

B.Sc. (Computer Science)-Part-III
Subject Name- “DBMS”
Paper-I (Video Part –I)



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Unit- III: Concept of DBMS and Data Models

Chapter-I: Introduction to DBMS

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Content

1. What is Data?
2. What is Database?
3. The Database Approach.
4. What is DBMS?
5. Need of DBMS.
6. Limitations of File Based System.
7. Purpose of DBMS.

Objective

- Describe Data and Database.
- Describe the File Based system and its limitations.
- Describe the structure of DBMS.

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What is Data?

- A Data is a fact or figure that can be recorded.

E.g.:- Data can be written form of:

1. text - name, address etc.
2. number- roll no., employee no., contact etc.
3. Images
4. Video
5. Audio or speech

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What is Database?

- A Database is organized collection of logically related data.

E.g.:-

- Traditional Database: that store the data in the form of TEXT or NUMBERS. Like student record, employee record, etc.
- Multimedia Database: that contains images, audio, video, songs, movies etc.
- Geographic Information System (GIS): this databases are used to provide information from satellites or rockets to or from the space.
- Real Time Databases: these are used to real time record or information such as in a production system or super market to check available products everyday after selling.

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The Database Approach:

- The initial attempts were to provide a centralized collection of data.
- A database has a self-describing nature.
- It contains not only the data but also the complete definition of the database structure and constraints, which are stored in a system catalog.

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What is Data Base Management System(DBMS)?

- A DBMS manages one or more databases of an enterprise.
- It allows data sharing and integration of data of an organization in a single database.
- DBMS controls access to this data and thus needs to provide features for database creation, data manipulation such as data value modification, data retrieval, data integrity and security etc.

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Need of DBMS

What is File Based System?

File based systems are an early attempt to computerize the manual filing system.

For example, a manual file can be set up to hold all the correspondence relating to a particular matter as a project, product, task, client or employee.

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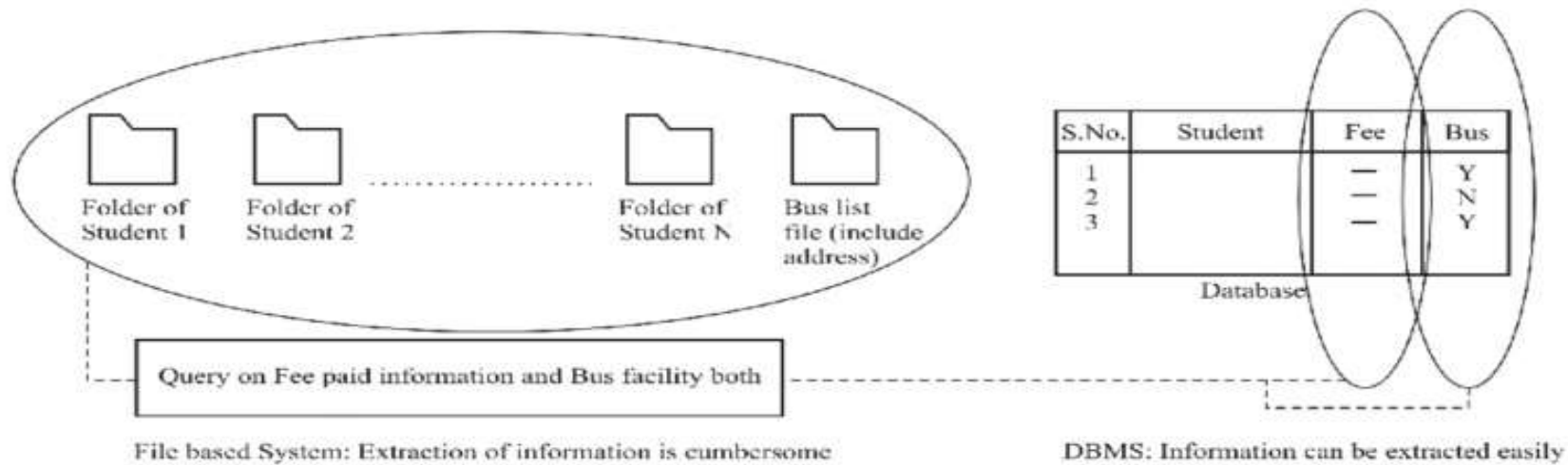


Fig: 1

Figure 1: File based system versus database system

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Limitations of File Based System

1. **Separation and isolation of data:** When the data is stored in separate files it becomes difficult to access. It becomes extremely complex when the data has to be retrieved from more than two files as a large amount of data has to be searched.
2. • **Duplication of data:** Due to the decentralised approach, the file system leads to uncontrolled duplication of data. This is undesirable as the duplication leads to wastage of a lot of storage space. It also costs time and money to enter the data more than once.

