1. What is RDBMS?

An RDBMS is a Relational database management system, it is a database management system that is based on the relational model introduced by E. F. Codd. It is the basis for SQL, and for all modern database systems like MS SQL Server, IBM DB2, Oracle, MySQL, and Microsoft Access.

1. What is a FOREIGN KEY?

A foreign key is a column or group of columns in a relational database table that provides a link between data in two tables. It acts as a cross-reference between tables because it references the primary key of another table

1. What is de-normalization?

Denormalization is a database optimization technique in which we add redundant data to one or more tables, which can help us avoid costly joins in a relational database.

For instance, in a normalized database, we might have a Courses table and a Teachers table. Each entry in Courses would store the teacherID for a Course but not the teacherName to avoid redundancy. Hence, in order to retrieve a list of all Courses with the Teacher name, we would do a join between these two tables, which makes more sense. However, if tables are large, we may spend an unnecessarily long time doing joins on tables.  
Under denormalization, we decide that we’re okay with some redundancy and some extra effort to update the database in order to get the efficiency advantages of fewer joins.

1. What is a view?

A view is a searchable object in a database that is defined by a query. It doesn’t store data. We can refer to views as “virtual tables,” and we can query a view like a table.  It can combine data from multiple tables [using joins](https://www.essentialsql.com/get-ready-to-learn-sql-12-introduction-to-database-joins). A view also shows rows and columns as they are in a real table in the database.

1. What is a subquery? Explain the properties of a subquery?

A subquery is a query within another SQL query and embedded within the WHERE clause. A few subquery properties are that it must be enclosed within parentheses, it can have only one column in the SELECT clause, unless multiple columns are in the main query for the subquery to compare its selected columns, and we can’t use an ORDER BY command in a subquery.

1. What is OLTP (Online Transaction Processing)?

OLTP is a category of data processing that is focused on transaction-oriented tasks. OLTP typically involves inserting, updating, and/or deleting small amounts of data in a database.

OLTP mainly deals with large numbers of transactions by a large number of users: such as: Online banking, purchasing a book online, booking an airline ticket…

1. What is the difference between a HAVING clause and a WHERE clause?

The where clause cannot be used with aggregates, but the having clause can. The where clause works on row’s data, not on aggregated data.

1. What is PIVOT and UNPIVOT?

Pivot and Unpivot are two relational operators that are used to convert a table expression into another. PIVOT is used when we want to transfer data from row level to column level and UNPIVOT performs the opposite operation.

1. What is the difference between a user-defined function (UDF) and a stored procedure?

There are many differences between UDFs and Stored Procedures, some of the most important differences are that: UDFs must return a value, which is optional for procedures. UDFs must be a part of SQL statement to be executed while procedures can only be called with EXECUTE. Also, UDFs can be called from Procedure, the opposite is not true.

1. What is collation?

A collation is a configuration setting that determines how the database engine should treat character data at the server, database, or column level.

Collation provides the sorting rules, case, and accent sensitivity properties for the data in the database. For instance, if we run a query, collation is what determines whether or not uppercase letters and lowercase letters are treated the same.

1. What are GROUPING SETS?

A grouping set is a set of columns by which we group using the GROUP BY clause. Normally, a single aggregate query defines a single grouping set.

1. Can we rewrite sub-queries into simple select statements using joins and CTEs?

Yes, we can rewrite sub-queries using joins and CTEs since a CTE is similar to a derived table in that it is not stored as an object and lasts only for the duration of the query.

1. Where are SQL Server usernames and passwords stored in SQL Server?

We can get usernames from the sys table sys.server\_principals, and the hashed passwords from sys.sql\_logins, but there's no way to get the plaintext passwords.

1. What is the maximum row size for a table?

The number of rows per table is only limited by available storage. For a single row size, 8060 bytes is generally the limit for a memory-optimized table.

1. What is the maximum number of columns a table can have?

The maximum number of columns a table can have is 1024 for non-wide table and 30000 for wide tables.

1. What is the maximum size per database for SQL Server Express?

The maximum size per database for SQL Server Express depends on the edition: Microsoft SQL Server Express Edition started off with a 4GB in 2005, and have upgraded over the year until getting to the 10GB size limit in the 2016 Express Edition.

1. Which TCP/IP port does the SQL Server run on? How can it be changed?

SQL Server runs on port 1433. It can be changed from the Network Utility TCP/IP properties.

1. Define HIERARCHYID datatypes?

The HierarchyID data type allows you to construct relationships among data elements within a table, specifically to represent a position in a hierarchy.

