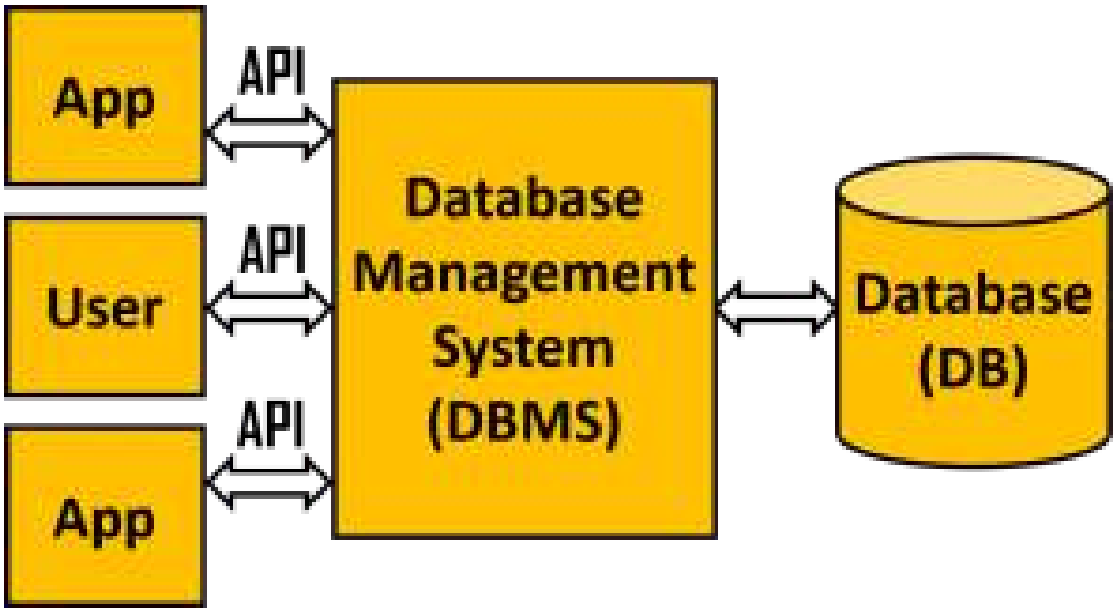
Sixth Chapter Lesson-2: Database Management System(DBMS) and RDBMS.

At the end of this lesson-

- 1. You will be able to explain & concept of DBMS.
- 2. You will be able to describe the functions of DBMS.
- 3. You will be able to describe advantages and disadvantages of DBMS.
- 4. You will be able to describe RDBMS, uses of RDBMS and advantages of RDBMS.
- 5. You will be able to describe DBA and its functions.

DBMS: A Database Management System (DBMS) is one kind of system software for creating and managing databases. The DBMS provides users and programmers with a systematic way to create, retrieve, update and manage data. The DBMS essentially serves as an interface between the database and end users or application programs.

Some DBMS examples include MySQL, PostgreSQL, Microsoft Access, SQL Server, FileMaker, Oracle, dBASE, Clipper, and FoxPro.



Functions of DBMS:

- 1. Data dictionary management
- 2. Data storage management
- 3. Data transformation and presentation
- 4. Security management
- 5. Multi-user access control
- 6. Backup and recovery management
- 7. Data integrity management
- 8. Database access interfaces
- 9. Database communication interfaces
- 10. Transaction management.

Advantages and disadvantages of DBMS:

Advantages of DBMS:

- **Better data sharing:** The DBMS helps create an environment in which end users have better access to more and better-managed data.
- **Improved data security:** A DBMS provides a framework for better enforcement of data privacy and security policies.
- **Improved data integration:** It becomes much easier to see how actions in one segment of the company affect other segments.
- **Minimized data inconsistency:** Data inconsistency exists when different versions of the same data appear in different places. The probability of data inconsistency is greatly reduced in a properly designed database.
- **Improved data access:** The DBMS makes it possible to produce quick answer to ad hoc queries.
- **Improved decision making:** The availability of data, combined with the tools that transform data into usable information, empowers end users to make quick, informed decisions that can make the difference between success and failure in the global economy.

Disadvantages of DBMS:

- **Increased costs:** Database systems require sophisticated hardware and software and highly skilled personnel. The cost of maintaining the hardware, software, and personnel required to operate and manage a database system can be substantial.
- **Management Complexity:** Database systems interface with many different technologies and have a significant impact on a company's resources and culture.
- **Maintaining currency:** To maximize the efficiency of the database system, you must keep your system current. You must perform frequent updates and apply the latest patches and security measures to all components.
- **Frequent upgrade/replacement cycles:** DBMS vendors frequently upgrade their products by adding new functionality. Such new features often come bundled in new upgrade versions of the software. Some of these versions require hardware upgrades. Not only do the upgrades themselves cost money, but it also costs money to train database users and administrators to properly use and manage the new features.

RDBMS: A Relational Database management System(RDBMS) is a database management system based on the relational model introduced by E.F Codd. In relational models, data is stored in relations(tables) and is represented in the form of tuples(rows).

RDBMS is used to manage Relational databases. Relational database is a collection of organized sets of tables related to each other, and from which data can be accessed easily. Relational Database is the most commonly used database these days.

Difference between RDBMS and DBMS: Database Management System (DBMS) is a software that is used to define, create and maintain a database and provides controlled access to the data. Relational Database Management System (RDBMS) is an advanced version of a DBMS.

DBMS	RDBMS
DBMS stores data as a file.	RDBMS stores data in tabular form.
Data elements need to access individually.	Multiple data elements can be accessed at the same time.
No relationship between data.	Data is stored in the form of tables which are related to each other.
Normalization is not present.	Normalization is present.
DBMS does not support distributed databases.	RDBMS supports distributed databases.
It stores data in either a navigational or hierarchical form.	It uses a tabular structure where the headers are the column names, and the rows contain corresponding values.
It deals with small quantities of data.	It deals with a large amount of data.
Data redundancy is common in this model.	Keys and indexes do not allow Data redundancy.
It is used for small organizations and deals with small data.	It is used to handle large amounts of data.
It supports single users.	It supports multiple users.
Data fetching is slower for large amounts of data.	Data fetching is fast because of relational approach.

The data in a DBMS is subject to low security levels with regards to data manipulation.	There exists multiple levels of data security in a RDBMS.
Low software and hardware necessities.	Higher software and hardware necessities.
Examples: XML, Microsoft Access, etc.	Examples: MySQL, PostgreSQL, SQL Server, Oracle, etc.

Database Administrator (DBA): Database administrator is an individual who is responsible for the maintenance and operation of the database to keep the data secure.

A database administrator's responsibilities can include the following tasks:

- 1. Installing and upgrading the database server and application tools.
- 2. Allocating system storage and planning storage requirements for the database system.
- 3. Modifying the database structure as necessary.
- 4. Enrolling users and maintaining system security.
- 5. Controlling and monitoring user access to the database.
- 6. Monitoring and optimizing the performance of the database.
- 7. Planning for backup and recovery of database information.
- 8. Backing up and restoring databases.
- 9. Generating various reports by querying from database as per need.
- 10. Managing and monitoring data replication.

Lesson Evaluation-

Knowledge Based Questions:

- a.What is DBMS?
- a.What is RDBMS?
- a.What is database administrator(DBA)?

Comprehension Based Questions:

- b.Explain the role of database administrator in the database.
- b.Is it needed to validate data in DBMS? Explain it.