1. Important CICS table details ?

TCT - Terminal Control Table - Terminal ID’s

PCT - Program Control Table - Transaction ID + Program ID

PPT - Program Processing Table - Program/Map set name with load library details

FCT - File Control Table - File details

RCT- Resource Control table - Transaction ID + Plan Name

TST - Temporary Storage Table

DCT - Destination Control Table

1. What we should do to run an async/trigger for every 5 minutes ?

EXEC CICS START command with interval option

EXEC CICS START TRANSID (‘trans name’)

TIME(hhmmss)| INTERVAL(hhmmss)

FROM(WS-ITEM) LENGTH(WS-LEN)

END-EXEC

TIME – Time at which transaction to be started

INTERVAL – Defined to start the transaction after a specified interval

1. What is the process of taking backups , how to append data to existing table ?

Taking Image copy using DSNUTIL option, RESUME=YES with REPLACE=NO

RESUME – Indicates whether data to be loaded into empty/non-empty table space, specifically for non-segmented table space where space remains unused for records deleted.

RESUME = NO – Data to be loaded into a non-empty table space, if TS is not empty, load step will abend with cond code 8

RESUME = YES – Load records into a non-empty table space which will append records at the end of table space

REPLACE – Indicates whether TS and all its indexes to be made empty before loading records.

1. How to run certain steps using jcl ?

Using IEBEDIT utility – “EDIT START=JOBNAME TYPE=INCLUDE STEP= (STEP1, STEP2)”

1. How to identify an empty dataset in jcl ?

PRINT INFILE (IN) COUNT (1) - IDCAMS

REPRO INFILE (INDD) OUTFILE (OUTDD) COUNT (1) - IDCAMS

COUNT FROM (IN) EMPTY - DFSORT

COUNT FROM (INDD) EMPTY – ICETOOL

PRINT DATASET (DSNAME) CHAR COUNT (1) – Will give RC 0 if able to find one rows and gives RC4 if not able to find any rows

Need to use this RC downline for further execution

6. DB2 error codes – 904, 922 , 811

-904 - Resource unavailable - If the resource is table/view, probably caused by contention, retrying may work once the object is made available

If it is a VSAM file, file might be archived/deleted

-922 - Authorization issue

-811 - Multiple row fetch – Result of select/subselect returns more than one row

7. Various sql codes and their solutions – 305 , 805,911

-305 - Null Indicator issue – Null value occurred and no indicator variable defined

-805 - Bind issue(DBRM not bound to plan)

-911 – Deadlock/timeout issue, updates rolled back

8. Can we use Call in CICS?

Yes, we can use call in CICS program.

9. Diff between XCTL, CALL and Link. When we need to use Call/XCTL or Link?

Call and Link are giving the control to the program in lower level and doesn’t expects the control to be returned. XCTL gives control to the program in the same level and expects the control to be returned. CALL provides better performance than LINK.

Main and sub-program are link-edited in call, so call provides better performance

When the program size is less and does not undergo frequent modifications, use CALL than LINK

10. Page up and Page down logic if account number changes(acct no is key)

Store the first and last account number in the COMMAREA

11. In Batch, if we are changing the field length of one of the output GDG file of a job and passing the same to next job. Development is completed with testing. If moved the same to PROD, will the job get abend or not?

Yes, it will ABEND. All the generations of the GDG can contain same/different length

Next job should have the new GDG length

1. VSAM file handling in CICS - STARTBR, READNEXT,READPREV,ENDBR for sequential read and UPDATE during BROWSE for random update in sequential read READ, WRITE,READ with REWRITE AND DELETE for random accessing
2. COMMAREA max length and if we give more data what will happen

32K, Results are unpredictable and LINK command will fail, to overcome the issue, use channels and containers

When commarea length exceeds, it will give region abend

1. Questions on the cics programs that developed and explaining about it relating to the application.
2. what is pseudo conversation, diff between conversational program and Pseudo conversation programming

In pseudo conversational programs resources are released and in conversations programs the resources are being held. They are differentiated by return command to give control to the CICS.

