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**MODULE 5: DBMS**

## 1. What do you understand by Database?

A database is an organized collection of structured information or data, typically stored electronically in a computer system. A database is usually controlled by a database management system (DBMS). Together, the data and the DBMS, along with the applications that are associated with them, are referred to as a database system. The main purpose of a database is to store and retrieve related data efficiently.

## 2. What is Normalization?

Normalization is a database design technique that organizes tables in a manner that reduces redundancy and dependency of data. It divides larger tables into smaller tables and links them using relationships. The primary goal is to isolate data so that additions, deletions, and modifications of a field can be made in just one table and then propagated through the rest of the database via the defined relationships.

## 3. What is Difference between DBMS and RDBMS?

- DBMS (Database Management System):  
 - Manages the data.  
 - Data is stored in files.  
 - Relationships between data are maintained programmatically.  
 - Examples: File system, XML, etc.  
  
- RDBMS (Relational Database Management System):  
 - Manages data using a relational model.  
 - Data is stored in tables.  
 - Relationships between data are maintained using foreign keys.  
 - Examples: MySQL, PostgreSQL, Oracle, SQL Server, etc.

## 4. What is MF Cod Rule of RDBMS Systems?

The MF Codd's rules are a set of thirteen rules proposed by Edgar F. Codd, a pioneer of the relational database model, which should be satisfied by a database management system to be considered as a relational database management system (RDBMS). These rules cover various aspects of data integrity, logical and physical data independence, and data manipulation.

## 5. What do you understand by Data Redundancy?

Data redundancy occurs when the same piece of data exists in multiple places within a database. This can lead to various problems such as data inconsistency, increased storage costs, and more complex data management. Normalization is a technique used to reduce data redundancy by organizing data into related tables.

## 6. What is DDL Interpreter?

A DDL (Data Definition Language) interpreter is a component of a DBMS that interprets and executes the database schema definitions written in DDL. It processes statements like CREATE, ALTER, and DROP, which define and modify the structure of database objects such as tables, indexes, and views.

## 7. What is DML Compiler in SQL?

A DML (Data Manipulation Language) compiler translates DML statements into low-level instructions that the database system can execute. DML includes statements like SELECT, INSERT, UPDATE, and DELETE, which are used to retrieve and manipulate data within the database.

## 8. What is SQL Key Constraints? Write an Example of SQL Key Constraints.

SQL key constraints are rules applied to columns in a table to ensure the integrity and uniqueness of data. Common key constraints include:  
**- Primary Key:** Ensures that each row in a table is unique.  
- **Foreign Key:** Ensures referential integrity between two tables.  
**- Unique Key:** Ensures all values in a column are unique.  
**- Not Null:** Ensures that a column cannot have NULL values.  
  
**Example:**  
```sql  
CREATE TABLE Employees (  
 EmployeeID INT PRIMARY KEY,  
 FirstName VARCHAR(50) NOT NULL,  
 LastName VARCHAR(50) NOT NULL,  
 DepartmentID INT,  
 CONSTRAINT FK\_Department FOREIGN KEY (DepartmentID)  
 REFERENCES Departments(DepartmentID)  
);  
```

## 9. What is a Save Point? How to create a Save Point? Write a Query.

A save point is a point within a transaction that you can rollback to without affecting the rest of the transaction. Save points allow for partial rollbacks, which can be useful for managing errors within complex transactions.  
  
**Creating a save point:**```sql  
SAVEPOINT my\_savepoint;  
```  
  
Rolling back to a save point:  
```sql  
ROLLBACK TO my\_savepoint;  
```

## 10. What is Trigger and How to Create a Trigger in SQL?

A trigger is a set of SQL statements that automatically executes in response to certain events on a particular table or view. Triggers can be used for enforcing business rules, validating input data, and maintaining audit trails.  
  
**Creating a trigger:**```sql  
CREATE TRIGGER trigger\_name  
AFTER INSERT ON table\_name  
FOR EACH ROW  
BEGIN  
 -- SQL statements to execute  
END;  
```  
  
**Example:**```sql  
CREATE TRIGGER after\_employee\_insert  
AFTER INSERT ON Employees  
FOR EACH ROW  
BEGIN  
 INSERT INTO EmployeeAudit (EmployeeID, Action, ActionDate)  
 VALUES (NEW.EmployeeID, 'INSERT', NOW());  
END;  
```