AS400 QUESTIONS

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1. AS400 was a result of what?
   Silver Lake Project at IBM
2. When was it created?
   Jun 21st 1988
3. System archi? DB used?
   System architecture:-
   a) Application software
      - Top layer
      - Direct contact with user
      - Acts as interface b/w user and AS400
      - Comes with sys supplied functions like PDM
   b) Operating System Software
      - Second layer
      - Manages system resources
      - Copying and deleting files etc – CL
   c) System Licensed Internal Code (SLIC)
      - Deepest layer
      - No contact with users
      - Security, communications etc.

   Database used → DB2

4. Utilities?
   ADTS (Application Development Tool Set)
   a) PDM → Program Development Manager – STRPDM
      Allows user to navigate through various physical files
   b) SEU → Source Entry Utility – STRSEU
   c) SDA → Screen Design Aid – STRSDA
   d) RLU → Report Layout Utility – STRRLU
   e) DFU → Data File Utility – STRDFU
      Used to make data entry directly into database files
5. Client access softwares?
   Enable communications between client and server
   - MOCHA SOFT (TN5250)
   - RENEX
   - RUMBA/400
   - IBM Personal Communication
6. ASP?
   Auxiliary Storage Pool
   Logical partitioning of hard disk space. Libraries lies within this ASP.
7. What is an as400 library? Root library?
   Library is a system object that acts as a directory to other objects
   Root library → QSYS
8. What are the types of libraries?
   a) System library → Starts with Q or #
   b) Product Library → Gets added to sys library when we use some products and gets removed after the job is done.
   c) Current Library → Library in which we are currently working
   d) User Library → Created by user

9. Library type?
   *PROD → Default type. *PROD libs can specify whether or not the files can be updated or deleted while the file is in debug mode. (Update production files -- *NO / *YES)
   *TEST → Can be modified even if stated *NO in debug mode
10. A max of how many libs can be defined for a job?
    25
11. A max of how many libs can be defined in a lib list?
    15 system libraries and 250 user libs
12. Source phy file?
    The file that contain the actual data
13. Command to create source phy file?
    CRTSRCPF
14. Standard record length for srcpf?
    The source sequence number contains 6 bytes, Date 6 contains bytes and the source statement contains 80 bytes.
    QRPGSRC, QDDSSRC, QDDLSRC, QCLSRC, QCMDSRC, etc - record length of 92
    QRGLESRC - a record length of 112 (92 default + 20 bytes of comment)
15. Additional parameters?
    MAXMBRS
    MBR
16. What is a job in as400?
    A job in AS400 is a unit of work that the system performs. It could be a request to run a program, print a report, or update data.
17. Types of jobs?
    - Interactive Jobs: Executed in response to user commands in real time.
    - Batch Jobs: Scheduled and run in the background without user intervention.
    - System Jobs: Internal tasks that the system performs to manage resources and operations.
18. What is a job name composed of?
    - Job Name: Assigned by the user.
    - User Name: The name of the user who submitted the job.
    - Job Number: Assigned by the system to uniquely identify the job.
19. Flow of a batch job?
    SBMJOB → JOBQ → ACTIVE (Enters subsys) → OUTQ → PRINTER (WRKSPLF)
20. Define : job priority
    Job priority determines the order in which jobs are selected for processing. It can be set from 1 (highest priority) to 99 (lowest priority).
21. output q?
    An output queue is a holding area where the system places the output of jobs until they are ready to be printed or processed further.
22. Run priority?
    Run priority determines the execution priority of a job when multiple jobs are running concurrently. Lower run priority values indicate higher importance.
23. Concatenating strings in as400?
    ||, *CAT(Simple concatenate), *TCAT (Trim and concatenate), *BCAT (Blank and concatenate)
24. CL logical exp?
    CL logical expressions are used to evaluate conditions. Operators include *EQ (equal), *NE (not equal), *LT (less than), *GT (greater than), etc.

