CSE-2101: Database Management System
CSE-2102: Database Management System Lab

Lecture 1: Introduction to Database

Skills to Develop

- Understanding of DBMS
- Designing Database
- Implementing Database
- Database Operations
- SQL (Structured Query Language)
- Two DBMS
  - MySQL, Oracle

DB vs DBMS

- **Data** is a collection of facts and figures that can be processed to produce information
  - **E.g.** recordable facts, text, numbers, images

- **Database** is a collection of related data
  - **E.g.** TDB, MDB, GIS

- A **DBMS** is a ***software*** that allows creation, definition and manipulation of database
- It is a ***tool*** used to perform any kind of operation on data in database
- Provides protection and security to database
- Example: MySQL, SQL Server, Oracle, MongoDB, PostgreSql

Uses of DBMS

- To develop software applications in less time
- Data independence and efficient use of data
- For uniform data administration
- For data integrity and security
- For concurrent access of data and data recovery from crashes
- To use user friendly declarative query language

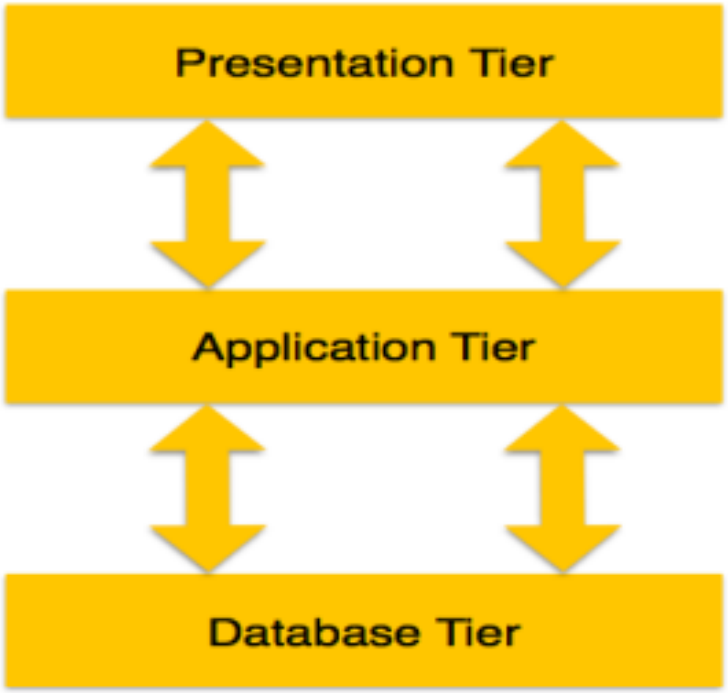
Database Application Examples

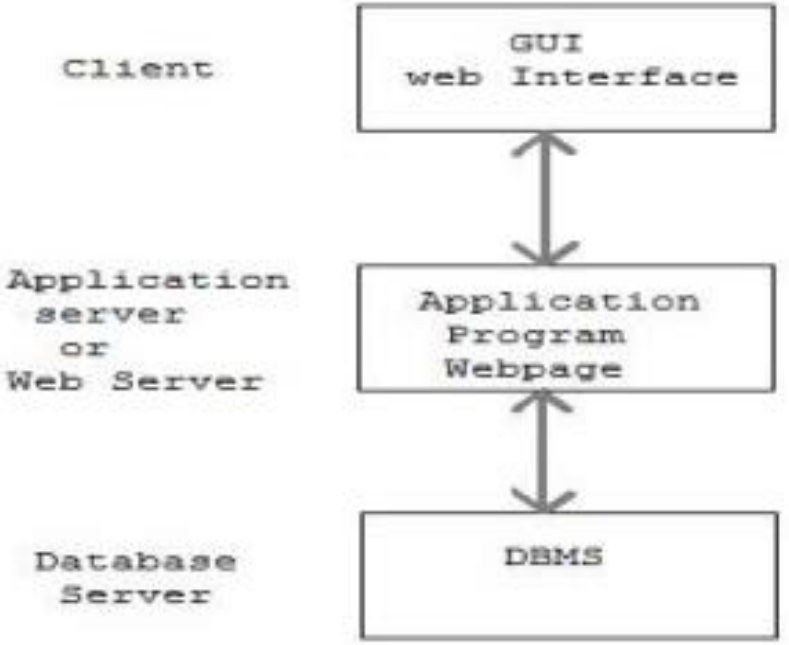
- Airlines, Telecom , Universities/Education, Banking, Industry, Online Shopping
- **Enterprise Information**
  - Sales: customers, products, purchases
  - Accounting: payments, receipts, assets
  - Human Resources: Information about employees, salaries, payroll taxes.
- **Manufacturing**: management of production, inventory, orders, supply chain.
- **Banking and finance**
  - customer information, accounts, loans, and banking transactions.
  - Credit card transactions
  - Finance: sales and purchases of financial instruments (e.g., stocks and bonds; storing real-time market data
- **Universities:** registration, result Processing

Characteristics of DBMS

- Real World Entity
- Relation based tables
- ACID Properties
- Less Redundancy
- Query Language
- Multiuser and Concurrent User
- Multiple views
- Security

3-tier Architecture of DBMS





Types of DBMS

- **Relational Database Management System (RDBMS)**
  - Example: MySQL, Oracle, PostgreSQL
- **NoSQL Databases**
  - Unstructured and semi structured database
  - Example: MongoDB, Cassandra, Redis
- **Graph Database**
  - Designed to manage and query highly interconnected data
  - used for social networks, recommendation engines, and fraud detection
  - Example: Neo4j
- **Document Database**
  - Used for storing and retrieving documents in a flexible
  - A cloud-based real-time database often used for mobile and web applications requiring real-time updates
  - **Example: Firebase, Couchbase**
- **Spatial Database**
  - Used in geographic information systems (GIS) and location-based services.
  - Examle: PostGIS (Extended version of PostgreSQL)

Function's of DB Administrator

- A person who has central control over the system is called a **database administrator (DBA).** Functions of a DBA include:
  - Schema definition
  - Storage structure and access-method definition
  - Schema and physical-organization modification
  - Granting of authorization for data access
  - Routine maintenance
  - Periodically backing up the database
  - Ensuring that enough free disk space is available for normal operations, and upgrading disk space as required
  - Monitoring jobs running on the database

Chapter 1

END OF LECTURE