

Day 1 – SQL Foundations (Interview-Ready Notes)

1. Database

Official definition: A database is an organized collection of structured data stored electronically, designed to allow efficient storage, retrieval, and management of information.

Example: An employee database storing employee details such as ID, name, role, and salary.

2. Database Management System (DBMS)

Definition: A DBMS is software that allows users to create, read, update, and delete data in a database while ensuring data integrity, security, and concurrency control.

Examples: MySQL, PostgreSQL, Oracle, SQL Server.

3. RDBMS vs NRDBMS (NoSQL)

RDBMS: Relational Database Management System stores data in tables with rows and columns, enforces relationships using keys, and follows a predefined schema. Uses SQL as the standard query language.

Examples: MySQL, PostgreSQL, Oracle.

NRDBMS (NoSQL): Non-relational databases store data in flexible formats such as documents, key-value pairs, graphs, or wide-column stores. They are designed for scalability and unstructured data.

Examples: MongoDB, Cassandra, Firebase.

4. SQL (Structured Query Language)

Definition: SQL is a standardized programming language used to manage and manipulate relational databases. It supports data definition, data manipulation, querying, and access control.

Common use cases: Creating tables, inserting data, updating records, deleting data, and querying information.

5. Categories of SQL Commands

- 1 **DDL (Data Definition Language):** Defines database structure. Examples: CREATE, ALTER, DROP.
- 2 **DML (Data Manipulation Language):** Modifies data. Examples: INSERT, UPDATE, DELETE.
- 3 **DQL (Data Query Language):** Retrieves data. Example: SELECT.
- 4 **DCL (Data Control Language):** Controls access. Examples: GRANT, REVOKE.

6. Schema

Definition: A schema is the logical blueprint of a database that defines tables, columns, data types, constraints, and relationships between tables.

Interview tip: Schema defines structure, not data.

7. Table

Definition: A table is a database object that stores data in rows and columns. Each row represents a record, and each column represents an attribute of that record.

8. Primary Key

Definition: A primary key is a column or set of columns that uniquely identifies each row in a table. It cannot contain NULL values and must be unique.

Types:

- **Natural Key:** A real-world attribute that uniquely identifies a record (e.g., Aadhaar number).
- **Surrogate Key:** An artificially generated identifier (e.g., auto-incremented ID).

9. SQL Commands Practiced (with examples)

CREATE TABLE

```
CREATE TABLE employees (emp_id INT PRIMARY KEY, name VARCHAR(50));
```

ALTER TABLE

```
ALTER TABLE employees ADD role VARCHAR(50);
```

DROP TABLE

```
DROP TABLE employees;
```

SELECT

```
SELECT * FROM employees;
```

WHERE

```
SELECT * FROM employees WHERE role = 'Analyst';
```

Day 1 Outcome

A strong and interview-ready foundation in SQL fundamentals, database concepts, and table manipulation using MySQL Workbench.