25. GOTO command?
    The GOTO command in CL (Control Language) is used to transfer control to a labeled statement within the program.
26. DO-ENDDO ELSE-IF?
    DO and ENDDO are used to define a block of code that executes in a loop. ELSE and IF are used for conditional branching within the loop.
27. CALL command?
    Call a pgm in AS400
28. ENDPGM & RETURN
    ENDPGM marks the end of a CL program, while RETURN is used to return from a called program to the calling program.
29. QCMDEXC api?
    QCMDEXC is an API in AS400 used to execute a command within a CL program.
30. Commands for subroutines in CL?
    SUBR, ENDSUBR, CALLSUBR,RTNSUBR
31. CL400 difference between Copy File and CRTDUPOBJ command?
    - COPY FILE is used to copy records from one file to another, while CRTDUPOBJ is used to create a duplicate of an object (e.g., file, program) in AS400.
    - CPYF creates a physical file always if needed. CRTDUPOBJ can create any kind of file.
32. Types of monmsgs?
    Program Level MONMSG is used to handle errors at a higher level, encompassing the entire program. It allows you to manage exceptions that occur during the execution of any part of the program. (Can use only GOTO)
    Command Level MONMSG is used to handle errors for a specific command. It allows you to manage exceptions that occur during the execution of that particular command.
33. CPF0000 vs CPF9999
    CPF0000: A generic message identifier that can trap all CPF messages (CPF0000-CPF9999). Used in error handling to monitor various error conditions.
    CPF9999: Represents a high-level error message, typically used to capture undefined error conditions or the most severe errors.
34. Data areas ? How to define? Op codes related to data areas?
    Data areas are storage locations used to store and retrieve small amounts of data. They are useful for inter-program communication or storing system values.
    DS Type U: Define a data structure with type U (for data area). Use the DTAARA keyword.
    IN, OUT, UN(Unlock previously locked data area)
35. Local and group data area?
    Local Data Area (LDA): Unique to each job and holds job-specific data.
    Group Data Area (GDA): Shared among all jobs in a job group, used for inter-job communication within the group.
36. A phy file is composed of?
    Records: Collection of related fields.
    Fields: Individual pieces of data.
    Member: A set of records.
37. Entry levels in phy file and keywords?
    File Level – UNIQUE, FIFO,LIFO,FCFO,REF,REFFLD
    Record Format Level – FORMAT, TEXT
    Field Level –
    ALIAS,ALWNULL,CMP/COMP,COLHDG,DATFMT,DATESEP,REFFLD,TEXT,TIMFMT,TIMSEP,VALUES,VARLEN

Key Field Level-ABSVAL,DESCEND,DIGIT,SIGNED,UNSIGNED

38. Logical file?

A Logical file (LF) with Keys are Access path (INDEX) over the physical file (PF)

A Logical file (LF) with no key are VIEWS over the physical file (PF).

If there is/are Logical files (LF) present for a physical file (PF) then we cannot delete Physical file (PF) until and unless we delete all the dependent Logical files (LF) over that physical file (PF). But Logical file (LF) can be deleted without deleting the Physical file (PF) first.

39. Types of LF?

Non-Join Logical File

Single Record Format Logical File

File level keyword -- PFILE

Multiple Record Format Logical File

Join Logical File (LF)

File level – JDFTVL(LEFT OUTER JOIN)

Join level – JDUPSEQ,JOIN,JFLD

Record – JFILE

Field – JREF

40. Journaling steps

CRTJRNRCV → CRTJRN → STRJRN → ENDJRN

41. Tables in DDL/SQL?

In DDL/SQL, tables are used to store structured data and can be created using the CREATE TABLE statement.

42. Difference bw index and view?

Index: Improves the speed of data retrieval operations on a table.

View: Provides a virtual table representing the result of a query on one or more tables.

43. Different types of sql joins?

INNER JOIN: Returns records with matching values in both tables.

LEFT JOIN: Returns all records from the left table and matched records from the right table.

