Data Base Management system

Unit:1 Introduction to Database

- **Data**:- Data is a meaningful Information
  - Facts that can be recorded.
  - Data is a collection of number, alphabets and special symbols.

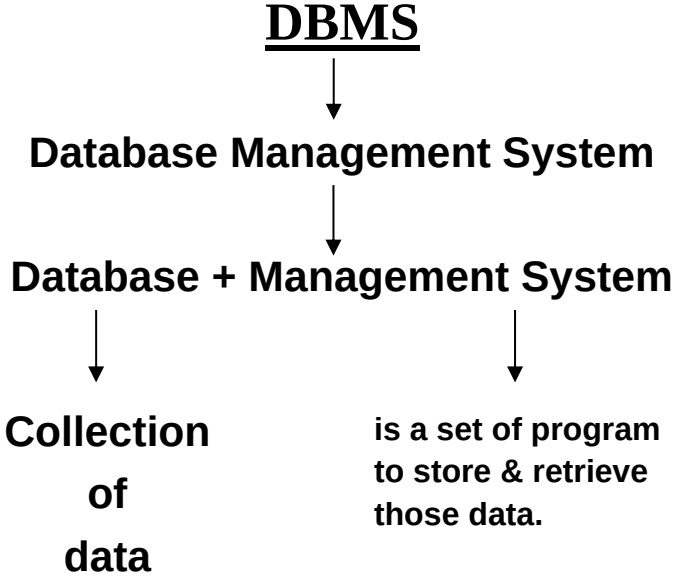
    Ex. Radhika

- **Information:-** It is a collection of data.

  Ex. Radhika , H/No. 10, society.

- **What is Database ? in Detail :-**
  - Database consist of collection of computerized data files that stored actual data which is used by Different Application like ... Banking, Airlines, University....
  - Database stored all data in physical forms.
  - Fos Accessing data into D base we need DBMS it is Language.

  Ex. Oracle , Fox pro, & DB2
  - A database is designed, built & populated with data for a specific purpose.
  - A Computerized database may be created and maintained either by a group of application programs written specifically for that task or by a data base management system.



★ DBMS:-

- DBMS is a collection of data & set of programs to access & store those data in an easy & efficient manner.
- DBMS is a software which is used to manage database.

  Ex. My SQL, Oracle, etc. are popular commercial DBMS use in different application.

★ Comparison b/w traditional file v/s DBMS:-

File Management	Database Management
➢ Data redantancy. ➢ Data dependency. ➢ It has low security. ➢ There is no any access control. ➢ Small system (C++). ➢ It is cheap. ➢ Simple structure. ➢ Very low design. ➢ Not secure. ➢ Single user only use file management. ➢ Isolated data. ➢ Backup mechanism is very simple (only you have to save file).	➢ Large system(oracle). ➢ It is Expensive. ➢ Complex structure. ➢ Designing is important. ➢ Very secure. ➢ Same time multiuser can use. ➢ Shared data. ➢ Very complex to take backup.

★ Characteristics of data in database:-

1) Data Persistence:-

- Persistence means if the data is not removed clearly then all the data will be maintained in DBMS.
- Data that is require to manage needs to be stored some where until job is not over.

★ Define data in database:-

- All meaningful data are store in database system.
  Ex. Employee data, Hospital data, school data.
- Database system support single user system data and also multi user system data.
- DBMS support data integrated features.

- Integrated means you can connect more than one table data each other.
  Ex. Student table connect with enrolment table.

- Another function of DBMS data can be shared multiple user access concurrent data.
  Ex. The Department Information in the employee file would typically be share by different users.

Ex.

