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SQL questions and answers

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1. What is a Cartesian product? What causes it?
Expected answer:
A Cartesian product is the result of an unrestricted join of two or more tables. The result set of a three table Cartesian product will have x * y * z number of rows where x, y, z correspond to the number of rows in each table involved in the join. It is causes by specifying a table in the FROM clause without joining it to another table.
2. What is an advantage to using a stored procedure as opposed to passing an SQL query from an application.
Expected answer:
A stored procedure is pre-loaded in memory for faster execution. It allows the DBMS control of permissions for security purposes. It also eliminates the need to recompile components when minor changes occur to the database.
3. What is the difference of a LEFT JOIN and an INNER JOIN statement?
Expected answer:
A LEFT JOIN will take ALL values from the first declared table and matching values from the second declared table based on the column the join has been declared on. An INNER JOIN will take only matching values from both tables
4. When a query is sent to the database and an index is not being used, what type of execution is taking place?
Expected answer:
A table scan.
5. What are the pros and cons of using triggers?
Expected answer:
A trigger is one or more statements of SQL that are being executed in event of data modification in a table to which the trigger belongs. Triggers enhance the security, efficiency, and standardization of databases.
Triggers can be beneficial when used:
– to check or modify values before they are actually updated or inserted in the database. This is useful if you need to transform data from the way the user sees it to some internal database format.
– to run other non-database operations coded in user-defined functions
– to update data in other tables. This is useful for maintaining relationships between data or in keeping audit trail information.
– to check against other data in the table or in other tables. This is useful to ensure data integrity when referential integrity constraints aren't appropriate, or when table check constraints limit checking to the current table only.
6. What are the pros and cons of using stored procedures. When would you use them?
7. What are the pros and cons of using cursors? When would you use them?

This one always gets asked. For a while the database interview questions were limited to Oracle and generic database design questions. This is a

set of more than a hundred Microsoft SQL Server interview questions. Some questions are open-ended, and some do not have answers.

1. What is normalization? - Well a relational database is basically composed of tables that contain related data. So the Process of organizing this data into tables is actually referred to as normalization.

2. What is a Stored Procedure? - Its nothing but a set of T-SQL statements combined to perform a single task of several tasks. Its basically like a Macro so when you invoke the Stored procedure, you actually run a set of statements.

3. Can you give an example of Stored Procedure? - sp_helpdb , sp_who2, sp_renamedb are a set of system defined stored procedures. We can also have user defined stored procedures which can be called in similar way.

4. What is a trigger? - Triggers are basically used to implement business rules. Triggers is also similar to stored procedures. The difference is that it can be activated when data is added or edited or deleted from a table in a database.

5. What is a view? - If we have several tables in a db and we want to view only specific columns from specific tables we can go for views. It would also suffice the needs of security some times allowing specfic users to see only specific columns based on the permission that we can configure on the view. Views also reduce the effort that is required for writing queries to access specific columns every time.

6. What is an Index? - When queries are run against a db, an index on that db basically helps in the way the data is sorted to process the query for faster and data retrievals are much faster when we have an index.

7. What are the types of indexes available with SQL Server? - There are basically two types of indexes that we use with the SQL Server. Clustered and the Non-Clustered.

8. What is the basic difference between clustered and a non-clustered index? - The difference is that, Clustered index is unique for any given table and we can have only one clustered index on a table. The leaf level of a clustered index is the actual data and the data is resorted in case of clustered index. Whereas in case of non-clustered index the leaf level is actually a pointer to the data in rows so we can have as many non-clustered indexes as we can on the db.

9. What are cursors? - Well cursors help us to do an operation on a set of data that we retreive by commands such as Select columns from table. For example : If we have duplicate records in a table we can remove it by declaring a cursor which would check the records during retreival one by one and remove rows which have duplicate values.

10. When do we use the UPDATE_STATISTICS command? - This command is basically used when we do a large processing of data. If we do a large amount of deletions any modification or Bulk Copy into the tables, we need to basically update the indexes to take these changes into account. UPDATE_STATISTICS updates the indexes on these tables accordingly.

11. Which TCP/IP port does SQL Server run on? - SQL Server runs on port 1433 but we can also change it for better security.

12. From where can you change the default port? - From the Network Utility TCP/IP properties –> Port number.both on client and the server.

13. Can you tell me the difference between DELETE & TRUNCATE commands? - Delete command removes the rows from a table based on the condition that we provide with a WHERE clause. Truncate will actually remove all the rows from a table and there will be no data in the table after we run the truncate command.

14. Can we use Truncate command on a table which is referenced by FOREIGN KEY? - No. We cannot use Truncate command on a table with Foreign Key because of referential integrity.

15. What is the use of DBCC commands? - DBCC stands for database consistency checker. We use these commands to check the consistency of the databases, i.e., maintenance, validation task and status checks.

16. Can you give me some DBCC command options?(Database consistency check) - DBCC CHECKDB - Ensures that tables in the db and the indexes are correctly linked.and DBCC CHECKALLOC - To check that all pages in a db are correctly allocated. DBCC SQLPERF - It gives report on current usage of transaction log in percentage. DBCC CHECKFILEGROUP - Checks all tables file group for any damage.

17. What command do we use to rename a db? - sp_renamedb 'oldname' , 'newname'

18. Well sometimes sp_reanmedb may not work you know because if some one is using the db it will not accept this command so what do you think you can do in such cases? - In such cases we can first bring to db to single user using sp_dboptions and then we can rename that db and then we can rerun the sp_dboptions command to remove the single user mode.

