Database Management System

Fundamentals

- Data consist of facts, text, graphics, images, sound and video segments.
- Information is defined as processed data that increases the knowledge.
- Metadata describes the properties and characteristics of data. i.e. data definition, data structures and rules or constraints.

Data Source

- A *data source* is simply the source of the data. It can be a file, a particular database on a DBMS, or even a live data feed.
- There are two types of data sources: machine data sources and file data sources.

File Processing System

- File processing system store data in separate computer files. File processing system is a system used to store and manage data that involves each department or area within an organization having its own set of files, often creating data redundancy and data isolation.

Disadvantages of File Processing System

1. Program-Data Dependence. File descriptions are stored within each application program that accesses a given file.
2. Duplication of Data. Applications are developed independently in file processing systems leading to unplanned duplicate files.

Disadvantages of File Processing System

- Duplication is wasteful as it requires additional storage space and changes in one file must be made manually in all files. This also results in loss of data integrity. It is also possible that the same data item may have different names in different files, or the same name may be used for different data items in different files.

Disadvantages of File Processing System

3. Limited data sharing. Each application has its own private files with little opportunity to share data outside their own applications. A requested report may require data from several incompatible files in separate systems.

4. Lengthy Development Times. There is little opportunity to leverage previous development efforts. Each new application requires the developer to start from scratch by designing new file formats and descriptions

Disadvantages of File Processing System

5. Excessive Program Maintenance. The preceding factors create a heavy program maintenance load.

6. Integrity Problem. The problem of integrity is the problem of ensuring that the data in the database is heighten.

Definition

- A database management system is a collection of interrelated data and a set of programs to access those data. The collection of data usually known as **database.**
- System which manages database is known as database management system.

Categories of DB Applications

- Personal Databases
- Workgroup Databases
- Department Databases
- Enterprise Databases
  - ERP systems
  - Data warehousing implementations
- Internet, Intranet and Extranet Databases

Database System Applications

- Banking
- Airline & Railway
- Universities
- Credit card transactions
- Telecommunication
- Finance
- Sales
- Manufacturing
- Human Resources
- Marketing etc.

View of Data

Data Abstraction : A database system is a collection of interrelated files and a set of programs that allow user to access and modify these files. The important purpose is to provide data in abstract view. Abstraction is the way of data retrieval in which developer hides the complexity from user.

Physical Level : The lowest level describes *how* the data are stored. It describes complex level of data structure.

Logical Level : What data are stored in database and what relation exist among them. This level thus describes the entire database in terms of a small number of relatively simple structure.

View Level : This highest level describes on part of the database. There may be so many views of same database.

Instances and Schemas

- Similar to Types and Variables of Programming
- Schema : The Logical Structure of Database
  - Physical Schema : Design at Physical Level
  - Logical Schema : Design at Logical Level
- Instance : The actual Content of Database at particular point and time.
- Physical Data Independence : Modification in physical schema without changing the logical schema.

Data Models

A collection of conceptual tools for describing data, data relationship, data semantics, and consistency constraints known as data model. Data model provides a way to describe the design of database at the logical level.

- Entity–Relationship model :

This is based on perception of real world that consists of a collection of objects, called entities, and relationship among them. Entities in database are describe as a set of attributes and relationship is an association among several entities. The overall logical structure (schema) is represented by E-R diagram.

- Relational Model :

It uses a collection of tables to represent both data and relation among those data. Each table has multiple columns, and each column has an unique name.

Database Languages

- Data Definition Language (DDL)
- Data Manipulation Language (DML)
  - Procedural DML s
  - Declarative DML s
- Data Control Language (DCL)

Database System Structure

- Storage Manager
  - Authorization and Integrity manager
  - Transaction manager
  - File manager
  - Buffer manager
- Query Processor
  - DDL Interpreter
  - DML Compiler
  - Query Evaluation Engine

Note : The storage manager implements several data structures by using data files, data dictionary, and Indices.

Definition: Database Reports

- A **database report** is a **report** created from a conclusion of queried data visualized for the purposes of analysis, data discovery, and decision-making and analysis.
- Most good business applications contain a built-in **reporting** tool; This is simply a front-end interface that calls or runs back-end **database** queries that are formatted for easy application usage.

Data Reports

- **Reports** are a great way to organize and present data from your Access **database**.
- **Reports** enable you to format your data in an attractive and informative layout for printing or viewing on screen.
- **Reports** are often used to present a big-picture overview, highlighting main facts and trends.

Query Session

- Ask your queries

Or

- Mail on paras.pal@gmail.com