Day 1-Interview questions

1. What is an RDBMS, and how does it differ from a non-relational database?
An RDBMS (Relational Database Management System) is a type of database management system that organizes data into structured tables with rows and columns. It enforces data integrity using ACID properties and supports SQL for querying and managing data. Non-relational databases, on the other hand, use various data models (e.g., document, key-value, graph) and do not require a fixed schema.

2. Explain the key components of a database management system (DBMS).
The key components of a DBMS include the data, the database engine, the query processor, the user interface, and various tools and utilities. The data is stored in tables, the database engine manages data storage and retrieval, the query processor interprets SQL queries, and the user interface allows users to interact with the data.

3. What is the purpose of a primary key in a database table?
A primary key uniquely identifies each record (row) in a table. It ensures data integrity by enforcing the uniqueness constraint and serves as a reference point for establishing relationships with other tables.

4. Describe the ACID properties in the context of database transactions.
ACID stands for Atomicity, Consistency, Isolation, and Durability. These properties ensure that database transactions are reliable and maintain data integrity.

- **Atomicity** ensures that transactions are treated as a single, indivisible unit.
- **Consistency** guarantees that a database transitions from one valid state to another.
- **Isolation** ensures that concurrent transactions do not interfere with each other.
- **Durability** ensures that committed changes are permanently saved even in the event of a system failure.

5. Differentiate between a database and a database instance.
A database is a collection of related data organized into tables, schemas, and other database objects. A database instance, on the other hand, refers to a running copy of the database management system (DBMS) software, along with the memory and processes needed to manage the database. Multiple database instances can exist on a single physical server.

6. What is a schema, and how does it relate to the CREATE TABLE statement?
In the context of a database, a schema is a logical container for organizing database objects such as tables, views, and procedures. When we create a table using the

CREATE TABLE statement, we can optionally specify the schema in which the table should be created.

7. Explain the purpose of constraints in a CREATE TABLE statement.
Constraints are rules that enforce data integrity. They can be defined when creating a table using the CREATE TABLE statement. Below are the different types of constraints:

- **Primary Key:** Ensures the uniqueness of values in a column.
- **Foreign Key:** Enforces referential integrity between tables.
- **NOT NULL:** Ensures that a column cannot contain NULL values.
- **UNIQUE:** Ensures that all values in a column are unique.

8. What is the purpose of the INSERT statement in SQL?
The INSERT statement is used to add new records (rows) to a database table. It allows us to specify the values to be inserted into each column.

9. Describe the difference between inserting data into specific columns and inserting data into all columns of a table.
When we insert data into specific columns, we specify the column names along with the corresponding values. This allows us to insert data into only those columns. Inserting data into all columns means we provide values for all columns in the order they appear in the table's schema.

10. How do you insert multiple rows of data in a single INSERT statement?
We can insert multiple rows in a single INSERT statement by specifying multiple sets of values in the VALUES clause. Each set of values is enclosed in parentheses and separated by commas.
For example:

```
INSERT INTO table_name (column1, column2)
VALUES
(value1a, value2a),
(value1b, value2b),
(value1c, value2c);
```