Simple DBMS Notes

Introduction to DBMS:

A Database Management System (DBMS) is software designed to store, manage, and retrieve data efficiently.

A DBMS provides an interface for users to interact with databases through querying and transaction processing.

It handles data integrity, security, and concurrency.

Components of DBMS:

1. Data: The collection of raw facts and figures.

2. DBMS Software: Software that manages data.

3. Hardware: Physical devices used to store and process data.

4. Users: The people who interact with the DBMS.

Types of DBMS:

1. Hierarchical DBMS: Data is structured in a tree-like hierarchy.

2. Network DBMS: Data is organized in a graph structure.

3. Relational DBMS: Data is stored in tables (most common).

4. Object-Oriented DBMS: Data is stored in objects.

Relational Database Model:

- Data is organized in tables (relations).

- Each table consists of rows (records) and columns (attributes).

- Each record in a table is identified by a unique key (Primary Key).

- Foreign keys are used to establish relationships between tables.

SQL (Structured Query Language):

- SQL is a language used to interact with relational databases.
- SQL Commands include:
  - SELECT: Retrieve data from a table.
  - INSERT: Add data to a table.
  - UPDATE: Modify existing data.
  - DELETE: Remove data.
  - CREATE: Create tables and other database objects.

Normalization:

- The process of organizing data to reduce redundancy and dependency.
- Normal forms include:
  - 1NF (First Normal Form): Eliminate duplicate columns.
  - 2NF (Second Normal Form): Eliminate partial dependencies.
  - 3NF (Third Normal Form): Eliminate transitive dependencies.

ACID Properties:

1. Atomicity: Transactions are all or nothing.
2. Consistency: Database is consistent before and after a transaction.
3. Isolation: Transactions are isolated from each other.
4. Durability: Committed transactions are permanent.

Conclusion:

A DBMS is a crucial tool for managing large datasets and maintaining data integrity and security.

Understanding its basic concepts is fundamental for working with databases in any application.