1. When does a cursor materialize?

During OPEN cursor statement

1. Should the DB2 region be up for the precompile, bind steps?

No DB2 region need not be up for pre-compile whereas for bind process, DB2 to be up since regions to be pointer

1. What and how many test cases will you create for a given requirement?

Unit test cases for the changed scenario with correct and incorrect data, teste cases for regression testing.

Empty (No test data) || Positive Scenario || Negative Scenario

1. Paging Logic

Find the maximum number of rows retrieved by the cursor

Fix the maximum number of rows displayed in the page

Store the first and last key values of the screen data and page number details in COMMAREA

20. If you open a cursor and close without fetching will you get error? - No

21. Paging Logic with TSQs

22. Paging Logic with COMMAREA

23. Paging Logic using Cursors – Expectation was different even though we give him a proper solution.

24. How can we make a field disappear on the map based on a given criteria? Eg: “Employee Salary” to disappear for Employee designation higher than Manager.

Instead of defining it as Label with INITIAL in DFHMDF, define it as length field which will display “Employee Salary: “ when Designation >= “Manager” assuming Job level.

25. What is Clustered Index and Clustered Index ratio?

Clustered Index is a special type of index and it defines the order in which data is physically stored in a table and it is created using CREATE INDEX statement with cluster option

CREATE INDEX DEPT\_IX ON EMP (DEPTNO ASC) CLUSTER; Cluster ratio is an indicator of the percentage of table rows that are in the order of the index columns.

1. Have you done a Reorg on a table? For what Clustered Index ratio, Reorg should be performed.

Yes, Reorg is done to reorganize data in tables and good to perform reorg after a mass delete/update operation

1. How will you copy data from a table in production region to development region(existing table with data)?

Use DB2 unload utility to copy data from production and load it using LOAD utility in development region.

Taking image copy of production table data using DSNUTIL option and load using DSNLOAD

1. What will happen to table data if LOAD with RESUME=NO? Why are we adding REPLACE along with RESUME=NO? What will happen if the Fetched data has 0 rows, existing table to be loaded has rows and LOAD with RESUME=NO, REPLACE given? In Which scenario do we use this regularly?

RESUME - Indicates whether records are to be loaded into an empty or non-empty table space. For non-segmented table spaces, space is not reused for rows that have been marked as deleted or for rows of dropped tables.

* 1. NO - Loads records into an empty table space. If the table space is not empty, and you have not used REPLACE, a message is issued and the utility job step terminates with a job step condition code of 8.
  2. YES - Loads records into a non-empty table space. If the table space is empty, a warning message is issued, but the table space is loaded. Loading begins at the current end of data in the table space. Space is not reused for rows that are marked as deleted or for rows of dropped tables.

REPLACE - Indicates whether the table space and all its indexes need to be reset to empty before records are loaded. With this option, the newly loaded rows replace all existing rows of all tables in the table space, not just those of the table that you are loading.

1. Order By necessity for Primary Key with single column.

ORDER BY is not necessary while fetching using primary key column

Eg - SELECT EMP\_ID from EMPTB;

1. What kind of testing is performed other than Unit testing in your account?

Volume/Load testing – Testing done to check the performance of the code for real time scenario’s in production

System Testing – Complete application/process flow testing after the new code changes

1. How do you perform regression testing? Is it really required for simple scenarios (given as examples during interview)?

Regression testing is done to ensure that no impact is done to the existing functionality

1. Have you tested with Production load in Unit test environment? If Yes, How? If No, Why?

For new changes, CMAN library will be mentioned in STEPLIB, whereas remove the STPELIB will point to production load

Note: General question on Working exposure with CICS API.

1. How many GDG's we can create in JCL and how we can create

255 is the limit of GDG versions and we can create using DEFINE GDG using IDCAMS utility

1. How will you refer the GDG version created in prior steps in a Job

Will refer with the same version number created in prior step

In JES2(decentralized), GDG’s/DS are pre-step allocated whereas in JES3(centralized), GDG’s/DS are pre-job allocated

1. How will you run Step 2 and step 4 when we have 4 steps in a Job

IEBEDIT utility and COND parameter

1. What will happen when you run the first step of the job with COND parameter 0,LT

COND parameter will not be referred for first step of JCL

1. What are the steps need to be taken care when you restart a job from particular step

Need to check the step getting restarted is not in IF-END-IF

For temporary datasets, we need to restart from the step which creates temp datasets

RESTART parm should be coded with correct step name which needs to be restarted

Ensure correct versions are used if GDG files are existing in STEP

Ensure that processed records are removed from the input filE

Remove the bad record from file and ensure backup of prod file was taken

1. What is temporary dataset and how will you use it in Job and what happen to the temporary datasets when you restart a job.

