Database Management System

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Data

- **Data** is nothing but facts and statistics stored or free flowing over a network, generally it's raw and unprocessed.
- For example: When you visit any website, they might store you IP address, that is data, in return they might add a cookie in your browser, marking you that you visited the website, that is data, your name, it's data, your age, it's data.

Information

- Data becomes **information** when it is processed, turning it into something meaningful.

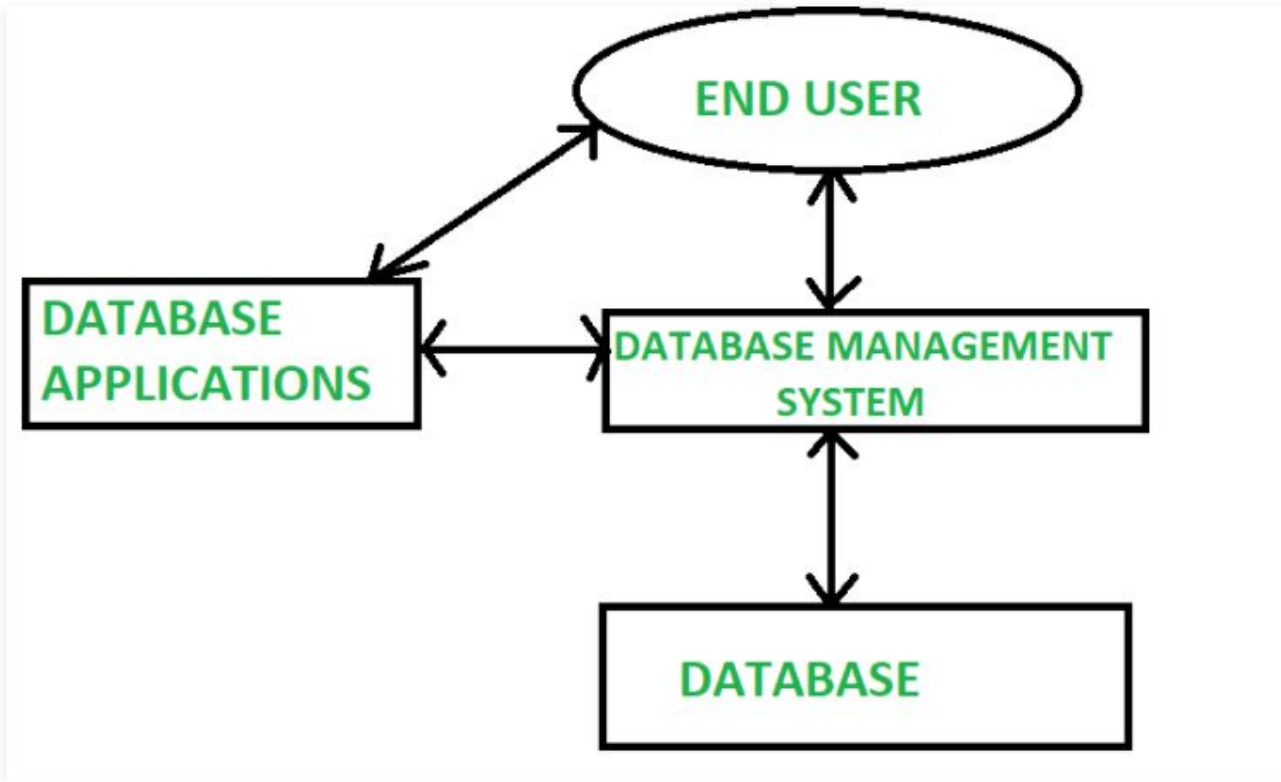
Database

- A database is an organized collection of structured information, or data, typically stored electronically in a computer system.

- Database Management System is basically a software that manages the collection of related data.
- It is used for storing data and retrieving the data effectively when it is needed.
- It also provides proper security measures for protecting the data from unauthorized access.
- In Database Management System the data can be fetched by SQL queries and relational algebra.
- It also provides mechanisms for data recovery and data backup.

