SQL (Structured Query Language) is a standard programming language specifically designed for managing and manipulating relational databases. It is widely used to perform various operations on data, such as querying, inserting, updating, and deleting data, as well as managing the structure of databases.

OR

SQL is a standard language for storing, manipulating and retrieving data in databases.

Our SQL tutorial will teach you how to use SQL in: MySQL, SQL Server, MS Access, Oracle, Sybase, Informix, Postgres, and other database systems.

Common SQL Variants:

While SQL is standardized, various database systems have their own dialects:

- **MySQL**: Open-source and widely used.
- **Microsoft SQL Server (T-SQL)**: Offers additional procedural programming features.
- **PostgreSQL**: Known for advanced features and extensibility.
- **Oracle SQL**: Used in Oracle databases with PL/SQL for procedural extensions.
- **SQLite**: Lightweight, serverless SQL database.

MS SQL, short for **Microsoft SQL Server**, is a powerful database management system developed by Microsoft. It helps businesses store, organize, and manage large amounts of data securely and efficiently.

Key Points in Simple Words:

1. **Data Storage**: It acts like a digital filing cabinet where you can store data in tables, rows, and columns (like Excel sheets but much more powerful).
   - Example: Store employee records, sales data, or product inventories.
2. **Data Management**: It lets you easily add, update, delete, or retrieve data using a language called **SQL (Structured Query Language)**.
3. **Built for Businesses**: MS SQL is often used by companies to handle critical data for apps, websites, and business systems.
4. **Automation & Security**: It helps automate repetitive tasks and ensures the data is safe with built-in security features like encryption and access control.
5. **User-Friendly Tools**: Microsoft provides tools like **SQL Server Management Studio (SSMS)** to write SQL queries, design databases, and monitor performance.
6. **Works with Other Microsoft Products**: It's great for integration with tools like **Power BI**, **Excel**, and **Azure Cloud** for reporting and analysis.

In short, MS SQL is a reliable tool for managing data professionally and efficiently, whether it's for a small app or a large organization.

What is Data?

Data is information that is collected, stored, and used for different purposes. It can be anything that describes something about the world around us.

Examples of Data:

1. **Personal Data**: Your name, age, phone number, or email address.
2. **Numbers**: Sales figures, temperatures, or exam scores.
3. **Text**: Customer feedback, product reviews, or messages.
4. **Images/Videos**: Photos, drawings, or video files.
5. **Sensor Data**: Readings from a thermometer or a fitness tracker.

What is Database?

A **database** is like a digital storage system where information (data) is organized and saved so it can be easily accessed, managed, and updated. It's used to store data in a way that's efficient and makes it easy to find or work with later.

Example of a Database:

Imagine a library:

- The **books** are the data.

Key Features of a Database:

1. **Organized**: Data is stored in tables (like rows and columns in a spreadsheet).
2. **Accessible**: You can search for, add, or update data easily.
3. **Secure**: Databases protect data from being lost or accessed without permission.
4. **Efficient**: Handles large amounts of information quickly.

Real-Life Uses:

- **Banks**: Store account details and transactions.
- **Online Stores**: Keep track of products, prices, and orders.
- **Social Media**: Save user profiles, posts, and comments.