Temporary datasets are used in execution of particular instance of a job and it is referred by &&, need to restart from step which creates temporary dataset

Temporary datasets will not be retained after job termination, DISP = (NEW,PASS)

1. -805 abend and difference between 805 and -818. How bind will be successful.

-805 – DBRM not bound to PLAN

-818 – Timestamp mismatch between Load module and PLAN

1. Usual Db2 queires like getting 100 top salaried employees and youngest employee and how will you generate a report only the active employee of a company.

SELECT EID,NAME,SAL FROM EMPTB WHERE E\_STAT = ‘ACTIVE’ ORDER BY SAL DESC

FETCH FIRST 100 ROWS ONLY

1. Life cycle of cursor

Declaration, Open, Fetch and Close, Open,Fetch and close is executable, Declare is not executable

1. What will happen when you open a cursor .

After issuing open statement, SELECT statement identifies a set of rows (uses current values of host variables) and creates resultant table and points to the first row in resultant table

1. When the cursor query results are materialized.

Cursor query results get materialized during Open

1. What are the isolation levels and its uses

CS – Cursor Stability, RR – Repeatable Read , RS – Read Stability , UR – Uncommitted Read

1. Paging logic - He expects using more than one cursors
2. Paging logic using VSAM files. STARTBR and READPREV.
3. What is the use of TSQ.

Created in main memory and does not need any pre-defining with exception of recoverable TSQ(should Be defined in TST)

Records in queue can be randomly accessed using ITEM option and records can be read again

Records can be read, write and deleted from Temporary Storage Queues

Used in passing huge amount of data between transaction

TSQ’s will get deleted automatically

TSQ’s can be used for both input and output operation

1. Difference between CICS screen program and CICS web services program , the steps involved.

Screen program will have map, web service program will have get container() and put container() methods

1. What is DFHCOMMAREA , what is its limitations , how can we solve the limitations

Useful in transferring data/information from one program to another with a maximum length of 32K

Mainly used in passing data transfer between programs and transactions of RETURN, XCTL and LINK commands

1. How the input data from GUI is passed to the COBOL programs( the programs that actually handle the Business logic)?

We can bring using Webservices, MQ, Stored procedures, API, Channels(Request and Response) and Containers

1. Difference between CICS XCTL and CICS LINK call

XCTL programs runs at the same level and returns control to the OS whereas LINK runs one level lower than calling pgm returns control to the called program by RETURN/GOBACK, CALL will be faster than link

1. Can we use COBOL CALL statement in CICS programs ? – Yes
2. Will a XCTL Call - return control to the Calling program? – No returns control to the next upper level
3. How do we identify which AID Key was pressed by the USER? – Using HANDLE AID/EIBAID (Uses WHEN DFHPF\*)
4. Pagination logic – show first 20 records stored in a VSAM file , then how do we implement the scroll logic (PF7 and PF8)
5. Have you developed a CICS screen program from scratch
6. What are the ways to invoke the transactions

By entering transaction identifier

By START and RETURN TRANSID command

Through ATI of TDQ

By registering programs in PLT which will get initiated during CICS startup

START command in programs:

1. Explain more on how you use the START to invoke the transaction

EXEC CICS START TRANSID (‘trans name’)

TIME(hhmmss)| INTERVAL(hhmmss)

FROM(WS-ITEM) LENGTH(WS-LEN)

END-EXEC.

