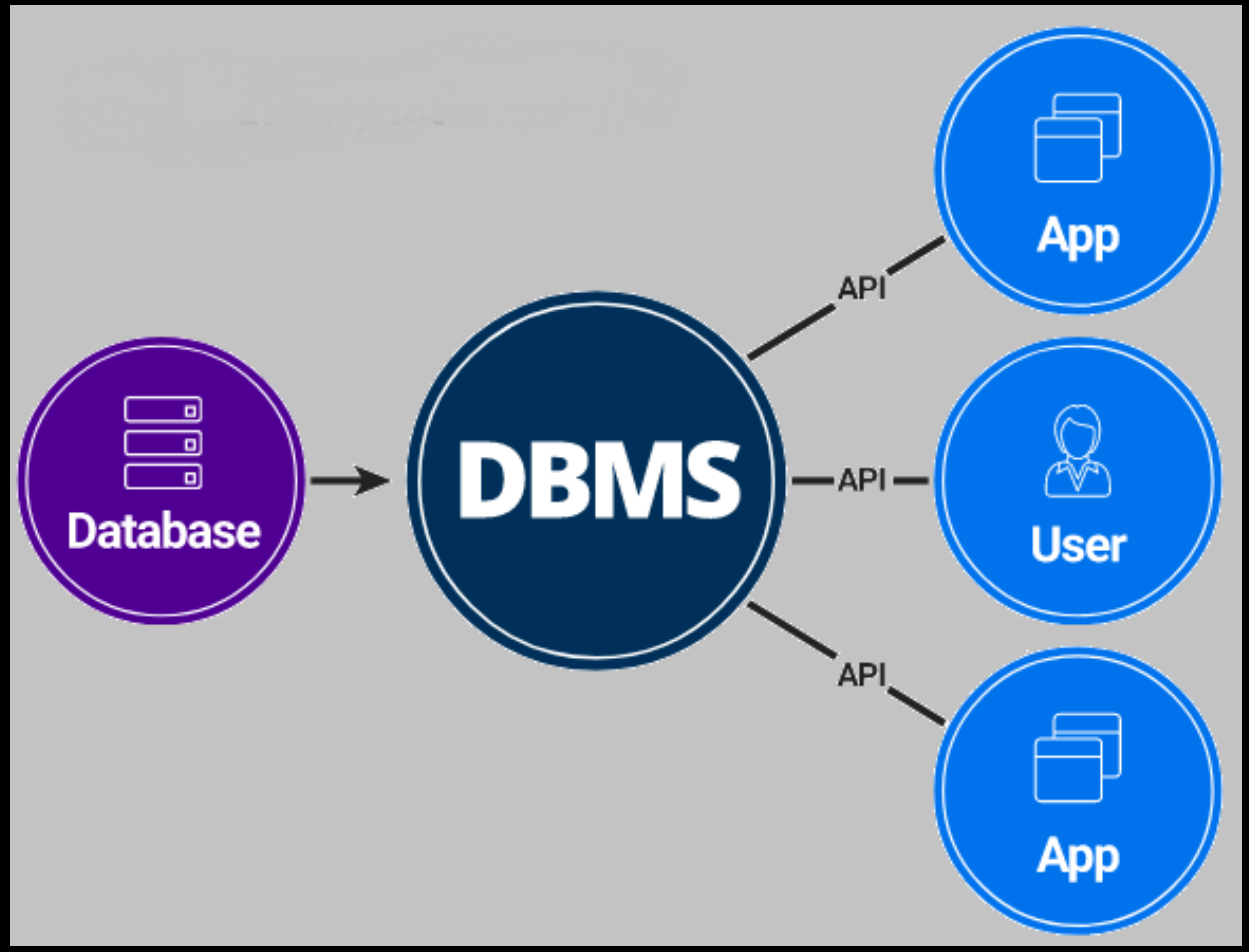
Database Management System

A Database Management System (DBMS) is a software system that is designed to manage and organize data in a structured manner. It allows users to create, modify, and query a database, as well as manage the security and access controls for that database.



Data

Collection of meaningful information

e.g.- Text, number, Images, Videos

Database

Systematic collection of data

e.g. – 1. Record of students stored in files

2. Information stored over internet

Database Management System(DBMS)

The software which is used to manage database is called database management system

e.g. 1. MySQL

2. Microsoft Access

What is the need of DBMS ?

Database system are basically developed for large amount of data
When dealing with huge amount of data there are two things that require optimization

- Storage of data
- Retrieval of data

Database Language

Types of DBMS languages:

1. Data Definition Language (DDL):

- ✓ Used to classify the database structure.
- ✓ To create the database instance – CREATE, ALTER, DROP, RENAME.

2. Data Manipulation Language (DML):

- ✓ DML is used for accessing and manipulating data in a database.
- ✓ To read records from table – SELECT, INSERT, UPDATE, DELETE.

3. Data Control language (DCL):

- ✓ DCL is used for granting and revoking user access on a database –
- ✓ To grant access to user – GRANT
- ✓ To revoke access from user – REVOKE

Relation Database

A relational database management system (RDBMS) is a system where data is organized in two-dimensional tables using rows and columns.

This is one of the most popular data models which is used in industries. It is based on SQL.

Every table in a database has a key field which uniquely identifies each record.

This type of system is the most widely used DBMS.

Relational database management system software is available for personal computers, workstation and large mainframe systems.
For example – Oracle Database, MySQL, Microsoft SQL Server etc.

Functions of DBMS

- To store data
- To organize data
- To control access to data
- To protect data
- Create databases
- Modify database data (insert, update, delete)
- Maintain database structures
- Provide security
- Perform backup and recovery

Uses of DBMS

- To develop software applications In less time
- Security and integrity of data
- Easy to understand and user friendly
- Data independence and efficient use of data
- Effective and efficient management of data
- Query processing and management
- Better Decision making
- Data sharing and storage
- Better access to accurate data
- Ensures error free information

APPLICATIONS

- **Banking**: For customer information, account, and loans, and transaction.
- **Airline:** For reservation and schedule information.
- **Universities**: For students information, course registration, and grades.
- **Telecom**: calls made, customer details, network usage
- **Credits card transaction:** For purchases on credits cards and generation of monthly statements.
- **Sales**: For customer, product, and purchase information.
- Railway Reservation System
- Online Shopping etc.

Relational DBMS (RDBMS):

- MySQL
- PostgreSQL
- Oracle Database
- Microsoft SQL Server
- SQLite
- IBM Db2
- MariaDB
- Amazon Aurora

NoSQL DBMS:

- MongoDB
- Cassandra
- Redis
- CouchDB
- Amazon DynamoDB
- Apache HBase
- Neo4j (graph database)

Object-Oriented DBMS (OODBMS):

- db4o
- ObjectDB
- ObjectStore

Distributed DBMS:

- Google Bigtable
- Apache Cassandra
- Amazon DynamoDB
- CockroachDB

Graph DBMS:

- Neo4j
- OrientDB
- ArangoDB

Document Store DBMS:

- MongoDB
- CouchDB
- RavenDB

In-memory DBMS:

- SAP HANA
- Redis
- Memcached

NewSQL DBMS:

- Google Spanner
- CockroachDB
- NuoDB

Multimodel DBMS:

ArangoDB
OrientDB

Time-Series DBMS:

InfluxDB
OpenTSDB
Prometheus