RIGHT JOIN: Returns all records from the right table and matched records from the left table.

FULL JOIN: Returns all records when there is a match in either table.

44. CL vs RPGLE

a. Start of pgm
b. File declaration
c. Variable def
d. Operations
e. End of pgm
f. Parameters
g. Error handling
h. Concat strings

Task	RPGLE	CL
Start of Program		PGM
File Declaration	F Spec	DCLF
Variable Def.	D Spec VAR A, B, C	DCL VAR(&a) TYPE(*DEC) LEN(10 0)
Operations	C-Spec command EVAL	CHGVAR
End of Program	*INLR='1' OR RETURN	ENDPGM
Parameters	PLIST	ACCEPT IN PGM COMMAND
Error Handling	MONITOR OR %ERROR	MONMSG
Concat String	EVAL STR= A+B	CHGVAR &STR VALUE(STR_A *CAT STR_B)
Concat String	EVAL STR= A+B	CAN ALSO USE *CAT, *TCAT, *BCAT

45. Source file and file type of CL?
    QCLSRC, CLP
46. Debugging in CLP?
    Source view option → *SRCDBG
47. Debugging in RPGLE?
    *NODEBUGIO, SOURCE
48. Debugging in ILE?
    Same as CLP
49. IF ELSE in rpgle vs clp
    Rpgle requires endif, clp requires ENDDO
50. CL is what kind of model?
    OPM (Original Program Model) Object-Process Methodology
51. How to read and write records in CLP?
    Rcvf,sndrcvf
52. Loops in CLP?
    DOUNTIL, DOWHILE, FOR
53. How to clear msg history in clp?

    CLRMSGQ <username>

54. What is an array in as400?How to define?
    Standalone and DIM
55. Types of array in as400 and how to eneter each one?
    Types of Array
    1) Compile time array : The compile time array means the elements of the array will be loaded before the execution of the programs i.e. at compile time. (static values)
    We must declare in keyword command DIM (), CTDATA (), and PERRCD ()
    2) Pre-runtime array
    In pre-runtime array, we maintain the array element in separate file. Hence, if we are making any change in array element we can just change this file containing the array element; we don't need to compile the source program again and again as in compile time array.
    Flat files : Files without any structure

    CRTPF COMMAND WITH RECORD length will create a flat file
    CRTPF FILE(FLATFILE) RCDLEN(500)
    To view flatfiles : DSPPFM FILE(EASYCLASS1/FLATFILE1)

    3) Run time array
    The run time array means the value will be loaded during the runtime only. (Dynamic)

56. Array indexing and initialisation?
    ArrayName(1) = 'FirstElement'
    ArrayName(2) = 'SecondElement'
57. Searching, sorting and summation in array?
    %lookup,SORTA,%xfoot
58. Data structure in as400 and how to define it?
    To break fields into subfields
    To Group fields
    To change the format of the field
    To Group non-contiguous data into contiguous format

To convert data.

59. Types of DS?

Types of data structures in as/400:

I. program described data structure
II. EXTERNALLY DESCRIBED DATASTRUCTURE
III. MULTIPLE OCCURENCE DATASTRUCTURE
IV. INDICATOR DATA STRUCTURE : The indicator data structure is used to rename the indicators used in our program with the name that is more meaningful and understanding.
V. DATA AREA DATA STRUCTURE (SPECIFIED IN 'U')
VI. PROGRAMME STATUS DATASTRUCTURE (SPECIFIED IN 'S')

A program status data structure (PSDS) can be defined to make program exception/error information available to the program so that the necessary action can be taken for the unhandled exception. The exception /errors can be Divide by zero, array index out-of-bound, Invalid Date, Time or Timestamp value. The PSDS must be defined in the main source section; therefore, there is only one PSDS per module.

VII. FILE INFORMATION DATASTRUCTURE[minimum RRN/first RRN]

A file information data structure (INFDS) can be defined for each file to make file exception/error and file feedback information available to the program.

