Chapter-1

Introduction to DBMS

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Database Systems

Database

- A collection of inter-related data that is organized in such a way that it can be easily accessed, managed and modified.

DBMS

- It is a set of computer programs to access the data from a collection of related data which store, update and manage all those data
- It is a software package that allows the users to define, manipulate, manage and retrieve the data from a database.
- Eg. MS Access, MySQL, MS SQL Server, Oracle, FoxPro, Dbase and so on

Database System

- It is a collection of interrelated data and a set of programs to access those data providing a way to store and retrieve the data efficiently.

DBMS

A collection of general-purpose, application-independent programs providing services to

- **define the structure** of a database, i.e., data types and constraints that the data will have to satisfy
- **manage the storage** of data, safely for long periods of time, on some storage medium controlled by the DBMS
- **manipulate a database**, with client user interfaces to query the database to retrieve specific data, update the database to reflect changes in the world, generate reports from the data
- **manage database usage**, users with their access rights, performance optimization, sharing of data among several users, security from accidents or unauthorized use
- **monitor** and analyze database usage

Database System Applications

1. Banking
2. Airlines
3. Universities
4. Telecommunications
5. Sales
6. Manufacturing and Inventory
7. Human resources

Drawbacks of Using Traditional File Systems

- Data Redundancy and Inconsistency
- Difficulty in accessing data
- Data Isolation
- Integrity problem
- Concurrent access anomalies
- Atomicity Problems
- Security Problems

Drawbacks of Using Traditional File Systems

1. Data Redundancy and Inconsistency
    - Same information may be duplicated in different files
    - Redundancy leads to higher storage and access cost
    - Changes in one record may not be changed in other same records concurrently

2. Difficulty in accessing data
    - Conventional file systems do not allow to access only required data
    - Needs to access whole data even if only required few data causing in difficulty of access

Drawbacks of Using Traditional File Systems

3. Data Isolation
    - Data is scattered in various files and files may be in different formats causing data isolation
4. Integrity problem
    - While storing data,, it needs to satisfy certain condition s
    - Eg. in bank, an account should have minimum balance
5. Concurrent access anomalies
    - Multiple users need to use and update data for overall performance and faster response
    - There is not any mechanism to support this in traditional file system

Drawbacks of Using Traditional File Systems

6. Atomicity Problems
    - Any operations, to be atomic, should happen in its entirety or not at all
    - Atomic operations ensures that the system is in consistent state
7. Security Problems
    - Needs to reveal the whole information while requiring some information
    - No mechanism to support identification, authentication and authorization

Advantages of DBMS

- No data Redundancy
- Data Consistency
- Sharing of data
- Enforcing data integrity
- Concurrency control
- Program-data Independence(Separation of data structure of database and application program)
- Data security
- Backup and Recovery

Disadvantages of DBMS

- High Cost (Cost of Hardware and Software)
- Complexity (complex for non-technical staffs)
- Requirement of Technical Staff
- Database Failure (Solution: Backup And Recovery)

Objectives of DBMS

1. Eliminate redundant data
2. Make easy access to the data for the user
3. Provide mass storage of relevant data
4. Protect the data from physical harm and unauthorized access
5. Allow for growth in the data base system
6. Make the latest modifications to the data base available immediately
7. Allow multiple users to be active at one time
8. Provide prompt response to user for the requests