Employee	**Name**	**ADDRESS**	**DEP.**	**SALARY**
Enrollment	**Name**	**COURSE**		

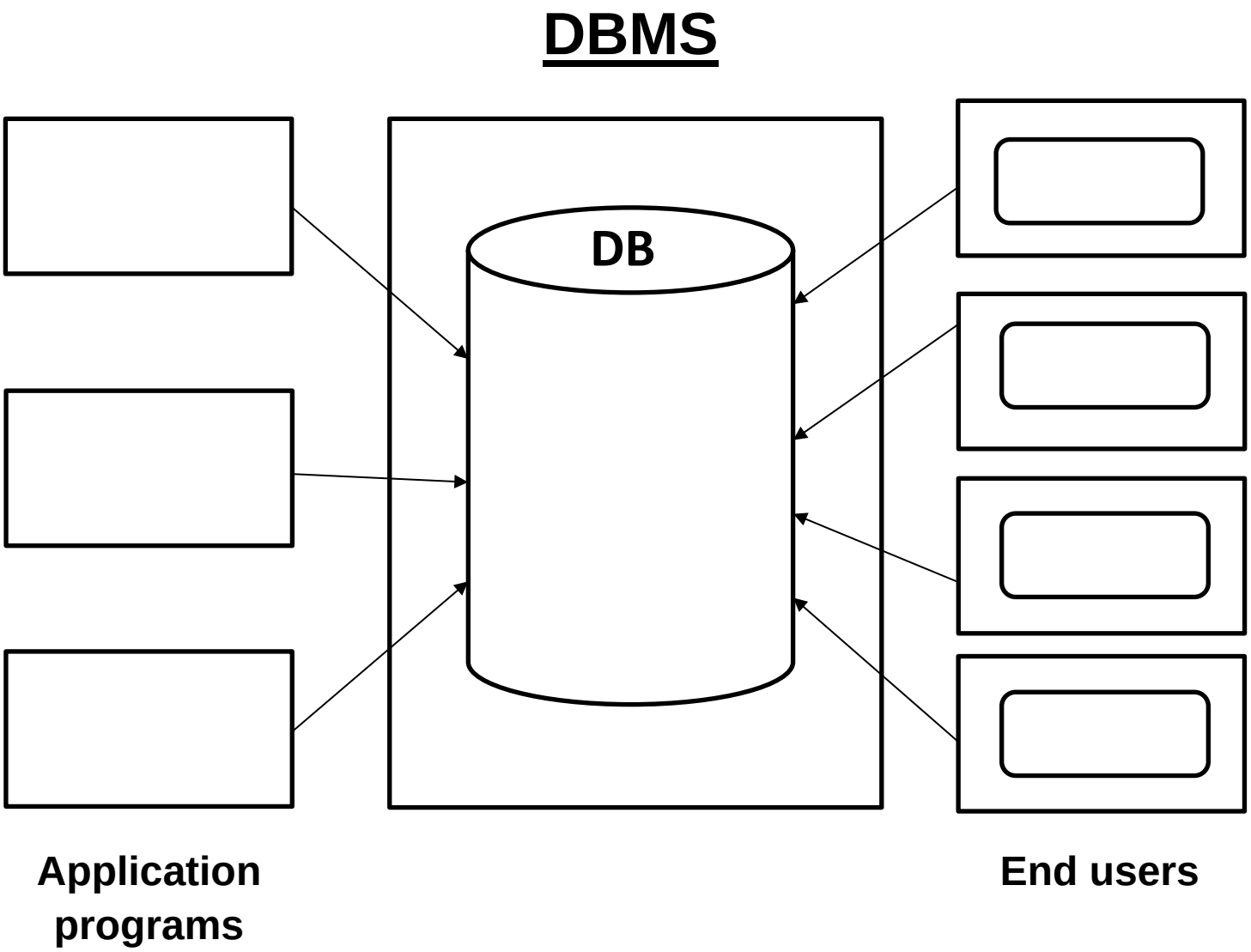
CONCURRANCY:- **Means that** Many users can access data at the same time.

Consistency:- means that each user sees a consistent view of data, including visible changes made by user's own transactions & transactions of other users.

Integrity:- Numeric cells should not accept alphabetic data.

★ Component of database system environment:-

- Database system have four major components.
  1. **Data**
  2. **Hardware**
  3. **Software**
  4. **Users.**



1. **Data:-** System on the large machines tend(Access karna) to be multi-user.
   - Whare as those on smaller machine tend to be single user.
   - A single user system in which at most user can access the database at any given time.
   - A multiuser system is a system in which many users can access the database at the same time.

★ Large system have to types of data:-

1) **Integrated:-** The process of combining data from different sources into a single view.
   Ex. GGU Database have contain both files or data like employee name, address, departments etc…..
2) **Shared:-** Different users can effectively access the same piece at the same time.

2. Hardware:-

- The hardware components of the system consist of:-
- The secondary storage volumes, mostly magnetic disks that are used to hold the stored data together with the I/O devices, device controllers, I/O channels.
- The hardware processor and associated main memory that are used to support the execution of the database system software.

3. Software:- The DBMS is most important software in overall system.

- All requests for access to the database are handled by the DBMS.
- For adding data removing data, retriving data from and updating data in such files or tables, all facilities provide by the DBMS.

4. Users:- There are three types of users.

1) Application Programmers:-

- Application programmers are responsible for writing database application programs in same programming language such C++, Java or some higher level "Fourth generation language.
- Such programs access the database by issuing the appropriate request.
- The purpose of those programs is to allow and end user to access the database from an online workstation.

2) End user:-

- The end users interact with the system form online workstation**.**

3) Database Administrator (DBA):-

- The technical person responsible for implementing the data administrator's decisions is the database administrator.

Data Administrator:- DA is the person who make the strategic and policy regarding the data of the enterprise.

DBA:- The database administrator is the person who provide the necessary technical support for implementing those decisions.

❖ Function of DBMS:-

1) Data dictionary management:-

- The DBMS stores metadata in a data dictionary.
- All the programs that access the data in the database work through the DBMS.
- The DBMS users the data dictionary to look up the required data component structures and relationships.

2) Data storage management:-

- The DBMS creates and manages the complex structures requires for data storage.
- A modern DBMS provides storage not only for the data but also for relate data entry forms or reports, data validation, rules, code, video & picture formats & so on.