TIME – Time at which transaction to be started || INTERVAL – Defined to start the transaction after a specified interval

1. For an unsorted array of 10 occurrence, pick the largest number

Bubble Sort – Consecutive numbers are compared and highest value will be kept in last position at the end of first iteration to pick the largest number

1. For an unsorted array of 10 occurrence, pick the second largest number – Can get using bubble sort with second iteration
2. In DB2 table, For a column value, need the next 2 max and min number(DB2 query)

SELECT EMP\_ID FROM EMPTB WHERE EMP\_ID NOT IN (SELECT EMP\_ID FROM EMPTB ORDER BY EMP\_ID FETCH FIRST 2 ROWS ONLY)

ORDER BY EMP\_ID FETCH FIRST 2 ROWS ONLY; (Use DESC in ORDER BY for next 2 MAX)

N-1

1. For a file which has fields emp id, name, sal, sex, location - how do you get(Cobol pseudo code is expected) –

the total salary for a particular location

the number of male/female emp list

1. S0C7 - how do you resolve in production

Data exception occurs due to non-numeric operation on a numeric field

1. About online experience (how inputs from front end comes into CICS program if we are using any other system as front end instead of map).
2. How to read 10 records sequentially in a VSAM file in CICS (line by line syntax is required).

EXEC CICS STARTBR to establish the position|| READNEXT command to read the file sequentially

Move LOW\_VAL to read from top and HIGH-VAL to read from bottom

1. What is the DFHCOMMAREA maximum length and how to handle the error caused when the data exceeds maximum length.
2. What are the CICS responses (error) we need to handle while reading/writing an online file.

NOTFND,IOERR,LENGERR

1. What are the validations we need to take while validating a date field in a COBOL program.

Date field should be numeric

Century should not be zero, but YY can be zero

Month cannot be less than 01 and > 12

Date cannot be less than 01 and > 31

If the month is Feb, For leap year (CURR-YEAR/4) if giving remainder is zero, then should be leap year

1. How to find the end of a COMP-3 field without using the copy book layout and tools like file-aid.

With HEX ON, Comp-3 field will have sign at the end of numeric value (Will have C for positive, D for negative and F for unsigned in trailing)

1. Compare two files based on a common field (Department code) and need to write the desired fields in a third output file if the common field matches.

File1 fields are Employee ID, Name, Salary, Department code and File2 fields are Department code and HOD name. File3 should have the fields Employee ID, Department code and HOD name.

1. JCL sort card to copy only records with employee\_location (Chennai and Hyderabad)

INCLUDE COND = (1,7,CH,EQ C’CHENNAI’ OR 1,9,CH,EQ,C’HYDERABAD’)

1. For an unsorted array of 10 occurrence, pick the largest and smallest number without using intrinsic COBOL function ORD\_MAX/ORD\_MIN.
2. Scenario: Key for a KSDS is Emp ID. We have to display Emp id 1 to 5, 1001 to 1005 and 10001 to 10005 on screen. How can this be done?
3. What are the error scenarios to be handled for above?
   1. Row not found condition, EOF. Other than this rarely used condition to check password to access the vsam file.
4. Can a rec 1 to 10 be displayed in reverse order on screen like 10 to 1? How?
5. How can a transaction be started? What is ATI and how is it achieved?
   1. Using START command.
   2. Using ATI definition on TDQ’s. Here a threshold of number of rows will be defined as trigger level, once the threshold is reached the associated tran id will be initiated.
   3. Using RETURN command.
   4. Thru manual entry of the tran id on the screen.
   5. Thru MQ’s. Additionally this is also applicable for distributed environments unlike the above ones.
6. Scenario: A JCL pass value '1' to a program where it is accepted into X(4) variable. How can this be stored on a table which has id as numeric?
   1. We can simple move the parm value to a number 9(n) variable.
   2. Or we can use intrinsic function NUMVAL.
   3. Move 1 to WS-VAR and use INSPECT to identify numeric value and pass it to DB2 numeric value

