE: percentage of each page to be left free

FREEPAGE: Number of pages to be loaded with data between each free page

100) What are simple, segmented and partitioned table spaces ?

Simple Tablespace:

Can contain one or more tables

Rows from multiple tables can be interleaved on a page under the DBAs 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.

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101) What is filter factor?

one divided by the number of distinct values of a column.

102) What is index cardinality? –

The number of distinct values a column or columns contain.

103) What is a synonym ?

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.

104) What is the difference between SYNONYM and ALIAS?

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 info from programs. Alias is a global object & is available to all.

105) What do you mean by NOT NULL WITH DEFAULT? When will you use it?

This column cannot have nulls and while insertion, if no value is supplied then it wil 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.

106) What do you mean by NOT NULL? When will you use it?

The column cannot have nulls. Use it for key fields.

107) When would you prefer to use VARCHAR?

When a column which contains long text, e.g. remarks, notes, may have in most cases less than 50% of the maximum length.

108) What are the disadvantages of using VARCHAR?

1. Can lead to high space utilization if most of the values are close to maximum.
2. Positioning of VARCHAR column has to be done carefully as it has performance implications.
3. Relocation of rows to different pages can lead to more I/Os on retrieval.

109) How do I create a table MANAGER (EMP#, MANAGER) where MANAGER is a foreign key which references to EMP# in the same table? Give the exact DDL.

First CREATE MANAGER table with EMP# as the primary key. Then ALTER it to define the foreign key.

When is the authorization check on DB2 objects done - at BIND time or run time?

At run time.

110) What is auditing?

Recording SQL statements that access a table. Specified at table creation time or through alter.

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5) How do you retrieve the first 5 characters of FIRSTNAME column of DB2 table EMP ?

SQL Query : `SELECT SUBSTR(FIRSTNAME,1,5) FROM EMP;`

6) What are aggregate functions?

Built-in mathematical functions for use in SELECT clause.

7) Can you use MAX on a CHAR column?

YES.

8) My SQL statement `SELECT AVG(SALARY) FROM EMP` yields inaccurate results. Why?

Because SALARY is not declared to have NULLs and the employees for whom the salary is not known are also counted.

9) How do you concatenate the FIRSTNAME and LASTNAME from EMP table to give a complete name?

`SELECT FIRSTNAME || ' ' || LASTNAME FROM EMP;`

10) What is the use of VALUE function?

1. Avoid -ve SQLCODEs by handling nulls and zeroes in computations

2. Substitute a numeric value for any nulls used in computation

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