3) Security Management:-

- The DBMS creates a security system that enforces security & data privacy.
- Security rules determines which users can access the database which data items users can access, and which

data operations (read, add, delete or modify) the user can perform.

- This is specially important in multiuser database systems.

4) Multiuser access control:-

- The DBMS user complex algorithms to ensure that multiple users can access the database concurrently without compromising the integrity if the database.

5) Backup and recovery management:-

- The DBMS provides backup & recovery data to ensure data safety and integrity.

6) Data integrity management:-

- The DBMS promotes and enforces integrity rules, The data relationships shared in the data dictionary are used to enforce data integrity.

7) Database access languages & application programming interfaces:-

- The DBMS provides data access through a query language.
- The DBMS also provides application programming interfaces to languages such as C, Java, visual etc.

8) Database communication interfaces:-

- Current generation DBMS accept end user requests via multiple, different network environments.

- Ex. The DBMS might provide access to the database via the internet through browsers.
- In this environment, communications can be accomplished in different ways.

★ Advantages & disadvantages of DBMS :-

❖ Advantages:-

1. Improved data sharing:-

- The DBMS helps create an environment in which end users have better access to more & better managed data.
- Such access makes is possible for end users to respond quickly to changes in their environment.

2. Improved data security:-

- The more users access the data, the greater the risks of data security.
- A DBMS provides a framework for better enforcement data privacy & security policies.

3. Better data integration:-

- Wider access to well managed data promotes an integrated view of the organization's operation a clearer view of the big picture.
- It becomes much easier to see how action in one segment of the company affect other segment.

4. Minimized data inconsistency:-

- Data inconsistency exists when different version of the same data appear in different places.

- The probability of data inconsistency in greatly reduced in a properly designed database.

5. Improved data access:-

- The DBMS makes it possible to produce quick answer to ad hoc queries.
- A query is a specific request issued to the DBMS for data manipulation.
  EX. To read or update the data simply put , a query Is a question, an ad hoc query is a spur-of the moment question.
- The DBMS sends back an answer (called the query result set) to the application.
  Ex:- end user

6. . Improved decision making:-

- Be her managed data & improved data access make it possible to generate better quality information ,on which better decisions are based.
- The quality of the information generated depends on the quality of the underlying data.

7. Increased end–user productivity :-

- The availability of data . combined with the tools that transform data in to usable information, end users to make quick, informed decisions that can make the different b/w success & failure in the global economy.

❖ Disadvantages of DBMS:-

1. Complexity:-

- The provision of the functionality that is expected of a good DBMS makes the DBMS an extremely complex piece of software .
- Database designers, developers and DBA & end users must understand this functionally to make full advantage of it failure to understand the system can lead to bad design decision, which can have serious casequences for an organization.

2. Size:-

- The complexity & functionality makes the DBMS an extremely large piece of software.
- Occupying many megabytes of of diskspace & requiring substantial amount of memory to run efficiently.

3. Cost of software & hardware:-

- A processor with high speed of data processing & memory of large size is required to run the DBMS s/w.
- It means that you have to up grade the h/w used for file – based system.
- DBMS s/w is also very costly.

4. Cost of data conversion:-

- When a computer file based system is replaced with a database system the data stored into file must be converted to database file.
- It is very difficult & costly method to convert data of files in to database.
- You have to hire database & system designers along with application programmer so a lot of money has to be paid for developing s/w.

5. Cost of staff training:-

- Most DBMS are often (again & again) complex system so the training for users to use the use the DBMS is required.
- Training is required at all levels including programming, application, development & database administration.
- The organization has to paid a lot of amount for the training of staff to run the DBMS.

6. Appointing technical staff:-

- The trained technical person such as database administrator, application programmers, data entry operators etc….. are required to handle the DBMS.
- You have to pay some salaries to these persons. Therefore the “system cost increases”.

7. Database damage:-

- In most of the organization all data is integrated in too single database.
- If database is damaged due to electric failure or database is corrupted on the storage media than your valuable data may be list forever.

❖ DBMS users:-

- There are three types of users.
  1) **Application programmer**
  2) **End user**
  3) **Database Administrator**

❖ Role of DBA:-

1) Defining the schema:

- The DBA defines the schema which contains the structure of the data in the application .
- The DBA decides what data needs to be present in the system and how thus data has to be represented & organized.

2) Defining storage structure & access method:

- The DBA chooses how the information is to be spoken to in the put away database.

3) Liaising with user:

- The DBA needs to interact continuously with the users to understand the data in the system & its use the DBA figures out which client needs access to which part of the database.

4) Defining security & integrity checks:

- The DBA finds about the access restrictions to be defined & defines security checks accordingly.
- Data integrity checks are also defined by the DBA.

5) Defining backup / recovery procedures:

- DBA also defines procedures for back up & recovery.
- Defining backup procedures includes specifying what data is to backed up .
- The periodicity of taking backup and also the medium & storage place for the backup data.

6) Monitoring performance:

- The DBA has to continuously monitor the performance of the queries & take measures to optimize all the queries in the application.

7) Assistance to application programmers:

- The DBA gives help to application software engineers to create application programs.