1. What is a database?

Database is an electronic system that allows data to be easily accessed, manipulated and updated. In other words, a database is used by an organization as a method of storing, managing and retrieving information.

1. What purpose are filegroups used for?

Filegroups can be created to group data files together for administrative, data allocation, and placement purposes.

2. What is the physical and logical representation of the table?

1. What is a logical read vs physical read?

A logical read happen every time the database engine requests a page from the buffer cache. If the page is not currently in the buffer cache, a physical read is then performed to read the page into the buffer cache. If the page is currently in the cache, the buffer cache simply uses the page already in memory.

3. What data types can be used in a table?

SQL data types can be broadly divided into following categories:

- Numeric data types such as Bit, Tinyint, Smallint, Int, Bigint, Demical, Numeric, Float, Real

- Date and Time data types such as Date, Time, Datetime, Timestamp, Year

- Character and String data types such as Char, Varchar, Text

- Unicode Character and String data types such as NChar, NVarchar, nNText

- Binary data types such as Binary, Varbinary, image

- Others data types –XML, JSON, Cursor

4. What is the purpose of the constrains below

1. PRIMARY KEY

Uniquely identifies each row/record in a database table

2. UNIQUE KEY (what is the difference between PK and UNIQUE?)

Ensures that all the values in a column are different.

Primary Key is used to identify a row (record) in a table, whereas Unique-key is to prevent duplicate values in a column (with the exception of a null entry)

3. FOREIGN KEY (mention the conditions to create FK, when FK cannot be created?)

Uniquely identifies a row/record in any another database table.

The Foreign key and the Parent key must have the same field number and type, and be in the same order.

FK cannot be created when PK and FK columns don't have the same type and order

4. CHECK

The CHECK constraint ensures that all values in a column satisfy certain conditions.

5. NOT NULL

Ensures that a column cannot have a NULL value.

5. What is an index? The structure of an index. The purpose of an index.

An index is a data structure which is used to quickly locate and access the data in a database table.

The rapid search possibilities provided by the index is achieved due to the fact that, the SQL Server index is created using the shape of B-Tree structure, that made up of 8K pages, with each page in that structure is called an index node. The B-Tree structure provides the SQL Server Engine with a fast way to move through the table rows based on index key, that decides to navigate left or right, to retrieve the requested values directly, without scanning all the underlying table rows. Each page in an index B-tree is called an index node. The top node of the B-tree is called the root node. The bottom nodes in the index are called the leaf nodes.

An index helps to speed up select queries and where clauses, but it slows down data input, with the update and the insert statements.

1. Covered, filtered, not-clustered indexes

A covering index is one which can satisfy all requested columns in a query without performing a further lookup into the clustered index.

Non-Clustered index is an index structure separate from the data stored in a table that reorders one or more selected columns. The non-clustered index is created to improve the performance of frequently used queries not covered by clustered index.

A filtered index is an optimized non-clustered index especially suited to cover queries that select from a well-defined subset of data. It uses a filter predicate to index a part of rows in the table

6. What is a view? What is the purpose of the views?

View is a virtual table which is created by a query joining one or more tables.

Views are used for security purpose in databases, views restricts the user from viewing certain column and rows means by using view we can apply the restriction on accessing the particular rows and columns for specific user.

1. Indexed views

Creating a unique clustered index on a view improves query performance because the view is stored in the database in the same way a table with a clustered index is stored.

7. What is a trigger? Types of triggers. What is the purpose of the trigger?

A trigger is a special type of stored procedure that automatically runs when an event occurs in the database server.

In SQL Server we can create three types of triggers DDL triggers, DML triggers and Logon triggers.

DDL trigger can be used to observe and control actions performed on the server, and to audit these operations. DDL triggers can be used to manage administrative tasks such as auditing and regulating database operations.

DML triggers can be used to enforce business rules and data integrity, query other tables, and include complex Transact-SQL statements.

Logon trigger can be used to audit and control server sessions, such as to track login activity or limit the number of sessions for a specific login.

1. Instead of trigger

   These kinds of triggers fire before the execution of an action query that can only be DML statements like Insert, Update and Delete but after the execution of that query. The table data will not be affected, in other words if we want to insert or update the data of the table then we need to write it in the trigger using "inserted" or "deleted" virtual tables.

8. Synonyms

In SQL Server, a synonym is an alias or alternative name for a database object such as a table, view, stored procedure, user-defined function, and sequence. It also hides object details like object name, owner, database link.