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Limitations of File Based System

- 3. Inconsistent Data:** The data in a file system can become inconsistent if more than one person modifies the data concurrently, for example, if any student changes the residence and the change is notified to only his/her file and not to bus list. Entering wrong data is also another reason for inconsistencies.
- 4. Data dependence:** The physical structure and storage of data files and records are defined in the application code. This means that it is extremely difficult to make changes to the existing structure. The programmer would have to identify all the affected programs, modify them and retest them. This characteristic of the File Based system is called **program data dependence**.
- 5. Incompatible File Formats:** Since the structure of the files is embedded in application programs, the structure is dependent on application programming languages.

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Limitations of File Based System

- 6. Fixed Queries:** File based systems are very much dependent on application programs. Any query or report needed by the organisation has to be developed by the application programmer. With time, the type and number of queries or reports increases. Producing different types of queries or reports is not possible in File Based Systems

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Purpose of Data Base Management System(DBMS):

1. **Reduction of Redundancy:** In database approach data can be stored at a single place or with controlled redundancy under DBMS, which saves space and does not permit inconsistency .
2. **Shared Data:** A DBMS allows the sharing of database under its control by any number of application programs or users. A database belongs to the entire organization and is shared by all authorized users .
3. **Data Independence:** Database Management systems separates data descriptions from data. Hence it is not affected by changes. This is called Data Independence, where details of data are not exposed. DBMS provides an abstract view and hides details.

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Purpose of Data Base Management System(DBMS):

- 4. Improved Integrity:** Data Integrity refers to validity and consistency of data. Data Integrity means that the data should be accurate and consistent. This is done by providing some checks or constraints. These are consistency rules that the database is not permitted to violate. Constraints may apply to data items within a record or relationships between records.
- 5. Efficient Data Access:** DBMS utilises techniques to store and retrieve the data efficiently at least for unforeseen queries. A complex DBMS should be able to provide services to end users, where they can efficiently retrieve the data almost immediately.

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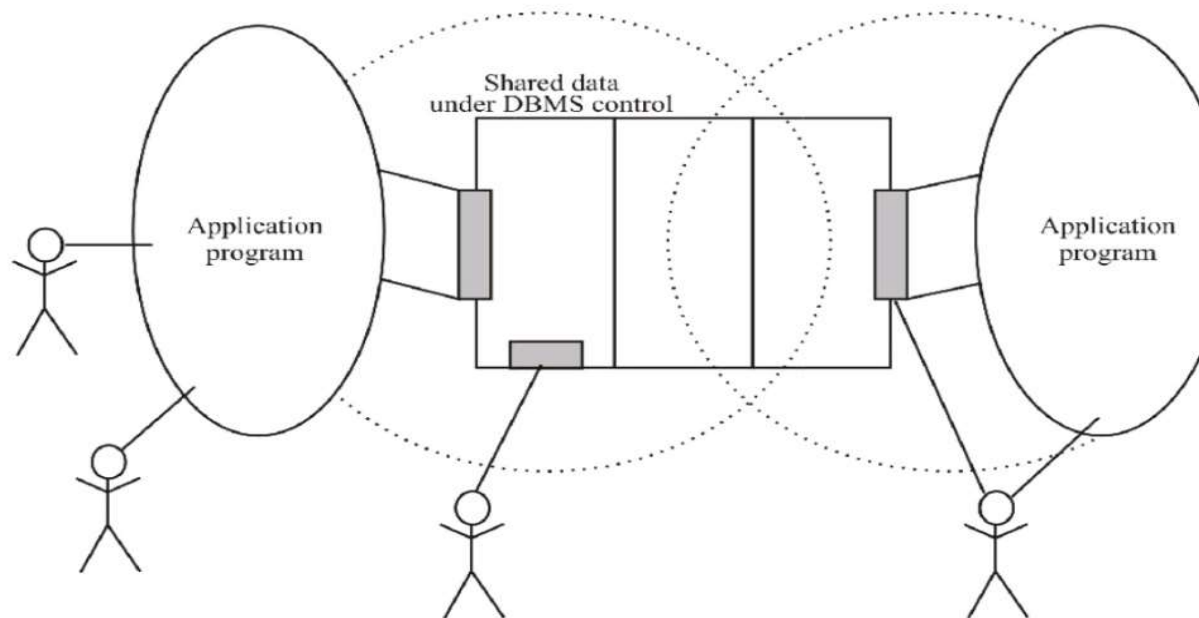
Purpose of Data Base Management System(DBMS):

- 6. Multiple User Interface:** Since many users having varying levels of technical knowledge use a database, a DBMS should be able to provide a variety of interfaces. This includes –
- query language for casual users,
 - programming language interfaces for application programmers,
 - forms and codes for parametric users,
 - menu driven interfaces, and
 - natural language interfaces for standalone users, these interfaces are still not available in standard form with commercial database.

Such as given in following figure:

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Purpose of Data Base Management System(DBMS):



A user can either access data window through DBMS or use an application program.

Figure 2: User interaction to DBMS

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Purpose of Data Base Management System(DBMS):

10. Support for concurrent transactions : A transaction is defined as the unit of work. A DBMS also allows multiple transactions to occur simultaneously.



Thank You

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