19. What is the difference between a HAVING CLAUSE and a WHERE CLAUSE? - Having Clause is basically used only with the GROUP BY function in a query. WHERE Clause is applied to each row before they are part of the GROUP BY function in a query.

20. What do you mean by COLLATION? - Collation is basically the sort order. There are three types of sort order Dictionary case sensitive, Dictonary - case insensitive and Binary.

21. What is a Join in SQL Server? - Join actually puts data from two or more tables into a single result set.

22. Can you explain the types of Joins that we can have with Sql Server? - There are three types of joins: Inner Join, Outer Join, Cross Join

23. When do you use SQL Profiler? - SQL Profiler utility allows us to basically track connections to the SQL Server and also determine activities such as which SQL Scripts are running, failed jobs etc..

24. What is a Linked Server? - Linked Servers is a concept in SQL Server by which we can add other SQL Server to a Group and query both the SQL Server dbs using T-SQL Statements.

25. Can you link only other SQL Servers or any database servers such as Oracle? - We can link any server provided we have the OLE-DB provider from Microsoft to allow a link. For Oracle we have a OLE-DB provider for oracle that microsoft provides to add it as a linked server to the sql server group.

26. Which stored procedure will you be running to add a linked server? - sp_addlinkedserver, sp_addlinkedsrvlogin

27. What are the OS services that the SQL Server installation adds? - MS SQL SERVER SERVICE, SQL AGENT SERVICE, DTC (Distribution transac co-ordinator)

28. Can you explain the role of each service? - SQL SERVER - is for running the databases SQL AGENT - is for automation such as Jobs, DB Maintanance, Backups DTC - Is for linking and connecting to other SQL Servers

29. How do you troubleshoot SQL Server if its running very slow? - First check the processor and memory usage to see that processor is not above 80% utilization and memory not above 40-45% utilization then check the disk utilization using Performance Monitor, Secondly, use SQL Profiler to check for the users and current SQL activities and jobs running which might be a problem. Third would be to run UPDATE_STATISTICS command to update the indexes

30. Lets say due to N/W or Security issues client is not able to connect to server or vice versa. How do you troubleshoot? - First I will look to ensure that port settings are proper on server and client Network utility for connections. ODBC is properly configured at client end for connection ——Makepipe & readpipe are utilities to check for connection. Makepipe is run on Server and readpipe on client to check for any connection issues.

31. What are the authentication modes in SQL Server? - Windows mode and mixed mode (SQL & Windows).

32. Where do you think the users names and passwords will be stored in sql server? - They get stored in master db in the sysxlogins table.

33. What is log shipping? Can we do logshipping with SQL Server 7.0 - Logshipping is a new feature of SQL Server 2000. We should have two

SQL Server - Enterprise Editions. From Enterprise Manager we can configure the logshipping. In logshipping the transactional log file from one server is automatically updated into the backup database on the other server. If one server fails, the other server will have the same db and we can use this as the DR (disaster recovery) plan.

34. Let us say the SQL Server crashed and you are rebuilding the databases including the master database what procedure to you follow? - For restoring the master db we have to stop the SQL Server first and then from command line we can type SQLSERVER –m which will basically bring it into the maintenance mode after which we can restore the master db.
35. Let us say master db itself has no backup. Now you have to rebuild the db so what kind of action do you take? - (I am not sure- but I think we have a command to do it).
36. What is BCP? When do we use it? - BulkCopy is a tool used to copy huge amount of data from tables and views. But it won't copy the structures of the same.
37. What should we do to copy the tables, schema and views from one SQL Server to another? - We have to write some DTS packages for it.
38. What are the different types of joins and what dies each do?
39. What are the four main query statements?
40. What is a sub-query? When would you use one?
41. What is a NOLOCK?
42. What are three SQL keywords used to change or set someone's permissions?
43. What is the difference between HAVING clause and the WHERE clause?
44. What is referential integrity? What are the advantages of it?
45. What is database normalization?
46. Which command using Query Analyzer will give you the version of SQL server and operating system?
47. Using query analyzer, name 3 ways you can get an accurate count of the number of records in a table?
48. What is the purpose of using COLLATE in a query?
49. What is a trigger?
50. What is one of the first things you would do to increase performance of a query? For example, a boss tells you that "a query that ran yesterday took 30 seconds, but today it takes 6 minutes"
51. What is an execution plan? When would you use it? How would you view the execution plan?
52. What is the STUFF function and how does it differ from the REPLACE function?
53. What does it mean to have quoted_identifier on? What are the implications of having it off?
54. What are the different types of replication? How are they used?
55. What is the difference between a local and a global variable?
56. What is the difference between a Local temporary table and a Global temporary table? How is each one used?
57. What are cursors? Name four types of cursors and when each one would be applied?
58. What is the purpose of UPDATE STATISTICS?
59. How do you use DBCC statements to monitor various aspects of a SQL server installation?
60. How do you load large data to the SQL server database?
61. How do you check the performance of a query and how do you optimize it?
62. How do SQL server 2000 and XML linked? Can XML be used to access data?
63. What is SQL server agent?
64. What is referential integrity and how is it achieved?
65. What is indexing?
66. What is normalization and what are the different forms of normalizations?
67. Difference between server.transfer and server.execute method?
68. What id de-normalization and when do you do it?
69. What is better - 2nd Normal form or 3rd normal form? Why?
70. Can we rewrite subqueries into simple select statements or with joins? Example?
71. What is a function? Give some example?
72. What is a stored procedure?
73. Difference between Function and Procedure-in general?
74. Difference between Function and Stored Procedure?
75. Can a stored procedure call another stored procedure. If yes what level and can it be controlled?
76. Can a stored procedure call itself(recursive). If yes what level and can it be controlled.?
77. How do you find the number of rows in a table?
78. Difference between Cluster and Non-cluster index?
79. What is a table called, if it does not have neither Cluster nor Non-cluster Index?
80. Explain DBMS, RDBMS?
81. Explain basic SQL queries with SELECT from where Order By, Group By-Having?
82. Explain the basic concepts of SQL server architecture?
83. Explain couple pf features of SQL server
84. Scalability, Availability, Integration with internet, etc.)?
85. Explain fundamentals of Data ware housing & OLAP?
86. Explain the new features of SQL server 2000?
87. How do we upgrade from SQL Server 6.5 to 7.0 and 7.0 to 2000?
88. What is data integrity? Explain constraints?
89. Explain some DBCC commands?
90. Explain sp_configure commands, set commands?
91. Explain what are db_options used for?
92. What is the basic functions for master, msdb, tempdb databases?
93. What is a job?
94. What are tasks?
95. What are primary keys and foreign keys?
96. How would you Update the rows which are divisible by 10, given a set of numbers in column?