WS-VAR - bb1b

INSPECT WS-VAR TALLYING WS-COUNT1 FOR LEADING SPACES

COMPUTE WS-ST-POS = WS-COUNT1+1

INSPECT WS-VAR TALLYING WS-COUNT2 FOR TRAILING SPACES

COMPUTE WS-TR-POS

Move ws-var(3:1) to ws-num

1. Scenario: From a flat file of ATM transactions, acc#, month and count of transactions needs to be displayed for each account no for every month. How can this be done without using aggregate functions? If account name also has to be displayed which is fetched from another file, how can this be achieved? Which file will be the outer file in loop?
   1. We can use joinkeys with assumptions that the name file contains the full list of account #. On the sort field we could use acc# and month and on the sum fields we can used the transaction count. Conversion of date to month can be achieved using date function. This needs to be set in INREC.
   2. Using cobol program, implementing the usual match logic and on top of that accumulating the transaction count and writing output file on the change of account number of month.
2. What is the use of RETURN()? RETURN() and EIBCALEN can be cheked in regular programs also. Then how additional of this makes program pseudo-conversational?
   1. RETRUN is used to transfer the control back to CICS. In addition to this we can also state the tran id to which the control is to be returned back when receiving any functional or attention key.
   2. EIBCALEN is used to check the length of commarea. For the first time call, this will be zero, for the second or subsequent calls this will be non-zero.
3. How to identify the key pressed on screen to be PF8 or PF7?
   1. EIBAID (DFHAID copybook) is used to check the function key.
4. What is restart and what are the steps to be taken care in restart?
   1. Restart is a procedure to recover from an unexpected failure.
   2. Restart procedure needs to have following logic.
      1. Logic to identify if the run is a first time run or a restarted one.
      2. Need to have a restart file or a table to update the progress of the program.
      3. Need to identify  the number of records or the last record key that was successfully processed in the previous run. Skip that many number of records from input file from processing again.
      4. Need to commit changes on a certain threshold and also save the record details of the last input record in the restart file or table.
      5. If the output is file then it could be defined as GDG. In case of restart, the contents of the previous GDG needs to be copied to the current generation.
5. Scenario: If a job abended in btw and few records were committed, how can the job be restarted?
   1. If restart logic is present in the program not additional handling is required in the program.
   2. If restart logic is not present, then it needs to be done manually.
      1. Backup input file, remove input records till the point it was successfully committed.
      2. Backup output files if any and restore the backup records after successful completion of the restart.
   3. Further options could be determined thru the existing functionality of the program.
6. How can the above be handled in VSAM?
   1. Instead of skipping input records, we can get the key from restart table and do a skip sequential read.
7. How to identify key that was last used before page up and down?
8. On a 3270 screen, if a field is changed from 9(5) to 9(10). How will the analysis for this change be done and what all will be considered? If the field is changed to 9(10) COMP will it need changes?

If field is in copybook, then programs which uses the copybook needs to be re-compiled

If field in change is moved to other fields, then programs in which new field is moving needs to be modified

1-4 – 2bytes || 5-8 – 4bytes for COMP || 9-18 – 8 bytes

Cobol variable name should not exceed 30 bytes and for numeric variable it is 18 bytes

1. How to read 2 flat files of different length and number of records (Employee details and Department details with employee number in common), and to write common records to the output file?

1. Till last week a job was taking 30 sec to run. But from last Saturday we are noticing that job runs for 5 to 6 minutes. This is invoking a COBOL-DB2 program which records from, table, does some calculation and writes to output file. When asked to analyse what will be the approach to find root cause and solve it?

Check if there is spike in volume of records

Since this involves retrieving data from table, check if any contention’s are there

Query optimization

1. A non DB2 program processing huge amount of records is running for 30 minutes now. Client wants us to optimize the code. What do u suggest to be done for it?

File contention, check if file is used by multiple jobs

Avoid cobol sort

When performing arithmetic, always use signed numeric fields. COBOL performs faster with signed fields than unsigned fields

If you use SEARCH in COBOL, it is better to use SEARCH ALL

Using indexes to address a table is more efficient than using subscripts since the index already contains the displacement from the start of the table and does not have to be calculated at run-time

1. A program has singleton select. Recently it encountered 811 error, which is for multi-row fetch. What value will be present in host variable? 1st row value or 2nd row value?

If SQLCODE is > 0, then data rows from table should not be fetched

1. There is a DB2 requirement for which DBA is taking long time to create table. But I want my code to be ready and binding done. Can compilation and binding be done now?

Use VALIDATE = NO in bind card to avoid usage of table validation, this is applicable only for existing table but we want to add new fields in such case we can use VALIDATE.

If no table is existing, then bind will fail

1. Any challenging scenario which you have experienced in your career and involvement from your part and whether any code development done for the same.

File status Codes