In short, a database is a tool to store and manage information in an organized way!
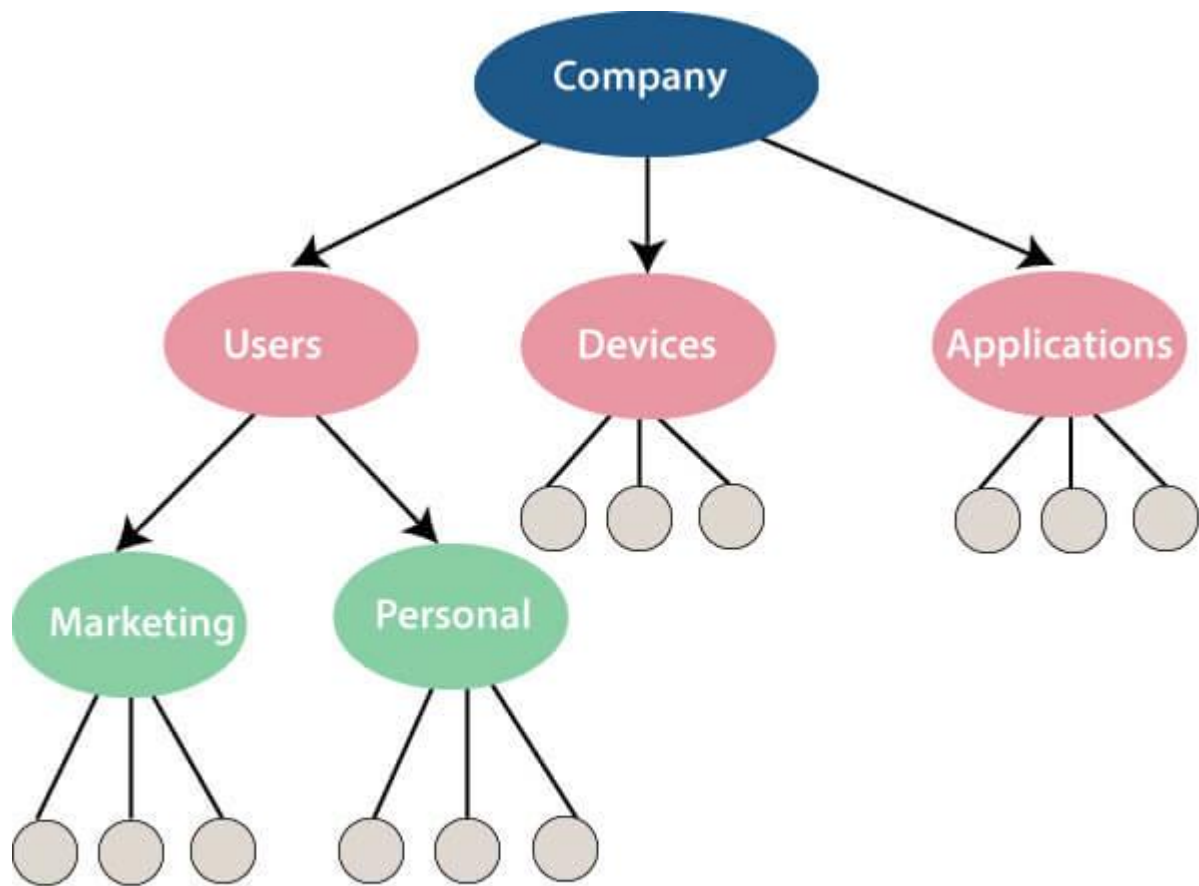
1. Relational Databases (SQL Databases)

- **Structure**: Data is stored in tables (rows and columns), similar to a spreadsheet. Tables are related to one another through **keys** (primary keys and foreign keys).
- **Data Relationships**: Enforces strict relationships between data using schemas and joins.
  - Example: A **Customers** table linked to an **Orders** table using `CustomerID`.

Examples:

- MySQL
- PostgreSQL
- Microsoft SQL Server
- Oracle Database

Use Cases:

- Banking and financial systems.
- E-commerce platforms to manage orders and inventory.
- Applications requiring complex queries and transactions.

2. Non-Relational Databases (NoSQL Databases)

- **Structure**: Data is stored in flexible formats like documents, key-value pairs, graphs, or wide-column stores. No predefined schema is required

Examples:

- MongoDB (Document Store)
- Redis (Key-Value Store)
- Neo4j (Graph Database)
- Apache Cassandra (Wide-Column Store)

Relational Model Concepts in DBMS

1. **Attribute:** Each column in a Table. Attributes are the properties which define a relation. e.g., Student_Rollno, NAME,etc.
2. **Tables** – In the Relational model the, relations are saved in the table format. It is stored along with its entities. A table has two properties rows and columns. Rows represent records and columns represent attributes.
3. **Tuple** – It is nothing but a single row of a table, which contains a single record.
4. **Relation Schema:** A relation schema represents the name of the relation with its attributes.
5. **Degree:** The total number of attributes which in the relation is called the degree of the relation.
6. **Cardinality:** Total number of rows present in the Table.
7. **Column:** The column represents the set of values for a specific attribute.

Table also called Relation

Primary Key

Domain
Ex: NOT NULL

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CustomerID	CustomerName	Status
1	Google	Active
2	Amazon	Active
3	Apple	Inactive

Tuple OR Row

Total # of rows is Cardinality

Column OR Attributes

Total # of column is Degree