97. If a stored procedure is taking a table data type, how it looks?
98. How m-m relationships are implemented?
99. How do you know which index a table is using?
100. How will oyu test the stored procedure taking two parameters namely first name and last name returning full name?
101. How do you find the error, how can you know the number of rows effected by last SQL statement?
102. How can you get @@error and @@rowcount at the same time?
103. What are sub-queries? Give example? In which case sub-queries are not feasible?
104. What are the type of joins? When do we use Outer and Self joins?
105. Which virtual table does a trigger use?
106. How do you measure the performance of a stored procedure?
107. Questions regarding Raiseerror?
108. Questions on identity?
109. If there is failure during updation of certain rows, what will be the state?
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40 Comments »
1. I believe there's a mistake in p.3-4: "What is a trigger?" should be a separate entry.
Tech Interviews comment by Sean
2. Q-12: Additionally, DELETE is a logged operation, whereas TRUNCATE is a non-logged operation. Helpful to know when log space is limited.
Tech Interviews comment by Paul Sligar
3. In question 10, it is worth mentioning that a table can have no more than 249 non clustered indexes - as opposed to saying "as many as we can on the db"
Tech Interviews comment by Hassan
4. What are sub-queries? Give example?
Sub-query means a Query within a Query. This is the Example:
Select Employee_Id, Employee_name From Employees Where Employee_Id IN (Select Mgr_Id from Manager)
Tech Interviews comment by Upendra
5. Hi,
Can you tell me how to get a query text in MS SQL SErver ?
If we want the same in Oracle we can get it by executing :
select SQL_TEXT from V$SQL
Pl. respond me ASAP.
Thanks !!
Tech Interviews comment by Deepak agarwal
6. Hello,
I have an issue where we have a temp table (I'll just call it #temp for this question) where we store table info that we are creating through an app….then once it's changed we need to copy all of the data from that table into a global temp table…say we'll call this one ##global…
can anyone tell me a way to copy or insert all of the columns and data from #temp into ##global please? and withought having to include all the existing colum names in the #Temp tabe in the script. Is it even possible withough using a bcp to out it then another to in it from files?
Any help would be GREATLY appreciated,
Thank you,
Jason
Tech Interviews comment by Jason
7. how is #67 related to SQL server?
Tech Interviews comment by mEmENT0m0RI
8. can u tell the command to get all table names from a database
Tech Interviews comment by vinay
9. Hello Jason ,
I think we can shoot any triger to do the job. Any app when work on #tmp table will fire the triger in the sql server, which will do the job to transfer the data from #tmp to #global.
Ofcourse there may be otherway, I just point out my suggestion.
Cheers!
Himadrish
Tech Interviews comment by Himadrish
10. Hi Vinay,
To get all the table names from a database just execute "sp_tables" system store procedure without the quotes.
Regards,
Chandraprakash.
Tech Interviews comment by Chandraprakash
11. Hello vinay,
Use below query to et all tables from database
Select name from sysObjects where xtype='u'
Tech Interviews comment by Kiran
12. its the best site i had ever visited
Tech Interviews comment by manmeet
13. Hi ,
Thanks a lot.It's really helpfull.
Tech Interviews comment by sangeetha
14. What is a Function?
Set of statements to perform a particular task.It compute a value and returns it.
if u call 1000 times a function,it has the same effect.It cannot be executed individually.
when u call a function,u must assign a value to the variable.

