**Objectives:**

* Describe the history of databases.
* Identify the characteristics of the database approach.
* Explain the advantages of the Database Management system approach.
* State the examples of databases and their users.

**History of Databases**

An early form of databases was defined within the file system approach. For example a file would have a row, with each column in that row containing information on different themes. However this presented multiple issues i.e. inflexibility, uncontrolled redundancy, etc. Overtime a proper relational database system was invented, which stored information in data entries which were related to one another.

**Characteristics of the database approach**

**Formatted and detailed data –** data is described well as it contains the database along with metadata defining its relationship with other tables in the database.

**Data security and integrity -** a database has security features preventing unauthorized access, augmentation or modification to the database information.

**Backup and Recovery –** a database provides the function of duplicating or backing up data to a network or file so it can be recovered at a later stage.

**Sharing of data and multi-user system –** multiple users can access the database at the same time, with each user having their own privileges in the database defining what they can or cannot access.

**Advantages of a Data Management System (DBMS)**

**Controlled redundancy –** consistency of data and integrity constraints.

**Lower cost –** reduction in program maintenance, no need to update large amounts of paper work.

**Services and controls –** security, privacy controls, backup and recovery are useful functions in a database management system.

**Efficient work flow –** makes it easier to develop and sustain applications using databases to store information related to the application’s functions, usage and performance.

**State examples of Databases and their users**

1. **Database developers –** write SQL queries to select/insert/delete/update data to form and structure the database. They do not use applications to interact with the database, they work at the backend of the database making use of its features and services to build the database.
2. **End users –** these are the casual users who use the existing application to interact with the database i.e. they require access to the database to login to their account, change their password, etc.
3. **Database Administrators –** a person in control of authorizing access to the database, monitoring its use and managing all the resources needed to support the function and use of the database.
4. **Application programmers –** developers making use of programming languages such as C, C++, Python, PHP, etc. to interact with the database.

**Examples:**

* Microsoft Access
* MySQL
* MongoDB