

# Introduction to DBMS.

Database Management System (DBMS): It is a collection of program that enables users to create & maintain a database.

## Characteristics of Database Approach:

- (1) Self describing nature of a database system.
- (2) Insulation between programs & data & abstraction.
- (3) Sharing of data in an organized way and multiuser transaction processing.

## Difference b/w File System and DBMS:

### File System

1. Less number of files used
2. Data access takes lot of time
3. Data redundancy is problem  
Loss of integrity (accurate & consistent data)
4. Doesn't provide security
5. Concurrency control not possible → single user system

### DBMS.

1. Large number of files used.
2. Less time.
3. Redundancy problem is solved. Data is independent.
4. Better security, username & password.
5. Multiple user access data at the same time.

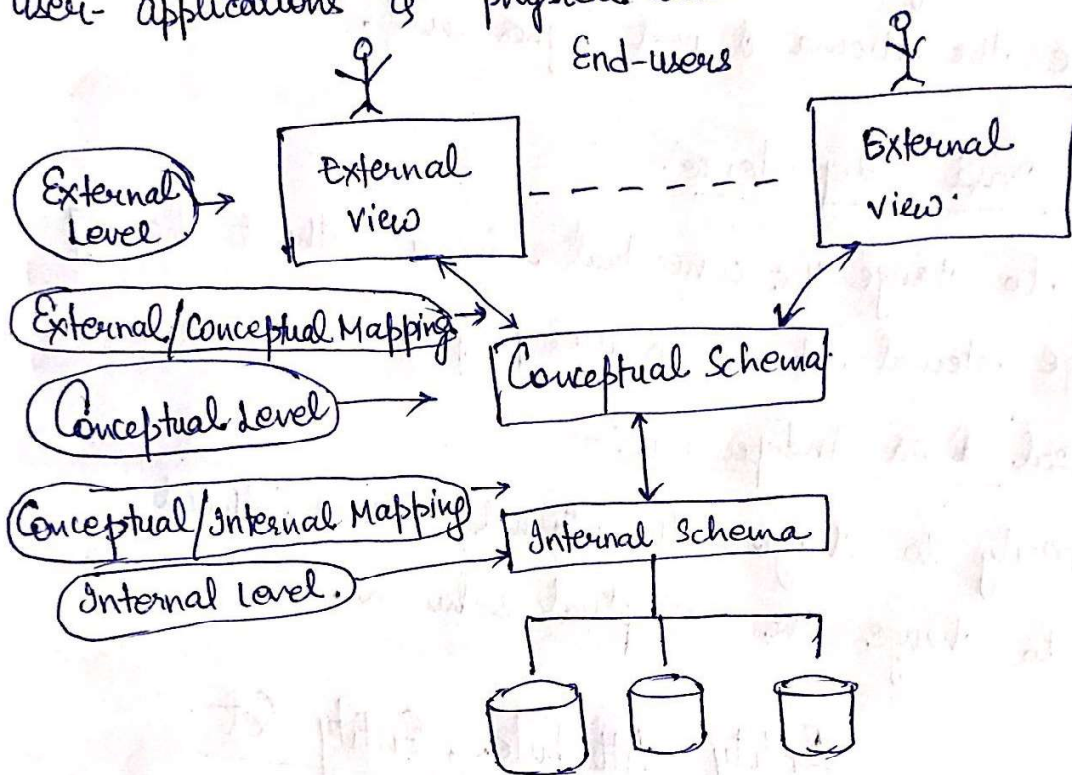
- DBMS is a general purpose software system that facilitates the process of defining, constructing, manipulating & sharing databases among various users & applications.
- A database can be defined by involving specifications on data types, structures & constraints of data to be stored.
- The descriptive info. is stored by DBMS in form of database catalog or dictionary, known as meta-data.
- Constructing the database is process of storing the data on some storage medium controlled by DBMS.
- Manipulating a database includes functions such as querying the database to retrieve specific data, updating the database & generating reports from data.
- Sharing a database allows multiple users & programs to access the database simultaneously.

## Adv. of using DBMS Approach

- Controlling redundancy
- restricting unauthorized access
- providing back-up & recovery
- providing multiple user interfaces
- Enforcing integrity constraints

## The three-schema architecture

The goal of three-schema architecture is to separate the user-applications from physical database.



- (1) The internal level has an internal schema, which describes the physical storage structure of the database.
- (2) The conceptual level has a conceptual schema, which describes the structure of whole database to users community.
- (3) The external level or view level includes a number of external schemas or user views. Each external schema describes the part of database that a particular user group is interested in & hides the rest of database from that user group.

## Data Independence:

It can be defined as the capacity to change the schema at one level of a database system without having to change the schema at next higher level.

### (1) Logical Data independence:

Capacity to change the conceptual schema without having to change external schemas or user program.

### (2) Physical Data Independence:-

The capacity to change the internal schema without having to change the conceptual schema.

## Entity, Attributes, Entity Set.

- Entity is an object that exist and is distinguishable from other objects. For eg. a person with given UID.
- An entity is described using a set of attributes, all entities in a given entity set have same attributes.
- An entity set is a collection of similar entities.

## Relationship & Relationship Sets

- Relationship is association b/w two or more entities.
- Relationship set is a set of relationships of same type ie relate two or more entity sets.

## Database Design Techniques:-

### ① Top Down Approach:-

We start defining the data set and then we go on defining data elements in those sets.

Eg. Entity-relationship Modelling.

### ② Bottom-up Approach:-

We start defining required attributes first and then group those attributes to form the entities.

Eg. Normalization

## Integrity Constraints (IC)

- It is a condition specified on a database schema & restricts the data that can be stored in an instance of the database.
- If the database instance satisfies all the integrity constraints specified on database schemas, it is legal instance.
- DBMS enforces IC, in that it permits only legal instances to be stored in database.