06 Introduction to Databases

- **Databases**
- **DBMS vs. RDBMS**
- **SQL vs. NoSQL**
- **Popular Database Systems (MySQL, PostgreSQL, Oracle, etc.)**

01 Databases

- A database is an organized collection of data, generally stored and accessed electronically from a computer system\
- It allows for data to be stored, retrieved, and manipulated efficiently
- Databases are used to store large volumes of data in a structured way so that it can be easily managed and retrieved

02 DBMS vs RDBMS

- **DBMS (Database Management System)**
  - A software that manages databases
  - It allows users to create, read, update, and delete data in a database
  - Examples: Microsoft Access, SQLite
- **RDBMS (Relational Database Management System)**
  - A type of DBMS that stores data in tables and allows for relationships between tables
  - It follows the principles of relational model (e.g., data is stored in tables with rows and columns)
  - Examples: **MySQL**, PostgreSQL, Oracle
  - In RDBMS, relationships between data are defined using foreign keys, whereas DBMS might not support this concept

03 SQL vs NoSQL

- **SQL (Structured Query Language)**
  - A standard language used to communicate with relational databases
  - It is used to perform operations like querying, updating, and managing data
  - **Examples of SQL databases:** MySQL, PostgreSQL, SQL Server
- **NoSQL (Not Only SQL)**

- Refers to non-relational databases that store data in formats other than tables
- Useful for handling large volumes of unstructured or semi-structured data
- **Examples of NoSQL databases:** MongoDB (document-based), Redis (key-value store), Cassandra (column-family store)
- SQL databases use structured schemas with tables and relationships, while NoSQL databases can use flexible schemas or no schema at all

04 Popular Database Systems

- **MySQL**
  - An open-source relational database management system
  - Widely used in web applications and known for its reliability and ease of use
- **PostgreSQL**
  - An advanced open-source RDBMS known for its compliance with SQL standards and support for complex queries
- **Oracle**
  - A powerful RDBMS used in large enterprise environments, known for its robustness and scalability
- **SQLite**
  - A lightweight, self-contained SQL database engine that is commonly used in mobile apps and small-scale applications