Database Systems

Chapter # 1
Databases and Database Users

Lecture # 1,2

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Subject's Marks Distribution

Class Activities	Max. Marks
Mid Term Examination	30
Assignments	10
Class Participation	1
Project	9
Final Examination	50

Books

- Text Book
  - Ramez Elmasri & Shamkant B. Navathe, Database Systems, Models, Languages, Design and Application Programming, 7th Edition, 2016.
- Reference Material
  - Thomas Connolly, Carolyn Begg, DatabasecSystems: A practical approach to design, implementation, and Management, 6thcEdition, 2015.
  - C.J. Date, An Introduction to Database Systems, 8th Edition, 2004

Chapter Outlines

1. Introduction
2. Characteristics of Database Approach
3. Files Vs. Databases
4. Advantages of using DBMS
5. When not to use DBMS

Google Classroom Code

Class Code: m4appef

Invite Link:
https://classroom.google.com/c/MzgzMTAyNzMzMjAy?cjc=m4appef

General Idea

- **Essential component of life:** most of us encounter several activities every day that involve some interaction with a database.
  - Banking(money deposit and withdraw)
  - Hotel Reservation
  - Airline Reservation
  - Accessing online Library
  - Shopping (Daraz, AliExpress, Amazon etc.)
  - Car Booking (Careem, Uber etc.)

General Idea

- Traditional databases: Most of the information that is stored and accessed is either textual or numeric.
- Non-traditional databases/Bigdata storage systems/ NOSQL systems: created to manage data for social media applications.
  - Facebook (Posts, images and video clips)
  - Twitter (Tweets, images and video clips)
  - Google
  - Amazon
  - Yahoo
- A large amount of data now resides on the “cloud”. which means it is in huge data centers using thousands of machines.

Introduction

- **Data:** Known facts that can be recorded and have an implicit meaning;
- **Database:** a highly organized, interrelated, and structured set of data.

Introduction

- A database can be of any size and complexity.
- An example of a large commercial database is Amazon.com. It contains:
  - Data for over 60 million active users, and millions of books, CDs, videos, DVDs, games, electronics, apparel, and other items.
  - The database occupies over 42 terabytes.

Properties of Database

- A database has the following implicit properties:
  - A database represents some aspect of the real world, sometimes called the miniworld or the universe of discourse (UoD). Changes to the miniworld are reflected in the database.
  - A database is a logically coherent collection of data with some inherent meaning. A random assortment of data cannot correctly be referred to as a database.
  - A database is designed, built, and populated with data for a specific purpose.

It has an intended group of users and some preconceived applications in which these users are interested.

Database management system (DBMS)

- Computerized system that enables users to create and maintain a database.
  - For example: MySQL, Oracle, etc. are a very popular commercial database which is used in different applications.
- **General-purpose software system:** facilitates the processes of defining, constructing, manipulating, and sharing databases among various users and applications.

DBMS Functionality

- **Define a database** : in terms of data types, structures and constraints
- **Construct or Load:** storing data on a secondary storage medium.
- **Manipulating the database :** querying, generating reports, insertions, deletions and modifications to its content
- Concurrent Processing and Sharing by a set of users and programs – yet, keeping all data valid and consistent.

DBMS FUNCTIONALITY

- An application program accesses the database by sending queries for data to the DBMS.
  - **Query:** to retrieve and manipulate data.
  - Transaction: that reads and write data into the database.
- Other important functions provided by the DBMS include:
  - **Protection** against hardware or software malfunction and unauthorized or malicious access.
  - **Maintenance:** database can be maintained and updated for a long period of time.