Note:Returns a single value.
Tech Interviews comment by sangeetha
15. Question: Which one is newer and better to use MS SQL server 2000 or SQL server 7.0?
Thanks
Rod
Tech Interviews comment by Rod J. Rhedugen
16. The webpage is really good. It is really informative. It would be better if answers for all questions are published
Tech Interviews comment by Vidhya
17. Answer to question 15 is SQL Server 2000 is newer and better than SQL 7.0
Tech Interviews comment by db don
18. Q: How to update one according to other table if one column is identical in both?
Tech Interviews comment by Banti Agrawal
19. tell me a query that second largest salary to display?
Tech Interviews comment by vinay
20. 42.
sp_addlogin 'Buck', 'password'With the name Buck and a password
If you have Windows authentication set on your server, you use a different command, and you don't have to specify the password:
sp_grantlogin 'HQ\Buck'
or we can say
GRANT SELECT, UPDATE
ON authors
TO [HQ\Buck
REVOKE SELECT
ON authors
FROM [HQ\Buck]
DENY INSERT
ON authors
TO [HQ\Buck]
Tech Interviews comment by Joji
21. 46.
Three command to get version or operating system related infomation.
Select @@Version
Or
EXEC sp_MSgetversion
or
Exec xp_msver
Tech Interviews comment by Jaweed Khan
22. 42.
Grant, Revoke, Deny
or
To create SQL Server logins using SQL authentication is sp_addlogin. The format looks like this:
sp_addlogin 'Buck', 'password'With the name Buck and a password of password (which is not a good password).
If you have Windows authentication set on your server, you use a different command, and you don't have to specify the password:
sp_grantlogin 'HQ\Buck'
46.
Three command to get version or operating system related infomation.
Select @@Version
Or
EXEC sp_MSgetversion
or
Exec xp_msver
Tech Interviews comment by Jaweed Khan
23. 42.
Grant, Revoke, Deny
or
To create SQL Server logins using SQL authentication is sp_addlogin. The format looks like this:
sp_addlogin 'Buck', 'password'With the name Buck and a password of password (which is not a good password).
If you have Windows authentication set on your server, you use a different command, and you don't have to specify the password:
sp_grantlogin 'HQ\Buck'
46.
Three command to get version or operating system related infomation.
Select @@Version
Or
EXEC sp_MSgetversion
or
Exec xp_msver
52.
SELECT STUFF('wabbit_season', 7, 1, '_hunting_')
Result will be
Microsoft SQL Server [returns 'wabbit_hunting_season']
Microsoft SQL Server uses the STUFF function to overwrite existing characters. Using this syntax, STUFF(string_expression, start, length,

replacement_characters), string_expression is the string that will have characters substituted, start is the starting position, length is the number of characters in the string that are substituted, and replacement_characters are the new characters interjected into the string.
————————————-
This example replaces the string cde in abcdefghi with xxx.
SELECT REPLACE('abcdefghicde','cde','xxx')
GO
Here is the result set:
————
abxxxfghixxx
(1 row(s) affected)
Tech Interviews comment by Jaweed Khan
24. 53.
when Quoted identifiers is ON
Quoted identifiers are delimited by double quotation marks (”):
SELECT * FROM “Blanks in Table Name”
or we can use ([])
SELECT * FROM [Blanks in Table Name]
Tech Interviews comment by Jaweed Khan
25. 56.
Prefix local temporary table names with single number sign (#table_name), and prefix global temporary table names with a double number sign (##table_name).
A local temporary table created in a stored procedure is dropped automatically when the stored procedure completes. All other local temporary tables are dropped automatically at the end of the current session.
Global temporary tables are automatically dropped when the session that created the table ends and all other tasks have stopped referencing them.
Tech Interviews comment by Jaweed Khan
26. 57.
Static cursors
Dynamic cursors
Forward-only cursors
Keyset-driven cursors
Static cursors detect few or no changes but consume relatively few resources while scrolling, although they store the entire cursor in tempdb.
Dynamic cursors detect all changes but consume more resources while scrolling, although they make the lightest use of tempdb. Keyset-driven cursors lie in between, detecting most changes but at less expense than dynamic cursors.
Tech Interviews comment by joji
27. Additionally, DELETE command can be rolled back but TRUNCATE cannot be rolled back
Tech Interviews comment by Asok
28. Four Types of Transaction Isloation level in SQL server
Transact-SQL scripts and DB-Library applications use the SET TRANSACTION ISOLATION LEVEL statement.
SET TRANSACTION ISOLATION LEVEL
{ READ UNCOMMITTED
| READ COMMITTED
| REPEATABLE READ
| SERIALIZABLE
}
BEGIN TRANSACTION
…
COMMIT TRANSACTION
Tech Interviews comment by jaweed khan
29. Truncate is a DDL command
Delete is a DML command
Tech Interviews comment by Swathi
30. 45.Database Normalization means organizing data into more than one table.
Normalization improves performance by reducing redundancy.
Tech Interviews comment by Swathi Gunnala
31. 38.there r 4 types of joins r there
1.Natual Join
2.Outer Join
3.Self Join
4.Equi Join
Tech Interviews comment by Swathi Gunnala
32. 66.
1st Normal Form
2nd Normal Form
3rd Normal Form
Boyce-codd Normal Form
Tech Interviews comment by Swathi Gunnala
33. 68.The intentional introduction of redundancy into a table in order to improve performance is called Denormalization
Tech Interviews comment by Swathi Gunnala
34. Data integrity ensures the consistency & correctness of data stored in a database.
5 types of constraints

1. PRIMARY constraint
2.FOREIGN constraint
3.UNIQUE constraint
4.CHECK constraint
5.DEFAULT constraint
Tech Interviews comment by Swathi Gunnala
35. 88.Data integrity ensures the consistency & correctness of data stored in a database.
5 types of constraints
1. PRIMARY constraint
2.FOREIGN constraint
3.UNIQUE constraint
4.CHECK constraint
5.DEFAULT constraint
Tech Interviews comment by Swathi Gunnala
36. The difference from REPLACE is that this function uses a position in the string to make replacement rather than a pattern.
Tech Interviews comment by Jimmy
37. Dear Friends
Another Way to get all the table names from a database ,
execute this query
SELECT Table_Name From Information_Schema.tables
Tech Interviews comment by Palaksha
38. Thanks a Lot. Please keep it updated. Readers are requested to post other questions also.
All the best.
Tech Interviews comment by premanshu
39. To copy the data from one table to another without creating the script:
let us consider the #temp is one table having data and that has to be copied to #globaltemp,
execute the following query:
select * into #globaltemp from #temp
Hope this helps u…Jason
Tech Interviews comment by Madhumalar
40. Hi Vinay,
Here's the query to get the second largest salary in a table. Let us have the employee table with salary as one of the column
select max(a.salary) from employee a, employee b where a.salary