60. Subfile and basic parameters?

A subfile is a feature in AS400 that allows you to display a list of records on a screen. Basic parameters for subfile operations include:
SFL: Define subfile records.
SFLCTL: Define subfile control operations.
SFLSIZ: Specify the subfile size.
SFLPAG: Specify the subfile page size.

61. Maximum number of records that can be loaded into a subfile?

9999

62. Subfile record formats?

Control Record Format (SFLCTL): Used to control subfile operations.
Subfile Record Format (SFL): Used to define the layout of subfile records.

63. Types of subfiles?

1) Single page
2) Load all
3) Elastic/Expandable

64. Subfile steps?

Clear, Load Display

65. Indicators for subfile?

SFLDSP: Display the subfile.
SFLDSPCTL: Display the subfile control
SFLCLR: Clear the subfile.
SFLEND: End of subfile processing.
SFLINZ: Initialize subfile.
SFLNXTCHG

66. Override scope parameter in cl?
    The override scope parameter (OVRSCOPE) in CL determines the scope of a file override. It can be set to:
    *JOB: Override applies to all programs in the job.
    *CALLLVL: Override applies to the current call level.
    *ACTGRP: Override applies to the current activation group.
67. Various specs in RPGLE?
68. How to rename the rcdfmt of any file?
    Ffilename IF   E   K DISK   RENAME(newrcdfmt)
69. What do you mean by an activation group in ILE?
    An activation group in Integrated Language Environment (ILE) is a resource container that manages the activation and resource usage of programs. Activation groups allow for modular programming and control over the scope and lifespan of resources used by the programs.
70. How to define a procedure in ILE?
71. Types of procedure calls?
72. Steps to create an internally described and externally described report?
73. SQL message diagnostics?
74. Types of cursors?
75. How to check error codes using SQLCODE?
    100 – EOF
    0 – SUCCESS
    <0 – ERROR
76. Types of queries in sql?
    Static using host variables and dynamic query by preparing executing sql strings
77. How to perform order by on subfile field names?
    RTNCRSLOC(&RECORD &FLD &POS)
78. Scrollable cursors?
79. Reading opcodes in RPGLE?
    READ, READE, READP, READPE, READC
80. Difference between return and INLR?
    Inlr => all the files will be closed, clear the memory.
    Return => closing will not happen, variable values will not be cleared unlike inlr. It will conflict with other program like if next program dont have intialization for those variables using again, it will retain the value of prev progam.
81. NODEBUGIO and SRCSTMT in H spec?
    *{NO}SRCSTMT: If *NOSRCSTMT is coded or this statement is excluded (*NOSRCSTMT is the default),statements will be re-numbered when compiling the program. If your program gets a run-time error, the statement indicated will be virtually useless unless you have a copy of compile. *SRCSTMT will prevent the compiler from renumbering the program's statements.
    *{NO}DEBUGIO: If you use the interactive source debugger to step through a program, you'll notice that the debugger will break many times on every I/O statement. This is because a separate breakpoint is inserted for every field returned from the I/O buffer. This is not a major problem, and very inconvenient. Coding *NODEBUGIO will break only once for each I/O statement.
82. Dynamic select in LF?

Dynamic select in Logical Files (LF) in AS400 allows you to specify selection criteria that can be dynamically adjusted at runtime. This is typically achieved using the S (Select) and OVRDBF (Override Database File) commands.

83. Datatypes in dds?

Data type --> A char

P packed decimal (2 digits occupy 1 byte) 5 or 6 bytes [default]

S zoned decimal (1 digit occupy 1 byte) 10 byteS

Date -- D

84. RPG III specs?

H : Control specification . This is also present in next version of RPG which is RPGLE/RPGIV

F : File specification. This is also present in next version of RPG which is RPGLE/RPGIV

E : Extension spec(s) are next, and describe arrays and tables, which may be prefetched from disk files (an Input table), drawn from constants placed at the end of the source between ** and /* symbols, or built from calculations. This is not present in RPGLE/RPGIV. Arrays are defined in D-SPEC

