JMC vLearning
"your virtual learning partner"

Information Technology Infrastructure

Part 2

AAT Level II

Information Systems in Digital Environment (ISD)

Susantha Weerakoon
B.Sc. (MIS), MBA (IMS), PHD (Business Psychology)

JMC ජයසේකර කළමනාකරණ මධ්‍යස්ථානය Estd. 1972
JAYASEKERA MANAGEMENT CENTRE (PVT) LTD

JMC Jayasekera Management Centre (Pvt) Ltd
Pioneers in Professional Education
65/2A, Chittampalam Gardiner Mawatha, Colombo 02 | T: +94 112 430451 | E: info@jmc.lk | F: +94 115 377917

Information Systems in Digital Environment

Lesson 04

Database Systems

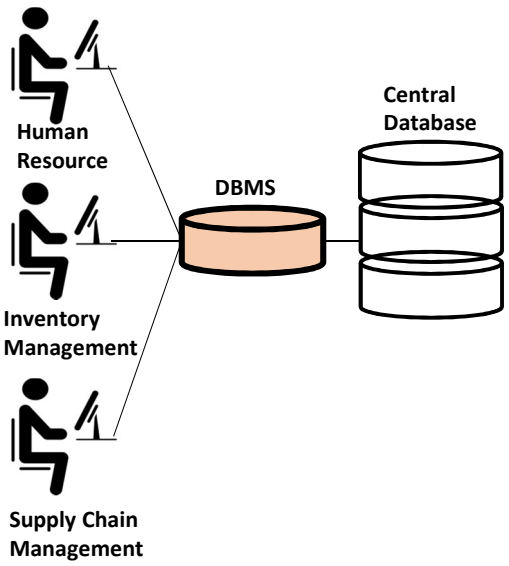
Lecturer

Dr. Susantha Bandara Weerakoon

{BSc(MIS), MBA (IMS), PHD (Business. Psychology}

Database Management System

A database management system (DBMS) is a software-package designed to define, manipulate, retrieve and manage data in a database. A DBMS generally manipulates the data itself, the data formats, field names, record structure and file structure.



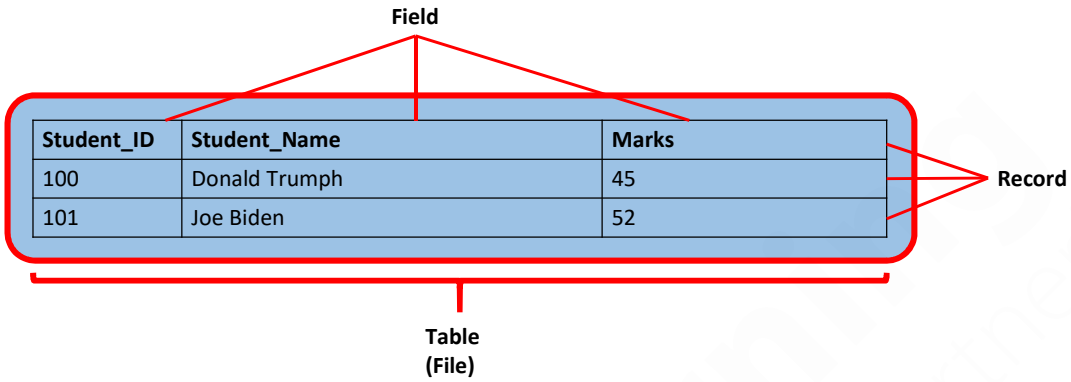
Database Management System

- Oracle Database (from Oracle)
- MS-SQL Server (from Microsoft)
- DB2 (from IBM)
- SyBase (from SAP)
- MySQL (from Oracle)
- SQLite (free)
- MS-Access (from Microsoft)

Database Management System

A data structure is a specialized format for organizing and storing data. General data structure types include the array, the file, the record, the table, the tree, and so on. Any data structure is designed to organize data to fit a specific purpose, so that it can be accessed and processed efficiently. In computer programming, a suitable data structure is selected or designed to store data so that it best fits for the purpose and can be accessed efficiently.

Database Structure



Relational Modal

Activity Code	Activity Name
23	Patching
24	Overlay
25	Crack Sealing

Key = 24

Activity Code	Date	Route No.
24	01/12/01	I-95
24	02/08/01	I-66

Date	Activity Code	Route No.
01/12/01	24	I-95
01/15/01	23	I-495
02/08/01	24	I-66

The relational model uses a collection of tables to represent both data and the relationships among those data. Each table has one or more columns and each column has a unique name or an identifier. The data is arranged in a two dimensional table. The data is inserted into the table in the form of tuples (rows / records). A tuple is made of one or many attributes.

Data-Definition Language (DDL)

Data-Definition Language (DDL) is a database schema defined by set of definitions expressed in specific a special language called a data-definition language (DDL). For instance, the following statement in the SQL language creates the accounts table in a database,

"CREATE TABLE accounts (account-number char(10), balance integer)"

Data Dictionary

Data dictionary contains metadata which is, data about data. The schema of a table is an example of metadata. A database system refers the data dictionary before reading or modifying actual data. The storage structure and access methods used by the database system is defined by a set of statements in a special type of DDL called a data storage and definition language.

Data Manipulation Language DML

A data-manipulation language (DML) is a language that enables users to access or manipulate data as organized by the appropriate data model. There are basically two types:

- Procedural DMLs require a user to specify what data are needed and how to obtain those data.
- Declarative DMLs (also referred to as nonprocedural DMLs) require a user to specify what data are needed without specifying how to get those data. Declarative DMLs are usually easier to learn and use than are procedural DMLs

Key Factors to consider when selecting a Database

- Structure of data.
- Size of data to be stored.
- Speed and scalability.
- Accessibility of data.
- Data modeling.
- Scope for multiple databases.
- Safety and security of data.

Database Users and Administrators

- Ordinary users
- Application programmers
- Sophisticated users
- Specialized users

Facilities Provided by DBMS

- to define and develop the structure of a database(data types and constraints that the data will have to satisfy)
- control and manage the data in the database, safely for future use on a storage medium
- manipulate a database, with efficient user interfaces to query the database to filter specific data, update the database to reflect changes in the application, generate reports from the data
- Manage database usage by providing access rights to the users, sharing of data among multiple users.
- Securing data from unauthorized access and physical failures by backups

Drawbacks of Flat file system

- Data redundancy and inconsistency
- Difficulty in accessing data.
- Data isolation
- Integrity problems
- Atomicity issues
- Concurrent access anomalies
- Security issues.

Advantages of DBMS

- Controlling of Redundancy.
- Improved Data Sharing..
- Data Integrity.
- Better Security.
- Data Consistency.
- Efficient Data Access
- Data Independence.
- Reduced Application Development and Maintenance Time.

Internet Connectivity options

Internet connectivity Options

- ADSL – Asymmetric Digital Subscriber Line
- DSL – Digital Subscriber Line
- ISDN Integrated Services Digital Network
- HSPA – High Speed Packet Access
- PSTN - Public Switched Telephone Network)
- 3G and 4G wireless connections
- Internet over Sattelite