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SQL SERVER

Interview Questions

[EXCLUSIVE NOTES]

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1. What is SQL Server?

Answer: SQL Server is one of the leading relational database management systems developed by Microsoft. It enables other applications running on the same computer as the SQL Server or other remote computers to store and retrieve data from a relational database.

2. List and explain types of commands used in SQL Server.

Answer: SQL Server supports four different types of commands, as given below:

- **Data Definition Language (DDL):**

We use DDL commands in SQL Server to deal with the structure of entities or objects. There are three DDL commands in SQL Server:

- **Create:** This command creates an object or entity.
- **Alter:** It makes changes in an object or entity.
- **Drop:** It deletes an object or entity.

Here, an object or an entity is a database, trigger, table, view, etc.

- **Data Manipulation Language (DML):**

DML commands in SQL Server are used to perform manipulations on the data stored in entities, like a table, view, etc. The three DML commands in SQL Server are:

- **Insert:** It adds new data into a table. Also, this command supports the insertion of bulk data into a table.
- **Delete:** This command deletes the specific data from the table.
- **Update:** It updates the values of data in a table.

- **Data Control Language (DCL):**

In SQL Server, we use DCL commands to ensure the security of the data stored in objects or entities. Two DCL commands in SQL Server are:

- **Grant:** It grants database access permission to a user.
- **Revoke:** This command takes back the database access permission from a user.
- **Transactional Control Language (TCL):**

We use TCL commands in SQL Server to manage transactions. Three TCL commands in SQL Server are:

- **Commit:** It saves a transaction in SQL Server permanently.
- **Rollback:** This TCL command undoes all changes made to the data in a database made before committing.
- **Save Tran:** It saves a transaction in SQL Server and rolls it back to the desired point.

3. Explain the method of creating a database in SQL Server.

- **Answer:** In computer programming, a database is a well-organized collection of data. Alternatively, a database is a set of various components used for storing data, like tables, schemas, procedures, etc. Furthermore, Structured Query Language (SQL) is used in Microsoft SQL Server to access the data and perform manipulations. We use the CREATE DATABASE command to create a database in the SQL Server. The syntax for creating a database in the SQL Server is:

```
CREATE DATABASE DatabaseName;
```

- **Example:** Consider we need to create a database having the name Students, so we need to run the following command:

```
CREATE DATABASE Students;
```

- Alternatively, we can use the SQL Server Management Studio to create a database; go to the left side of the window, right-click on the **Databases** option and then click on the **New Database** option.

4. What is SQL?

Answer: SQL stands for Structured Query Language. All relational database management systems use this domain-specific language to access and manipulate the stored data. It enables us to perform various tasks, such as creating a database , retrieving data from a database, creating records, tables, views, and procedures in a database, etc. All these operations make use of SQL queries.

5. What is the latest version of SQL Server?

Answer: The latest version is Microsoft SQL Server 2019 which was released on November 4th 2019.

6. Explain PL/SQL.

Answer: An extension to SQL is PL/SQL. It stands for Procedural Language extensions to Structured Query Language. PL/SQL combines the SQL's data manipulation feature and the procedural language's processing power.

Moreover, it is one of the most powerful programming languages that improve a database's security and sturdiness.

PL/SQL instructs the Oracle compiler about 'what actions to perform using the SQL's manipulation feature and 'how to perform actions' using the procedural language's processing power. As PL/SQL is a procedural language, it involves looping and conditional statements.

7. List out properties of RDBMS.

Answer: The below list explains the properties of RDBMS:

- All values in a table are atomic.
- Each tuple in a table is unique.
- The sequence of attributes and tuples does not matter in SQL Server.
- Each attribute in a table should have a unique name.
- All field values in a single column are of the same type.

8. Differentiate between SQL and PL/SQL.

Answer: The below table highlights some of the key dissimilarities between SQL and PL/SQL:

SQL	PL/SQL
It stands for Structured Query Language.	It stands for Procedural Language extensions to Structured Query Language.
SQL executes a single query or line of code at a time.	PL/SQL executes a block of code or multiple lines in one go.