L: Line Counter spec(s) are next, and if present, describe the form to be printed. It defines the number of lines in a page and the positions where printing begins and ends. This is not present in RPGLE/RPGIV

I : Input specs are next, and describe the data areas within files. RPG II permits redefinition of data areas so that a field named FLDA might occupy the same area as an array AR that contains 8 elements of 1 character each. Non-record areas such as data structures can be described. Depending on the values of the input record, indicators may be conditioned. This is not present in RPGLE/RPGIV

C Calculation spec(s) are next. Total fields may be described and accumulated. Complex computations and string manipulations are possible. Indicators may be conditioned. This is present in RPGLE/RPGIV

O : Output specifications, which describe the output record in terms of fields and output positions.

This is present in RPGLE/RPGIV

In rpgle/rpgiv new specification for field definition got added which is D-SPEC. E/L/I spec got dropped in RPGLE

85. Data types in DDS?

A : Character

P : Packed decimal (2 digits occupy 1 byte) 5 or 6 bytes

S : zoned decimal (1 digit occupy 1 byte) 10 bytes

L : Date

t : Time

z : timestamp

86. Correct sequence of sql clause?

SELECT

FROM

JOIN-ON

WHERE-EXISTS-NOT EXISTS

AND-ALL-LIKE

GROUP BY

HAVING

ORDER BY

87. Steps to create service pgm?

Create service interface → CRTSRVPGM→ Bind in directory

88. ADD and MOVE opcodes in RPG III?

Z-ADD/Z-SUB : This is basically used to initialize numeric variables.

Z-ADD opcode will make variable as 0 and then add the value in factor 2 to that.
Z-ADD 2 A (Here A will contain value of 2).

Z-SUB opcode will make variable as 0 and then Subtract the value in factor 2 to that.
Z-SUB 2 A (Here A will contain value of -2)

ADD/SUB/DIV/MULT : These opcodes are used for arithmetic addition/subtraction/division/multiplication.

MOVEL

The MOVEL operation transfers characters from factor 2 to the result field. Moving begins with the leftmost character in factor 2. You cannot specify resulting indicators if the result field is an array. You can specify them if the result field is an array element, or a non-array field.

MOVE (Move)

- The MOVE operation transfers characters from factor 2 to the result field.
- Moving starts with the rightmost character of factor 2.
- When moving Date, Time or Timestamp data, factor 1 must be blank unless either the source or the target is a character or numeric field.
- If factor 2 is longer than the result field, the excess leftmost characters or digits of factor 2 are not moved.
- If the result field is longer than factor 2, the excess leftmost characters or digits in the result field are unchanged, unless padding is specified.
- If factor 2 is shorter than the length of the result field, a P specified in the operation extender position causes the result field to be padded on the left after the move occurs.
- A MOVE operation does not change the length of a variable-length result field.

ADDUR :-

The ADDDUR operation adds the duration specified in factor 2 to a date or time and places the resulting Date, Time or Timestamp in the result field.
Duration can be defined as *M/*D/*Y along with factor 2 or extended names like *MONTHS/*DAYS/*YEARS

Syntax is
DATE ADDDUR VALUE:DURATION RESULT
Duration can be defined as *M/*D/*Y along with factor 2 or extended names like *MONTHS/*DAYS/*YEARS

89. CAS and CAB?

CAS (Compare And Set): Compares and sets a value based on a condition.
CAB (Compare and Branch): Compares and branches to a specified label.

90. Loops in RPG III?

Loops in RPG III can be implemented using DO and DOU (Do Until) statements.

```
C       DO    LoopCount
C       ENDDO

C       DOU   Condition
C       ENDDO
```

91. Opcode to parse XML files?

XML-INTO

92. How to parse XML from IFS?

93. Namespace?

Namespaces are used to define the scope of element and attribute names in XML. They prevent name conflicts by qualifying names with a unique identifier.

94. Options in XML?
95. ifs_read and write?