Part – II
A site visitor writes: Here are some SQL Server DBA/Developer interview questions I faced myself personally and/or heard from people. I will try to answer these questions briefly here, but be advised that these answers may not be complete and it will be better for you to go through text books, books online and other resources on the net.
Before you go for the interview, be prepared to explain the database design of one of your latest projects. Don't be surprised if the interviewer asks you to draw ER diagrams.
Well, here are some questions for you. Hope this helps you prepare for your interview. Wish you all the best in your job hunt! Feel free to email me 'interview questions' that you've faced.
Questions are categorized under the following sections, for your convenience:
1. Database design (8 questions)
2. SQL Server architecture (12 questions)
3. Database administration (13 questions)
4. Database programming (10 questions)
5. Database design

• What is normalization? Explain different levels of normalization?
o Check out the article Q100139 from Microsoft knowledge base and of course, there's much more information available in the net. It'll be a good idea to get a hold of any RDBMS fundamentals text book, especially the one by C. J. Date. Most of the times, it will be okay if you can explain till third normal form.
• What is denormalization and when would you go for it?
o As the name indicates, denormalization is the reverse process of normalization. It's the controlled introduction of redundancy in to the database design. It helps improve the query performance as the number of joins could be reduced.
• How do you implement one-to-one, one-to-many and many-to-many relationships while designing tables?
o One-to-One relationship can be implemented as a single table and rarely as two tables with primary and foreign key relationships. One-to-Many relationships are implemented by splitting the data into two tables with primary key and foreign key relationships. Many-to-Many relationships are implemented using a junction table with the keys from both the tables forming the composite primary key of the junction table. It will be a good idea to read up a database designing fundamentals text book.
• What's the difference between a primary key and a unique key?
o Both primary key and unique enforce uniqueness of the column on which they are defined. But by default primary key creates a clustered index on the column, where are unique creates a nonclustered index by default. Another major difference is that, primary key doesn't allow NULLs, but unique key allows one NULL only.
• What are user defined datatypes and when you should go for them?
o User defined datatypes let you extend the base SQL Server datatypes by providing a descriptive name, and format to the database. Take for example, in your database, there is a column called Flight_Num which appears in many tables. In all these tables it should be varchar(8). In this case you could create a user defined datatype called Flight_num_type of varchar(8) and use it across all your tables. See sp_addtype, sp_droptype in books online.

