

**Data Base Management Systems  
(DBMS)**

For  
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*BY*

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# Data Base Management Systems

Data bases and database systems have become an essential component of everyday life in modern society.

## **Need to store data :**

Data originates at one time and used later(i.e.) Store registrations for grading later, Store for future information needs, Governmental regulations requires access to past data, Data used later for auditing, evaluation purpose, Used more than once : save for future use.

## **Limitations of manual methods:**

Problems of speed, Problems of accuracy, Problems of consistency and reliability, Problems of poor response time, Problems of work-load handling capability, Problems of meeting ad hoc information needs, Problems of cost, Problems due to human frailties: (misplaced) loyalty, inconsistency, irregularity, difficulties in handling big tasks.

## **Why computerized data processing?**

Advantage of speed, Advantage of accuracy, Advantage of reliability and consistency, Advantage of storage and retrieval efficiency, Advantage of on-line-access to meet ad-hoc needs, Advantage of cost.

**Data Base :** Collection of related data.

## **Data Base Management Systems**

**Definition of DBMS:** A data base management system(DBMS) is a collection of programs that enables users to create and maintain a database. It is a general purpose software system that facilitates the process of defining, constructing, manipulating and sharing databases among the various users and applications.

## **Advantages of Database Systems**

- Minimal Data Redundancy
- Data Consistency
- Data Integration
- Data Sharing
- Enforcement of Standards
- Application Development Ease
- Better Controls
- Data Independence
- Reduced Maintenance

Maintenance is less and easy, again, due to the centralized nature of the system.

## **Functions of a DBMS**

The functions performed by a typical DBMS are the following:

### **Data Definition**

The DBMS provides functions to define the structure of the data in the application. These include defining and modifying the record structure, the type and size of fields and the various constraints/conditions to be satisfied by the data in each field.

### **Data Manipulation**

Once the data structure is defined, data needs to be inserted, modified or deleted. The functions which perform these operations are also part of the DBMS. These function can handle planned and unplanned data manipulation needs. Planned queries are those which form part of the application. Unplanned queries are ad-hoc queries which are performed on a need basis.

### **Data Security & Integrity**

The DBMS contains functions which handle the security and integrity of data in the application. These can be easily invoked by the application and hence the application programmer need not code these functions in his/her programs.

### **Data Recovery & Concurrency**

Recovery of data after a system failure and concurrent access of records by multiple users are also handled by the DBMS.

## Data Dictionary Maintenance

Maintaining the Data Dictionary which contains the data definition of the application is also one of the functions of a DBMS.

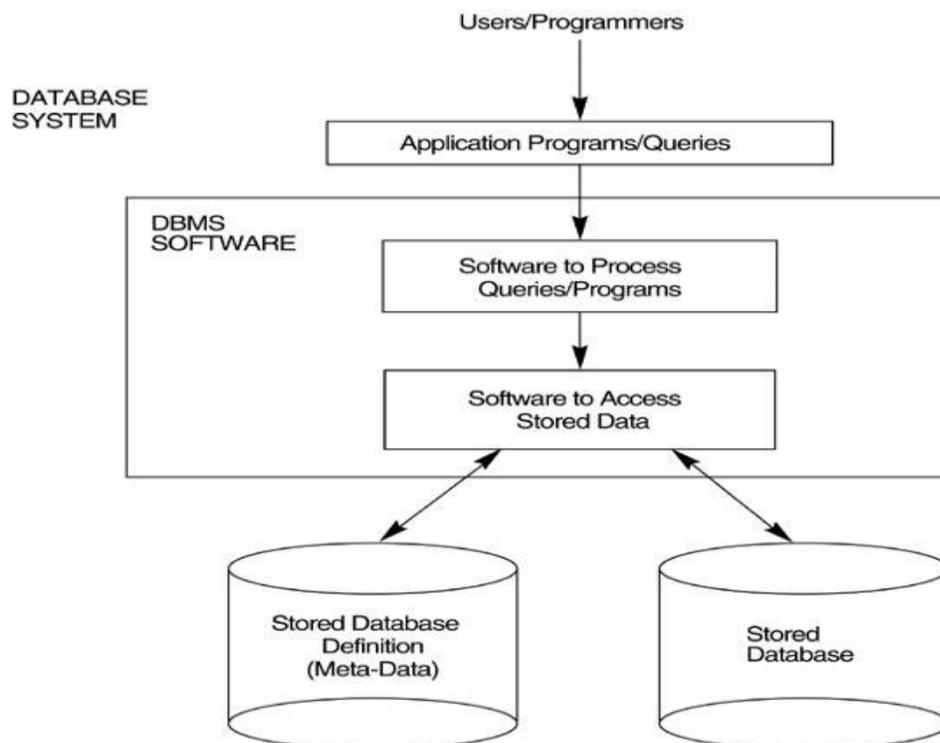
## Performance

Optimizing the performance of the queries is one of the important functions of a DBMS. Hence the DBMS has a set of programs forming the Query Optimizer which evaluates the different implementations of a query and chooses the best among them.

## Types of Databases and Database Applications

- Numeric and Textual Databases (Traditional Database)
- Multimedia Databases (Video clips, pictures, sound message)
- Geographic Information Systems (GIS)(Weather data, map analysis, satellite images)
- Data Warehouses (Decision making)
- Real-time and Active Databases (Internet based (World wide web))

A simplified database system environment.



## **Database Users:**

**Database administrators:** responsible for authorizing access to the database, for coordinating and monitoring its use, acquiring software, and hardware resources, controlling its use and monitoring efficiency of operations.

**Database Designers:** Responsible to define the content, the structure, the constraints, and functions or

transactions against the database. They must communicate with the end-users and understand their needs.

**End users :** End users are the people whose jobs require access to the database for querying, updating, and generating reports; the database primarily exists for their use. There are several categories of end users:

**Casual End User:** access database occasionally when needed. But they may need different information each time.

**Naive or Parametric End user :** they make up a large section of the end-user population. They use previously well-defined functions in the form of “canned transactions” against the database. Examples are bank-tellers or reservation clerks who do this activity for an entire shift of operations.

**Sophisticated End User :** These include business analysts, scientists, engineers, others thoroughly familiar with the system capabilities. Many use tools in the form of software packages that work closely with the stored database.

**Stand-alone End User :** Mostly maintain personal databases using ready-to-use packaged applications. An example is a tax program user that creates his or her own internal database.