It uses DDL and DML commands to develop SQL queries and commands.	It uses functions, variables, procedures, triggers, and packages to develop blocks of code.
We use SQL queries to fetch data, modify it, or delete it from a database.	PLSQL is used to develop applications that display information retrieved using SQL queries.
SQL queries do not support the use of PL/SQL syntax.	The PL/SQL syntax allows the use of SQL queries.

9. Explain a Relational Database Management System (RDBMS).

Answer: A database management system based on E. F. Codd's relational model is called a Relational Database Management System (RDBMS). Alternatively, RDBMS is a collection of programs and functionalities that enables organizations and individuals to interact or communicate with a relational database. Data in RDBMS is stored in the form of tuples, i.e., rows and columns. It supports a Structured Query Language (SQL) to access data from a relational database.

Some vital characteristics of RDBMS are:

- It allows multiple users to access data.
- RDBMS is a robust type of database model that can handle every data size, whether small, medium, or large-scale.
- It uses the ACID property to ensure data consistency in a database.
- RDBMS supports distributed databases and normalization.

10. What do you understand about a database table?

Answer: A database table in SQL Server stores all data in the form of horizontal rows and vertical columns. In addition, a cell in a table is a unit where a row and a column intersect. A database table has a specific number of columns or attributes, whereas it may have any number of rows or tuples. We use DDL commands for a database table, as a table is an object. The CREATE command creates a database table, whereas the DROP command deletes it. Moreover, the ALTER command modifies the previously defined structure of a table, and the SELECT command displays data from a table.

11. Tell the syntax for creating a table in SQL Server with an example.

Answer: The syntax for creating a table in SQL Server is:

```
CREATE TABLE TableName (ColumnName1 datatype,
ColumnName2 datatype, ...., ColumnNameN datatype) ;
```

Let us see one example of creating a Students table in SQL Server. Consider that the Students table has four columns or attributes, like Name, Student_ID, Mobile_No, and City.

```
CREATE TABLE Students ( Name varchar(20), Student_ID int,
Mobile_no int, City varchar (20));
```

After you hit enter, you will get a message 'Table created successfully.'

12. Write down the syntax for deleting a table in SQL Server.

Answer: To delete a table from a database in SQL Server, we use the DROP command. The syntax of the DROP command is:

```
DROP TABLE TableName;
```

Example: Let us consider that we have a table named Employees, and we need to delete it from a database.

```
DROP TABLE Employees;
```

13. Tell the syntax for updating a table in the SQL Server.

Answer: In SQL Server, we use the ALTER command to update a table. While creating a table, we specify column names and their corresponding data types. Also, if we want to add, delete, or alter any column after creating a table, we can again use the ALTER command. Therefore, the ALTER command is used in three different ways, as follows:

- To add a column:

Syntax:

```
ALTER TABLE table_name ADD column_name datatype;
```

- To delete a column:

Syntax: ALTER TABLE table_name DROP COLUMN column_name;

- To modify a column:

Syntax:

```
ALTER TABLE table_name ALTER COLUMN column_name datatype;
```

14. Explain different kinds of relationships in SQL Server.

Answer: SQL Server supports three kinds of relationships in a database, as explained below:

- **One-to-one:**

The one-to-one relation in SQL Server has rare usage. In this type of relationship, a record or data in one table correlates with only one record or data present in another table. The primary advantage of using one-to-one relationships is better security. For example, consider a Student database. Here, only one Student_ID is assigned to a single student. Conversely, each student has a unique ID assigned.

- **One-to-many and Many-to-one:**

When one record in a table correlates with multiple records in another table, it is a one-to-many relationship. Conversely, when multiple records in a table are associated with a single record in another table, it is a many-to-one relationship. For example, consider a Customer database. Here, a single customer can place any number of orders. On the other hand, a specific order belongs to a single customer.