• What is bit datatype and what's the information that can be stored inside a bit column?
o Bit datatype is used to store boolean information like 1 or 0 (true or false). Untill SQL Server 6.5 bit datatype could hold either a 1 or 0 and there was no support for NULL. But from SQL Server 7.0 onwards, bit datatype can represent a third state, which is NULL.
• Define candidate key, alternate key, composite key.
o A candidate key is one that can identify each row of a table uniquely. Generally a candidate key becomes the primary key of the table. If the table has more than one candidate key, one of them will become the primary key, and the rest are called alternate keys. A key formed by combining at least two or more columns is called composite key.
• What are defaults? Is there a column to which a default can't be bound?
o A default is a value that will be used by a column, if no value is supplied to that column while inserting data. IDENTITY columns and timestamp columns can't have defaults bound to them. See CREATE DEFAULT in books online.
• What is a transaction and what are ACID properties?
o A transaction is a logical unit of work in which, all the steps must be performed or none. ACID stands for Atomicity, Consistency, Isolation, Durability. These are the properties of a transaction. For more information and explanation of these properties, see SQL Server books online or any RDBMS fundamentals text book. Explain different isolation levels An isolation level determines the degree of isolation of data between concurrent transactions. The default SQL Server isolation level is Read Committed. Here are the other isolation levels (in the ascending order of isolation): Read Uncommitted, Read Committed, Repeatable Read, Serializable. See SQL Server books online for an explanation of the isolation levels. Be sure to read about SET TRANSACTION ISOLATION LEVEL, which lets you customize the isolation level at the connection level. Read Committed - A transaction operating at the Read Committed level cannot see changes made by other transactions until those transactions are committed. At this level of isolation, dirty reads are not possible but nonrepeatable reads and phantoms are possible. Read Uncommitted - A transaction operating at the Read Uncommitted level can see uncommitted changes made by other transactions. At this level of isolation, dirty reads, nonrepeatable reads, and phantoms are all possible. Repeatable Read - A transaction operating at the Repeatable Read level is guaranteed not to see any changes made by other transactions in values it has already read. At this level of isolation, dirty reads and nonrepeatable reads are not possible but phantoms are possible. Serializable - A transaction operating at the Serializable level guarantees that all concurrent transactions interact only in ways that produce the same effect as if each transaction were entirely executed one after the other. At this isolation level, dirty reads, nonrepeatable reads, and phantoms are not possible.
• CREATE INDEX myIndex ON myTable(myColumn)What type of Index will get created after executing the above statement?
o Non-clustered index. Important thing to note: By default a clustered index gets created on the primary key, unless specified otherwise.
• What's the maximum size of a row?
o 8060 bytes. Don't be surprised with questions like 'what is the maximum number of columns per table'. 1024 columns per table. Check out SQL Server books online for the page titled: "Maximum Capacity Specifications". Explain Active/Active and Active/Passive cluster configurations Hopefully you have experience setting up cluster servers. But if you don't, at least be familiar with the way clustering works and the two clusterning configurations Active/Active and Active/Passive. SQL Server books online has enough information on this topic and there is a good white paper available on Microsoft site. Explain the architecture of SQL Server This is a very important question and you better be able to answer it if consider yourself a DBA. SQL Server books online is the best place to read about SQL Server architecture. Read up the chapter dedicated to SQL Server Architecture.
• What is lock escalation?
o Lock escalation is the process of converting a lot of low level locks (like row locks, page locks) into higher level locks (like table locks). Every lock is a memory structure too many locks would mean, more memory being occupied by locks. To prevent this from happening, SQL Server escalates the many fine-grain locks to fewer coarse-grain locks. Lock escalation threshold was definable in SQL Server 6.5, but from SQL Server 7.0 onwards it's dynamically managed by SQL Server.
• What's the difference between DELETE TABLE and TRUNCATE TABLE commands?
o DELETE TABLE is a logged operation, so the deletion of each row gets logged in the transaction log, which makes it slow. TRUNCATE TABLE also deletes all the rows in a table, but it won't log the deletion of each row, instead it logs the deallocation of the data pages of the table, which makes it faster. Of course, TRUNCATE TABLE can be rolled back. TRUNCATE TABLE is functionally identical to DELETE statement with no WHERE clause: both remove all rows in the table. But TRUNCATE TABLE is faster and uses fewer system and transaction log resources than DELETE. The DELETE statement removes rows one at a time and records an entry in the transaction log for each deleted row. TRUNCATE TABLE removes the data by deallocating the data pages used to store the table's data, and only the page deallocations are recorded in the transaction log. TRUNCATE TABLE removes all rows from a table, but the table structure and its columns, constraints, indexes and so on remain. The counter used by an identity for new rows is reset to the seed for the column. If you want to retain the identity counter, use DELETE instead. If you want to remove table definition and its data, use the DROP TABLE statement. You cannot use TRUNCATE TABLE on a table referenced by a FOREIGN KEY constraint; instead, use DELETE statement without a WHERE clause. Because TRUNCATE TABLE is not logged, it cannot activate a trigger. TRUNCATE TABLE may not be used on tables participating in an indexed view
• Explain the storage models of OLAP
o Check out MOLAP, ROLAP and HOLAP in SQL Server books online for more infomation.
• What are the new features introduced in SQL Server 2000 (or the latest release of SQL Server at the time of your interview)? What changed between the previous version of SQL Server and the current version?
o This question is generally asked to see how current is your knowledge. Generally there is a section in the beginning of the books online titled "What's New", which has all such information. Of course, reading just that is not enough, you should have tried those things to better answer the questions. Also check out the section titled "Backward Compatibility" in books online which talks about the changes that have taken place in the new version.
• What are constraints? Explain different types of constraints.
o Constraints enable the RDBMS enforce the integrity of the database automatically, without needing you to create triggers, rule or defaults. Types of constraints: NOT NULL, CHECK, UNIQUE, PRIMARY KEY, FOREIGN KEY. For an explanation of these constraints see books online for the pages titled: "Constraints" and "CREATE TABLE", "ALTER TABLE"
• What is an index? What are the types of indexes? How many clustered indexes can be created on a table? I create a separate index on each column of a table. What are the advantages and disadvantages of this approach?
o Indexes in SQL Server are similar to the indexes in books. They help SQL Server retrieve the data quicker. Indexes are of two types. Clustered indexes and non-clustered indexes. When you create a clustered index on a table, all the rows in the table are stored in the order of the clustered index key. So, there can be only one clustered index per table. Non-clustered indexes have their own storage separate from the table data storage. Non-clustered indexes are stored as B-tree structures (so do clustered indexes), with the leaf level nodes having the index key and it's row locater. The row located could be the RID or the Clustered index key, depending up on the absence or presence of clustered index on the

table. If you create an index on each column of a table, it improves the query performance, as the query optimizer can choose from all the existing indexes to come up with an efficient execution plan. At the same t ime, data modification operations (such as INSERT, UPDATE, DELETE) will become slow, as every time data changes in the table, all the indexes need to be updated. Another disadvantage is that, indexes need disk space, the more indexes you have, more disk space is used.

• What is RAID and what are different types of RAID configurations?

o RAID stands for Redundant Array of Inexpensive Disks, used to provide fault tolerance to database servers. There are six RAID levels 0 through 5 offering different levels of performance, fault tolerance. MSDN has some information about RAID levels and for detailed information, check out the RAID advisory board's homepage

• What are the steps you will take to improve performance of a poor performing query?

o This is a very open ended question and there could be a lot of reasons behind the poor performance of a query. But some general issues that you could talk about would be: No indexes, table scans, missing or out of date statistics, blocking, excess recompilations of stored procedures, procedures and triggers without SET NOCOUNT ON, poorly written query with unnecessarily complicated joins, too much normalization, excess usage of cursors and temporary tables. Some of the tools/ways that help you troubleshooting performance problems are: SET SHOWPLAN_ALL ON, SET SHOWPLAN_TEXT ON, SET STATISTICS IO ON, SQL Server Profiler, Windows NT /2000 Performance monitor, Graphical execution plan in Query Analyzer. Download the white paper on performance tuning SQL Server from Microsoft web site. Don't forget to check out sql-server-performance.com

• What are the steps you will take, if you are tasked with securing an SQL Server?

