Database

What is database?

**Data** A data is a collection of facts, figures, information that is stores and can be used by a computer / program for calculation, reasoning, discussion.

A database is a collection of related data stored in a format that can easily be accessed. Databases are used for storing, maintaining and accessing any sort of data.

What is DBMS?

A DBMS is software that allows users to create, manage, and interact with databases, ensuring data is efficiently stored, retrieved, and maintained.

It provides a interface between users and the data, helping manage data structures, enforce data integrity, control data access, and maintain data consistency.

DBMS examples included MySQL, PostgreSQL, Oracle, and SQL Server

Types of databases

Relational Database (RDBMS)

Stores data in table with rows and columns.

Uses SQL for managing and querying data.

Ensures data integrity through relationships.

Relational database examples are MySQL, PostgreSQL, and Oracle.

NoSQL Database

Non relational, suitable for unstructured and semi structured data.

Supports various data models like key-value, document, column family, and graph.

Scales horizontally, ideal for large datasets and real tim applications.

Non relational database examples are MongoDB (document based), Redis (key-value model), Cassandra (column family), Neo4j (graph based).

Object oriented Database

Stores data as objects, similar to object oriented programming.

Suitable for applications with complex data structures.

Object oriented database example is db4o

Hierarchical Database

Data is organized in a tree like structure, with a single root and multiple child nodes.

Commonly used in applications requiring fast data retrieval and predictable patterns.

Hierarchical database example is IBM Information Management System.

Network Database

Similar to hierarchical but allows multiple parent child relationships.

Uses a graph structure for representing data relationships.

Network database example is integrated data store.

In-memory Database

Stores data in the main memory for faster data retrieval and low latency.

Used in applications requiring high speed data processing.

In memory database example is Redis.