DBMS

- A database is a systematic collection of data. They support electronic storage and manipulation of data. Databases make data management easy.
- Let us discuss a database example: An online telephone directory uses a database to store data of people, phone numbers, and other contact details. Your electricity service provider uses a database to manage billing, client-related issues, handle fault data, etc.
- Let us also consider Facebook. It needs to store, manipulate, and present data related to members, their friends, member activities, messages, advertisements, and a lot more. We can provide a countless number of examples for the usage of databases.


END USER
DATABASE APPLICATIONS
DATABASE MANAGEMENT SYSTEM
DATABASE

DBMS Example

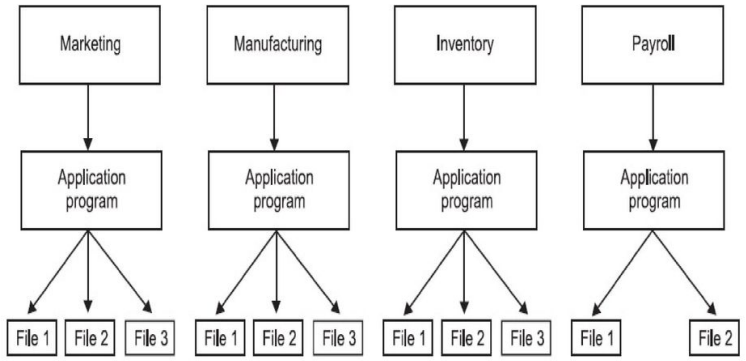
- Here are some examples of popular DBMS used these days:
- MySql
- Oracle
- SQL Server
- IBM DB2
- PostgreSQL
- Amazon SimpleDB (cloud based) etc.

DBMS (Database Management System)

- DBMS contains information about a particular enterprise
  - Collection of interrelated data
  - Set of programs to access the data
  - An environment that is both *convenient* and *efficient* to use
- Database Applications:
  - Banking: transactions
  - Airlines: reservations, schedules
  - Universities: registration, grades
  - Sales: customers, products, purchases
  - Online retailers: order tracking, customized recommendations
  - Manufacturing: production, inventory, orders, supply chain
  - Human resources: employee records, salaries, tax deductions
- Databases can be very large.
- Databases touch all aspects of our lives

File system

Example for File Systems



File System

- File system is basically a way of arranging the files in a storage medium like hard disk.
- File system organizes the files and helps in retrieval of files when they are required.
- File systems consists of different files which are grouped into directories.
- The directories further contain other folders and files.
- File system performs basic operations like management, file naming, giving access rules etc.

Drawbacks of File system

- Data redundancy and inconsistency
  - duplication of information in different files
- Difficulty in accessing data
  - Need to write a new program to carry out each new task
- Data isolation
  - Multiple files and formats

- Atomicity of updates
  - Failures may leave database in an inconsistent state with partial updates carried out
  - Example: Transfer of funds from one account to another should either complete or not happen at all
- Concurrent access by multiple users
  - Concurrent access needed for performance
  - Uncontrolled concurrent accesses can lead to inconsistencies
    - Example: Two people reading a balance (say 100) and updating it by withdrawing money (say 50 each) at the same time
- Security problems
  - Hard to provide user access to some, but not all, data

Difference between File System and DBMS :

File System	DBMS
File system is a software that manages and organizes the files in a storage medium within a computer.	DBMS is a software for managing the database.
Redundant data can be present in a file system.	In DBMS there is no redundant data.
It doesn’t provide backup and recovery of data if it is lost.	It provides backup and recovery of data even if it is lost.
There is no efficient query processing in file system.	Efficient query processing is there in DBMS.
There is less data consistency in file system.	There is more data consistency because of the process of normalization.
It is less complex as compared to DBMS.	It has more complexity in handling as compared to file system.
File systems provide less security in comparison to DBMS.	DBMS has more security mechanisms as compared to file system.
It is less expensive than DBMS.	It has a comparatively higher cost than a file system.
There is no data independence.	In DBMS data independence exists.