How they work is they do not store the identifier of the parent element but a set of information to locate the element in the hierarchy.

1. What is the NOLOCK hint?

The NOLOCK hint allows SQL to read data from tables by ignoring any locks and therefore not being blocked by other processes.

This can improve query performance, but can also introduce the possibility of dirty reads.

1. What is the CHECKPOINT process in SQL Server?

[Checkpoint](http://sqlbak.com/academy/checkpoint/) is a process that writes current in-memory dirty pages and [transaction log](http://sqlbak.com/academy/transaction-log/)records to physical disk. SQL Server checkpoints are used to reduce the time required for recovery in the event of system failure.

1. What is SQL Profiler?

SQL profiler is a graphical user interface software tool in Microsoft’s SQL Server RDBMS. It monitors, analyzes, troubleshoots and tunes SQL databases and their environment.

In a nutshell, it’s like a dashboard that shows the health of an instance of MS SQL Server.

1. What is log shipping?

SQL Server log shipping is a technique which involves two or more SQL Server instances and copying of a transaction log file from one SQL Server instance to another. The process is automated across SQL Servers. The result is getting two copies of the data on two separate locations.

1. What are DMVs and DMFs used for?

Dynamic management views and dynamic management functions are system views and system functions that return metadata of the system state.

The metadata can be used to monitor SQL Server health during runtime, troubleshoot the performance bottleneck issues and proactively work to minimize the downtime.

1. What is a deadlock? How can you identify and resolve a deadlock?

A deadlock occurs when two or more processes are waiting on the same resource and each process is waiting on the other process to complete before moving forward.  When this situation occurs and there is no way for these processes to resolve the conflict, SQL Server will choose one of processes as the deadlock victim and rollback that process, so the other process or processes can move forward.

There are many ways to resolve deadlocks, the most practical one could be to observe the performance monitor provided by SSMS. The concurring queries can be identified and the type of the deadlock can be found on the table. Once the identification process is over, it is possible to manually stop the problematic query (especially if related to a SQL job) to free the resource and re-launch it.

1. What is the use of data-tier application (DAC)?

The lifecycle of most database applications involves developers and DBAs sharing scripts and ad hoc integration notes for application update and maintenance. This can quickly become unscalable once databases grow in number, size, and complexity.

A DAC, which is a database lifecycle management and productivity tool comes to solve this issue by enabling declarative database development to simplify deployment and management. A developer can author a database in SQL Server Data Tool database project and then build the database into a DACPAC for handoff to a DBA and so on. This ensures an scalable implementation of databases.

1. What is the difference between a local temporary table and a global temporary table?

**Local**  
- Only available to the current Database connection for current user and are cleared when connection is closed.  
- Multiple users can’t share a local temporary table.  
**Global**  
- Available to any connection once created. They are cleared when the last connection is closed.  
- Can be shared by multiple user sessions.

1. What is a scheduled job and what is a scheduled task?

Scheduled tasks are much more general than scheduled jobs. A scheduled job has the native ability to capture and manipulate the output of the task and can perform many different tasks. Job steps give users control over execution.

1. What is a table called, if it has neither cluster nor non-cluster index?

If a table has neither a cluster nor non-cluster index it is called a Heap. One use of a heap could be to set a non-indexed cluster onto a heap (like putting values onto an empty table.

1. What is the difference between VARCHAR and VARCHAR (MAX) datatypes?

VARCHAR(MAX) can hold the same amount of data BLOBs can hold (2 GB) and they are stored in the same type of data pages used for other data types. When data in a MAX data type exceeds 8 KB, an over-flow page is used. VARCHAR holds much smaller amount (inputed as VARCHAR(n) where n could be up to 8000 bytes).

1. Why can there be only one clustered index per table and not more?

A Clustered index defines the way in which data is stored magnetically on the disk. And there can only be one way in which you can store/order the data on the disk. Hence there can only be one clustered index per table.

1. Can we insert data if the clustered Index is disabled?

No because its data rows cannot be accessed if its clustered index is disabled. I can only use **Drop or REBUILD statements.**

1. What is a covered index?

A covering index is an index that contains all of, and possibly more, the columns you need for your query so one doesn’t need to do another lookup into the clustered index.

1. What is PAD\_INDEX?

The fill-factor option is provided for fine-tuning index data storage and performance. When an index is created or rebuilt, the fill-factor value determines the percentage of space on each leaf-level page to be filled with data, reserving the remainder on each page as free space for future growth. For example, specifying a fill-factor value of 80 means that 20 percent of each leaf-level page will be left empty, providing space for index expansion as data is added to the underlying table. The empty space is reserved between the index rows rather than at the end of the index.