o Again this is another open ended question. Here are some things you could talk about: Preferring NT authentication, using server, databse and application roles to control access to the data, securing the physical database files using NTFS permissions, using an unguessable SA password, restricting physical access to the SQL Server, renaming the Administrator account on the SQL Server computer, disabling the Guest account, enabling auditing, using multiprotocol encryption, setting up SSL, setting up firewalls, isolating SQL Server from the web server etc. Read the white paper on SQL Server security from Microsoft website. Also check out My SQL Server security best practices

• What is a deadlock and what is a live lock? How will you go about resolving deadlocks?

o Deadlock is a situation when two processes, each having a lock on one piece of data, attempt to acquire a lock on the other's piece. Each process would wait indefinitely for the other to release the lock, unless one of the user processes is terminated. SQL Server detects deadlocks and terminates one user's process. A livelock is one, where a request for an exclusive lock is repeatedly denied because a series of overlapping shared locks keeps interfering. SQL Server detects the situation after four denials and refuses further shared locks. A livelock also occurs when read transactions monopolize a table or page, forcing a write transaction to wait indefinitely. Check out SET DEADLOCK_PRIORITY and "Minimizing Deadlocks" in SQL Server books online. Also check out the article Q169960 from Microsoft knowledge base.

• What is blocking and how would you troubleshoot it?

o Blocking happens when one connection from an application holds a lock and a second connection requires a conflicting lock type. This forces the second connection to wait, blocked on the first. Read up the following topics in SQL Server books online: Understanding and avoiding blocking, Coding efficient transactions. Explain CREATE DATABASE syntax Many of us are used to creating databases from the Enterprise Manager or by just issuing the command: CREATE DATABAE MyDB.

• But what if you have to create a database with two filegroups, one on drive C and the other on drive D with log on drive E with an initial size of 600 MB and with a growth factor of 15%?

o That's why being a DBA you should be familiar with the CREATE DATABASE syntax. Check out SQL Server books online for more information.

• How to restart SQL Server in single user mode? How to start SQL Server in minimal configuration mode?

o SQL Server can be started from command line, using the SQLSERVR.EXE. This EXE has some very important parameters with which a DBA should be familiar with. -m is used for starting SQL Server in single user mode and -f is used to start the SQL Server in minimal configuration mode. Check out SQL Server books online for more parameters and their explanations.

• As a part of your job, what are the DBCC commands that you commonly use for database maintenance?

o DBCC CHECKDB, DBCC CHECKTABLE, DBCC CHECKCATALOG, DBCC CHECKALLOC, DBCC SHOWCONTIG, DBCC SHRINKDATABASE, DBCC SHRINKFILE etc. But there are a whole load of DBCC commands which are very useful for DBAs. Check out SQL Server books online for more information.

• What are statistics, under what circumstances they go out of date, how do you update them?

o Statistics determine the selectivity of the indexes. If an indexed column has unique values then the selectivity of that index is more, as opposed to an index with non-unique values. Query optimizer uses these indexes in determining whether to choose an index or not while executing a query. Some situations under which you should update statistics: 1) If there is significant change in the key values in the index 2) If a large amount of data in an indexed column has been added, changed, or removed (that is, if the distribution of key values has changed), or the table has been truncated using the TRUNCATE TABLE statement and then repopulated 3) Database is upgraded from a previous version. Look up SQL Server books online for the following commands: UPDATE STATISTICS, STATS_DATE, DBCC SHOW_STATISTICS, CREATE STATISTICS, DROP STATISTICS, sp_autostats, sp_createstats, sp_updatestats

• What are the different ways of moving data/databases between servers and databases in SQL Server?

o There are lots of options available, you have to choose your option depending upon your requirements. Some of the options you have are: BACKUP/RESTORE, dettaching and attaching databases, replication, DTS, BCP, logshipping, INSERT…SELECT, SELECT…INTO, creating INSERT scripts to generate data.

• Explain different types of BACKUPs avaialabe in SQL Server? Given a particular scenario, how would you go about choosing a backup plan?

o Types of backups you can create in SQL Sever 7.0+ are Full database backup, differential database backup, transaction log backup, filegroup backup. Check out the BACKUP and RESTORE commands in SQL Server books online. Be prepared to write the commands in your interview. Books online also has information on detailed backup/restore architecture and when one should go for a particular kind of backup.

• What is database replication? What are the different types of replication you can set up in SQL Server?

o Replication is the process of copying/moving data between databases on the same or different servers. SQL Server supports the following types of replication scenarios: ? Snapshot replication ? Transactional replication (with immediate updating subscribers, with queued updating subscribers) ? Merge replication See SQL Server books online for indepth coverage on replication. Be prepared to explain how different replication agents function, what are the main system tables used in replication etc.

• How to determine the service pack currently installed on SQL Server?

o The global variable @@Version stores the build number of the sqlservr.exe, which is used to determine the service pack installed. To know more about this process visit SQL Server service packs and versions.

