A **Database** is an organised collection of inter-related data which can be efficient stored and accessed.

There are 2 **types** of Databases.

Relational (SQL based)

Non-Relational (each have its own query language, API, or data access method).

In **Relational Database** data is stored in the form of Tables (Rows and Columns). And tables are inter-related as needed.

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| **RDBMS** | **Developed By** | **Query Language** | **Key Features** | **Common Use Cases** |
| **MySQL** | Oracle (originally MySQL AB) | SQL  (MySQL dialect) | Open-source, widely used, fast for read-heavy tasks | Web apps (WordPress, PHP apps), LAMP stack |
| **PostgreSQL** | PostgreSQL Global Dev Group | SQL  (PostgreSQL dialect) | Open-source, very powerful, supports advanced features like JSON, GIS | Complex business logic, data analysis |
| **Oracle Database** | Oracle Corporation | SQL + PL/SQL | Enterprise-grade, strong in security, scalability, and performance | Banking, ERP, large enterprises |
| **SQL Server** | Microsoft | T-SQL | Integrated with Windows ecosystem, strong BI tools (SSRS, SSIS) | Corporate apps, .NET/Windows apps |
| **SQLite** | SQLite Consortium | SQL (SQLite flavor) | Lightweight, file-based, zero-configuration | Mobile apps, local storage (browsers, apps) |

There are different types of Relational Database Management System (RDBMS). Like MySQL, PostgreSQL, Oracle, SQL Server. All these RDBMS use the base SQL to query the database. However, each RDBMs have their own dialect of SQL.

In Non-Relational Database, data is stored in Json like document, Key Value, wide column, graphs etc.

mongoDB, Redis, Cassandra, Neo4j.+

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| **NoSQL Type** | **Example DB** | **Query Style** |
| Document Store | MongoDB | Mongo Query Language (MQL) |
| Key-Value Store | Redis, DynamoDB | Commands / API calls |
| Column Store | Cassandra, HBase | CQL / HQL (custom SQL-like) |
| Graph Store | Neo4j | Cypher |

In Relational Database, Enforce **schema** (fixed/defined table structure).

# Schema

A schema is a logical container or namespace in a relational database that holds database objects like Tables, Views, Indexes, Stored Procedures, Functions, Triggers, Sequences, Synonyms

**Purpose**: Organize logically, manage access, Avoid name conflicts, multi-tenant design.

In **Oracle**: Every user has their own default schema. Schema name = user name by default.

In **PostgreSQL**: A single database can have many schemas. Default schema is usually public

In **MySQL**: Schema = Database. CREATE SCHEMA is just an alias for CREATE DATABASE

# Keys

Primary key and Surrogate Key does not have a mapping to the real world.

Natural key will have a mapping in the real world.

Foreign key, usually it is the primary key in another table.

Composite key = Primary key + Primary key + ….