**What is a Database?**

A **database** is: **An organized collection of data** that can be easily accessed, managed, and updated.

* A super-smart **electronic filing cabinet**
* Where all information (like customer names, orders, products, etc.) is **stored** safely
* And you can **search, add, update, or delete** that information anytime you want

**What is a Relational Database (RDBMS)?**

* A **Relational Database** is:  
  ➡️ A type of database that **stores data in tables** (rows and columns)  
  ➡️ **Each table** is related to others through **keys** (like IDs)

**What is SQL?**

**SQL** (Structured Query Language)  
It is a standard programming language used to **communicate with, manage, and manipulate databases**.

You mainly use SQL to:

* **Create** databases and tables
* **Insert** data
* **Retrieve** data (queries)
* **Update** data
* **Delete** data
* **Control access** to data (permissions)

It’s used across many database systems like MySQL, PostgreSQL, Microsoft SQL Server, Oracle, etc.

**Different Types of SQL**

You can think of SQL as having **five major categories** based on what you're trying to do:

| **SQL Type** | **Purpose** | **Examples** |
| --- | --- | --- |
| **DDL (Data Definition Language)** | Defines and modifies the database structure | CREATE, ALTER, DROP, TRUNCATE |
| **DML (Data Manipulation Language)** | Manages data inside tables | SELECT, INSERT, UPDATE, DELETE |
| **DCL (Data Control Language)** | Controls access to data and permissions | GRANT, REVOKE |
| **TCL (Transaction Control Language)** | Manages transactions inside a database | COMMIT, ROLLBACK, SAVEPOINT |
| **DQL (Data Query Language)** | Retrieves data from database (sometimes grouped inside DML) | SELECT |

**Quick Example:**

* CREATE TABLE employees (...) → **DDL**
* INSERT INTO employees (...) VALUES (...) → **DML**
* SELECT \* FROM employees → **DQL**
* GRANT SELECT ON employees TO user1 → **DCL**
* COMMIT after multiple inserts → **TCL**

**Example:**

* One table for Customers
* One table for Orders
* You can "relate" orders to customers using something like CustomerID!

That's why it's called "**Relational**" — tables relate to each other.

Popular **Relational Database Management Systems (RDBMS)**:

* **MySQL**
* **PostgreSQL**
* **Oracle Database**
* **Microsoft SQL Server**
* **SQLite**

**Different Types of Databases**

| **Type of Database** | **Description** | **Example** |
| --- | --- | --- |
| **Relational Database (RDBMS)** | Stores data in tables with relationships using keys | MySQL, PostgreSQL, Oracle |
| **NoSQL Database** | Stores data without strict tables (good for flexible, huge, or complex data) | MongoDB, Cassandra, Redis |
| **Cloud Database** | Databases hosted on cloud platforms | Amazon RDS, Google Cloud SQL |

**Search-Based Databases?**

➡️ A **search-based database** is a special kind of database designed to:

* **Quickly search**, **index**, and **retrieve** large amounts of information
* Handle **full-text search**, **filtering**, **ranking**, **highlighting**, etc.
* Work much faster for **search queries** than traditional relational databases

Instead of just storing and retrieving by ID (like normal databases), search databases can:

* Search **inside documents**, **across multiple fields**, **by keywords**, **phrases**, **wildcards**, etc.
* Provide **relevance-based** results (like Google does!)

**Examples of Search-Based Databases**

| **Search Database** | **Description** | **Use Cases** |
| --- | --- | --- |
| **Elasticsearch** | Distributed, RESTful search engine based on Lucene | Website search, logs analysis, big data search |
| **Apache Solr** | Open-source search platform, also based on Lucene | Enterprise search, e-commerce sites |
| **Amazon CloudSearch** | Fully managed cloud search service by AWS | App search, document search |
| **Typesense** | Open-source typo-tolerant search engine | Instant search in apps, dashboards |
| **Algolia** | Hosted search-as-a-service platform | Site search, product search |
| **MeiliSearch** | Lightning-fast, open-source search engine | Internal tools, mobile apps |