• What are cursors? Explain different types of cursors. What are the disadvantages of cursors? How can you avoid cursors?

o Cursors allow row-by-row processing of the resultsets. Types of cursors: Static, Dynamic, Forward-only, Keyset-driven. See books online for

more information. Disadvantages of cursors: Each time you fetch a row from the cursor, it results in a network roundtrip, where as a normal SELECT query makes only one roundtrip, however large the resultset is. Cursors are also costly because they require more resources and temporary storage (results in more IO operations). Further, there are restrictions on the SELECT statements that can be used with some types of cursors. Most of the times, set based operations can be used instead of cursors. Here is an example: If you have to give a flat hike to your employees using the following criteria: Salary between 30000 and 40000 — 5000 hike Salary between 40000 and 55000 — 7000 hike Salary between 55000 and 65000 — 9000 hike. In this situation many developers tend to use a cursor, determine each employee's salary and update his salary according to the above formula. But the same can be achieved by multiple update statements or can be combined in a single UPDATE statement as shown below:

o UPDATE tbl_emp SET salary = CASE WHEN salary BETWEEN 30000 AND 40000 THEN salary + 5000 WHEN salary BETWEEN 40000 AND 55000 THEN salary + 7000 WHEN salary BETWEEN 55000 AND 65000 THEN salary + 10000 END

o Another situation in which developers tend to use cursors: You need to call a stored procedure when a column in a particular row meets certain condition. You don't have to use cursors for this. This can be achieved using WHILE loop, as long as there is a unique key to identify each row. For examples of using WHILE loop for row by row processing, check out the 'My code library' section of my site or search for WHILE. Write down the general syntax for a SELECT statements covering all the options. Here's the basic syntax: (Also checkout SELECT in books online for advanced syntax).

o SELECT select_list [INTO new_table_] FROM table_source [WHERE search_condition] [GROUP BY group_by_expression] [HAVING search_condition] [ORDER BY order_expression [ASC | DESC]]

• What is a join and explain different types of joins.

o Joins are used in queries to explain how different tables are related. Joins also let you select data from a table depending upon data from another table. Types of joins: INNER JOINs, OUTER JOINs, CROSS JOINs. OUTER JOINs are further classified as LEFT OUTER JOINS, RIGHT OUTER JOINS and FULL OUTER JOINS. For more information see pages from books online titled: "Join Fundamentals" and "Using Joins".

• Can you have a nested transaction?

o Yes, very much. Check out BEGIN TRAN, COMMIT, ROLLBACK, SAVE TRAN and @@TRANCOUNT

• What is an extended stored procedure? Can you instantiate a COM object by using T-SQL?

o An extended stored procedure is a function within a DLL (written in a programming language like C, C++ using Open Data Services (ODS) API) that can be called from T-SQL, just the way we call normal stored procedures using the EXEC statement. See books online to learn how to create extended stored procedures and how to add them to SQL Server. Yes, you can instantiate a COM (written in languages like VB, VC++) object from T-SQL by using sp_OACreate stored procedure. Also see books online for sp_OAMethod, sp_OAGetProperty, sp_OASetProperty, sp_OADestroy. For an example of creating a COM object in VB and calling it from T-SQL, see 'My code library' section of this site.

• What is the system function to get the current user's user id?

o USER_ID(). Also check out other system functions like USER_NAME(), SYSTEM_USER, SESSION_USER, CURRENT_USER, USER, SUSER_SID(), HOST_NAME().

• What are triggers? How many triggers you can have on a table? How to invoke a trigger on demand?

o Triggers are special kind of stored procedures that get executed automatically when an INSERT, UPDATE or DELETE operation takes place on a table. In SQL Server 6.5 you could define only 3 triggers per table, one for INSERT, one for UPDATE and one for DELETE. From SQL Server 7.0 onwards, this restriction is gone, and you could create multiple triggers per each action. But in 7.0 there's no way to control the order in which the triggers fire. In SQL Server 2000 you could specify which trigger fires first or fires last using sp_settriggerorder. Triggers can't be invoked on demand. They get triggered only when an associated action (INSERT, UPDATE, DELETE) happens on the table on which they are defined. Triggers are generally used to implement business rules, auditing. Triggers can also be used to extend the referential integrity checks, but wherever possible, use constraints for this purpose, instead of triggers, as constraints are much faster. Till SQL Server 7.0, triggers fire only after the data modification operation happens. So in a way, they are called post triggers. But in SQL Server 2000 you could create pre triggers also. Search SQL Server 2000 books online for INSTEAD OF triggers. Also check out books online for 'inserted table', 'deleted table' and COLUMNS_UPDATED()

• There is a trigger defined for INSERT operations on a table, in an OLTP system. The trigger is written to instantiate a COM object and pass the newly insterted rows to it for some custom processing. What do you think of this implementation? Can this be implemented better?

o Instantiating COM objects is a time consuming process and since you are doing it from within a trigger, it slows down the data insertion process. Same is the case with sending emails from triggers. This scenario can be better implemented by logging all the necessary data into a separate table, and have a job which periodically checks this table and does the needful.

• What is a self join? Explain it with an example.

o Self join is just like any other join, except that two instances of the same table will be joined in the query. Here is an example: Employees table which contains rows for normal employees as well as managers. So, to find out the managers of all the employees, you need a self join.

o CREATE TABLE emp (empid int, mgrid int, empname char(10))

o INSERT emp SELECT 1,2,'Vyas' INSERT emp SELECT 2,3,'Mohan' INSERT emp SELECT 3,NULL,'Shobha' INSERT emp SELECT 4,2,'Shridhar' INSERT emp SELECT 5,2,'Sourabh'

o SELECT t1.empname [Employee], t2.empname [Manager] FROM emp t1, emp t2 WHERE t1.mgrid = t2.empid Here's an advanced query using a LEFT OUTER JOIN that even returns the employees without managers (super bosses)

o SELECT t1.empname [Employee], COALESCE(t2.empname, 'No manager') [Manager] FROM emp t1 LEFT OUTER JOIN emp t2 ON t1.mgrid = t2.empid

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kavita
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Oct 2010

good questions.

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