PAD\_INDEX ON means "Apply FILLFACTOR to all layers"

This means that PAD\_INDEX is only useful if FILLFACTOR is set. FILLFACTOR determines how much free space in a data page (roughly)

Basically, you set PAD\_INDEX = ON if you expect a lot of random changes to the index regularly.

That helps avoiding index page splits.

1. Why does the LOGON trigger fire multiple times during a single login in SSMS?

**It happens because multiple SQL Server services are running as well as intellisense is turned on.** IntelliSense feature reads internal metadata and lists all of the available objects and its properties, thereby helping Database Developers, DBAs effectively and quickly write TSQL scripts.

1. What is Service Broker?

SQL Server Service Broker provide native support for messaging and queuing in the SQL Server Database Engine and Azure SQL Database Managed Instance. Developers can easily create sophisticated applications that use the Database Engine components to communicate between disparate databases, and build distributed and reliable applications.

1. What is XPath?

XPath is a graph navigation language used to select a set of nodes from an XML document. Each XPath operator selects a node-set based on a node-set selected by a previous XPath operator. For example, given a set of **<Customer>** nodes, XPath can select all **<Order>** nodes with the **date** attribute value of **"8/14/1999"**. The resulting node-set contains all the orders with order date 8/14/1999.

The XPath language is defined by the World Wide Web Consortium (W3C) as a standard navigation language. SQLXML 4.0 implements a subset of the W3C XPath specification..

1. What is Filestream in SQL Server?

FILESTREAM enables SQL Server-based applications to store unstructured data, such as documents and images, on the file system.

1. What is change Data Capture (CDC) in SQL Server 2008?

Change data capture records insert, update, and delete activity that is applied to a SQL Server table.

1. How do you get data from a database on another server?

Creating a linked server by using sp\_addlinkedserver.

1. How do you rebuild the master database?

To restore the master database files, you need to have latest backup of the master.ldf and MDF file. Start SQL server in a single user mode and follow the below give steps with complete precision:

**STEP 1:** Launch “SQL Server Configuration Manager” and then select “SQL Server 2005 Services”

**STEP 2:** Go to the SQL Server instance, and perform right-click operation and select “Properties” option.

**STEP 3:** Select “Advanced” tab on the “SQL Server Properties” window. Go to Startup Parameters box, and then add “-m;” prefix to the already existing parameters.

1. How is SQLCMD different from OSQL?

OSQL is outdated and one should only use SQLCMD instead

1. What is the use of the Dedicated Admin Connection (DAC)?

The Dedicated Admin Connection was built to help you connect and run basic troubleshooting queries in cases of serious performance problems.

1. What is transparent data encryption?

Technology employed by Microsoft, IBM and Oracle to encrypt database files. TDE offers encryption at file level. TDE solves the problem of protecting data at rest, encrypting databases both on the hard drive and consequently on backup media. It does not protect data in transit nor data in use. Enterprises typically employ TDE to solve compliance issues such as PCI DSS which require the protection of data at rest.

1. What is bidirectional transactional replication?

A specific transactional replication topology that allows two servers to exchange changes with each other: each server publishes data and then subscribes to a publication with the same data from the other server

1. Why can’t I run TRUNCATE TABLE on a published table?

We cannot truncate a published table because of Transactional Replication or Merge Replication. However, DELETE is still a possible workaround is a published or referenced table needs to be deleted.

1. How can you validate a backup copy of your database?

To check the integrity of a backup before using it to restore and validating it, the “BACKUP…VALIDATE” can be used.

1. What is Business Intelligence (BI)?

**Business intelligence** (**BI**) comprise the strategies and technologies used by enterprises for the data analysis of business information. It is the process of collecting, integrating, analyzing and presenting business data for the purpose of supporting business decision making. That is why business intelligence systems are considered data-driven Decision Support Systems.

1. What is a fact table?

In data warehousing, a fact table consists of the measurements, metrics or facts of a business process. It comprises of “what we want to see”. The dimensions around a fact table answer the question “How do we want to see these measures”.

1. What is ETL?

Extract Transform Load; which is the core procedure of Business Intelligence systems. Data is extracted from various sources, then, it is transformed (cleaned and organized) to finally be loaded into the final data warehouse or data marts (or both) , from which the data is analyzed and turned into valuable information that support decision making.

1. What is PowerPivot for Excel?

PowerPivot is a Microsoft Excel Add-in capable of powerful data analysis and create sophisticated data models. It uses DAX expressions resolve to T-SQL queries.