- **Many-to-many:**

When multiple records in a table are correlated to multiple records in another table, it is a many-to-many relationship. For example, multiple customers can purchase different products.

15. Explain the primary key in SQL Server.

Answer: A primary key in SQL Server can be a single attribute or field or combination of attributes or fields that uniquely identify a record or a tuple in a table. There is only one primary key for a database table. In addition, we can set a primary key for a table while creating or updating it. However, fields of an attribute or a combination of attributes that are considered a primary key cannot be NULL. Below is the syntax for creating a primary key for a table:

```
CREATE TABLE table_name ( columnName1 datatype [NULL | NOT NULL], columnName2 datatype [NULL | NOT NULL], ...
CONSTRAINTS constraint_name PRIMARY KEY (pk_col1, pk_col2, ...,pk_col_n));
```

16. What is a foreign key?

Answer: We use a foreign key in SQL Server to connect data between two different tables; one table will be a child, and another will be a parent. Alternatively, if an attribute or column of one table points to the primary key of another table, then that attribute or column is said to be a foreign key. Let us go through one example to understand clearly the foreign key. Consider two tables: Student_record and Student_Marks.

Student_record

Student_ID	Stduent_Name	Subject_ID	Subject
S01	John	CC01	Chemistry

S02	Maddy	CD01	Computer Science
S03	Williams	CE01	Mechanics

Student_Marks

Student_ID	Subject_ID	Marks
S01	CC01	68
S02	CD01	79
S03	CE01	56

In the above tables, Student_ID is the foreign key. The Student_ID attribute is a primary key of the table named Student_record and is present as an attribute in Student_marks.

17. Name the TCP/IP Port on which SQL Server runs.

Answer: The SQL Server runs on the 1433 TCP/IP port by default.

18. Explain database normalization and list its forms.

Answer: The technique used to organize data present in a database to reduce data redundancy is called database normalization . In addition, database normalization eliminates Update, Insertion, and Deletion Anomalies from a relation. The fundamental idea of using the database normalization technique is to divide a table into smaller ones and connect them using database relationships. There are six forms of database normalization, as listed below:

- First Normal Form (1NF)
- Second Normal Form (2NF)
- Third Normal Form (3NF)
- Boyce-Codd Normal Form (BCNF or 4NF)
- Fifth Normal Form (5NF)
- Fifth Normal Form (6NF)

19. Explain functions in SQL Server.

Answer: A function in SQL Server is analogous to a function in programming languages. It is a sequence of SQL statements written to accomplish a definite task. In addition, a function in SQL Server accepts input parameters and returns the desired output. More importantly, SQL functions are not used to insert, update, or delete data from a database. Every function in SQL Server has a specific name and does not begin with special symbols, such as $, #, or @. SQL Server has two distinct kinds of SQL Server: predefined and user-defined.

- **Predefined Functions:**

Functions defined by SQL Server are called pre-defined functions. Aggregate functions and scalar functions are two different kinds of predefined functions in SQL Server. Aggregate functions are min(), sum(), count(), max(), and avg(), whereas scalar functions are round(), ucase(), lcase(), format(), mid(), len(), and now().

- **User-defined Functions:**

A block of SQL statements written by a programmer or developer to accomplish a particular task is called a user-defined function.

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20. Explain Aggregate functions in SQL Server.

Answer: Aggregate functions in SQL Server group values from multiple rows of a table under specific criteria and return a single value. There are five aggregate functions in SQL Server, as given below:

- **sum():**

It takes all values from different rows and returns their sum value.

- **max():**

This function accepts values from multiple tuples, compares them, and returns the maximum value.

- **min():**

This function accepts values from multiple tuples, compares them, and returns the minimum value.

- **count():**

This function returns the total number of rows or records present in a table.

- **avg():**

This function accepts values from multiple tuples and returns an average of all values.

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