# Contents



## SQL: Structed Query Language

- DBMS (Database Management System): A DBMS is software that manages data storage, retrieval, and updates in databases. It allows users to interact with data using CRUD (**Create, Read, Update, Delete**) operations.

- RDBMS (Relational Database Management System): An RDBMS is a type of DBMS that organizes data into tables (relations) and uses relationships to link different data. It follows **ACID properties** for data consistency and integrity.

- SQL (Structured Query Language): SQL is the language used to interact with RDBMS systems, enabling tasks such as data retrieval, insertion, updating, and deletion.

It includes commands like SELECT, INSERT, UPDATE, and DELETE to manage database content.

## ACID

is a set of properties that ensure reliable processing in a database system, especially in transactions:

1. **Atomicity**: Each transaction is all-or-nothing; if any part of it fails, the entire transaction fails, and the database remains unchanged.
2. **Consistency**: Transactions take the database from one valid state to another, maintaining all defined rules (e.g., constraints).
3. **Isolation**: Transactions are processed independently, so the operations of one transaction do not interfere with those of another.
4. **Durability**: Once a transaction is committed, its changes are permanently stored, even in the case of a system failure.

## SQL Databases:

1. **MS SQL Server**: Developed by Microsoft, it's known for robust data management, high security, and integration with Microsoft products.
2. **MySQL**: An open-source RDBMS popular for web applications, known for speed, reliability, and easy integration in the LAMP stack.
3. **PostgreSQL**: An advanced, open-source RDBMS with support for complex queries and JSON, valued for its extensibility.
4. **Oracle Database**: Enterprise-grade RDBMS known for high performance and scalability, used widely in large organizations.
5. **DB2**: IBM's RDBMS known for reliability and optimization on mainframes, often used in large enterprises.

## NoSQL Databases:

6. **MongoDB**: A document-oriented NoSQL database that stores data in flexible, JSON-like documents, ideal for dynamic schemas.
7. **Amazon DynamoDB**: A fully managed NoSQL database service on AWS, optimized for high scalability and low-latency applications.

## In MySQL, commands are grouped into several main types:

1. **DDL (Data Definition Language)**: Defines and modifies the structure of database objects.
    - Commands: CREATE, ALTER, DROP, TRUNCATE
2. **DML (Data Manipulation Language)**: Manipulates data within tables.
    - Commands: INSERT, UPDATE, DELETE
3. **DQL (Data Query Language)**: Retrieves data from databases.
    - Commands: SELECT
4. **DCL (Data Control Language)**: Manages access to the database.
    - Commands: GRANT, REVOKE
5. **TCL (Transaction Control Language)**: Manages transactions within databases.
    - Commands: COMMIT, ROLLBACK, SAVEPOINT

## In MySQL, simple data types are categorized into three main types:

1. **Numeric Data Types**:
    - **INT**: Stores whole numbers.
    - **FLOAT** and **DOUBLE**: Stores floating-point numbers.
    - **DECIMAL**: Stores fixed-point numbers, often used for currency.
2. **String Data Types**:

- **CHAR**: Fixed-length character string.
- **VARCHAR**: Variable-length character string.
- **TEXT**: Stores long text strings.

3. **Date and Time Data Types**:
   - **DATE**: Stores date values (YYYY-MM-DD).
   - **TIME**: Stores time values (HH:MM:SS).
   - **DATETIME**: Stores date and time (YYYY-MM-DD HH:MM:SS).

## DDL:

### CREATE: Creates a new table.

```
CREATE TABLE Employees (
   ID INT PRIMARY KEY,
   Name VARCHAR(50),
   Age INT
);
```

### ALTER: Modifies an existing table, such as adding a new column.

```
ALTER TABLE Employees
ADD COLUMN Gender VARCHAR(10);

ALTER TABLE Employees
MODIFY COLUMN Age TINYINT;

ALTER TABLE Employees
DROP COLUMN Address;
```

DROP: Deletes an existing table and all of its data.

```
DROP TABLE Employees;
```

TRUNCATE: Removes all records from a table, but keeps the table structure intact.

```
TRUNCATE TABLE Employees;
```