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**DBMS LAB**

**File**

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**Practical No.1**

Introduction to DBMS

**DBMS**

**Database Management System (DBMS)** is a software for storing and retrieving users' data while considering appropriate security measures. It consists of a group of programs which manipulate the database. The DBMS accepts the request for data from an application and instructs the operating system to provide the specific data. In large systems, a DBMS helps users and other third-party software to store and retrieve data.

DBMS allows users to create their own databases as per their requirement. The term “DBMS” includes the user of the database and other application programs. It provides an interface between the data and the software application.

**Example:-**

* The STUDENT file stores data of each student
* The COURSE file stores contain data on each course.
* The SECTION stores the information about sections in a particular course.
* The GRADE file stores the grades which students receive in the various sections
* The TUTOR file contains information about each professor.

**Popular DBMS Software’s:-**

* Here, is the list of some popular DBMS system:
* MySQL
* Microsoft Access
* Oracle
* PostgreSQL
* dBASE
* FoxPro
* SQLite
* IBM DB2
* LibreOffice Base
* MariaDB
* Microsoft SQL Server etc.

**Database:**

A database is a collection of related data which represents some aspect of the real world. A database system is designed to be built and populated with data for a certain task.

**Data:**

Data is a raw and unorganized fact that required to be processed to make it meaningful. Data can be simple at the same time unorganized unless it is organized. Generally, data comprises facts, observations, perceptions numbers, characters, symbols, image, etc.

Data is always interpreted, by a human or machine, to derive meaning. So, data is meaningless. Data contains numbers, statements, and characters in a raw form.

**Information:**

Information is a set of data which is processed in a meaningful way according to the given requirement. Information is processed, structured, or presented in a given context to make it meaningful and useful.

It is processed data which includes data that possess context, relevance, and purpose. It also involves manipulation of raw data.

Information assigns meaning and improves the reliability of the data. It helps to ensure undesirability and reduces uncertainty. So, when the data is transformed into information, it never has any useless details.

**Components of DBMS:**

DBMS have several components, each performing very significant tasks in the database management system environment. Below is a list of components within the database and its environment.

**Software**

This is the set of programs used to control and manage the overall database. This includes the DBMS software itself, the Operating System, the network software being used to share the data among users, and the application programs used to access data in the DBMS.

**Hardware**

Consists of a set of physical electronic devices such as computers, I/O devices, storage devices, etc., this provides the interface between computers and the real world systems.

**Data**

DBMS exists to collect, store, process and access data, the most important component. The database contains both the actual or operational data and the metadata.

**Procedures**

These are the instructions and rules that assist on how to use the DBMS, and in designing and running the database, using documented procedures, to guide the users that operate and manage it.

**Database Access Language**

This is used to access the data to and from the database, to enter new data, update existing data, or retrieve required data from databases. The user writes a set of appropriate commands in a database access language, submits these to the DBMS, which then processes the data and generates and displays a set of results into a user readable form.

**Query Processor**

This transforms the user queries into a series of low level instructions. This reads the online user’s query and translates it into an efficient series of operations in a form capable of being sent to the run time data manager for execution.

**Run Time Database Manager**

Sometimes referred to as the database control system, this is the central software component of the DBMS that interfaces with user-submitted application programs and queries, and handles database access at run time. Its function is to convert operations in user’s queries. It provides control to maintain the consistency, integrity and security of the data.

**Data Manager**

Also called the cache manger, this is responsible for handling of data in the database, providing a recovery to the system that allows it to recover the data after a failure.

**Database Engine**

The core service for storing, processing, and securing data, this provides controlled access and rapid transaction processing to address the requirements of the most demanding data consuming applications. It is often used to create relational databases for online transaction processing or online analytical processing data.

**Data Dictionary**

This is a reserved space within a database used to store information about the database itself. A data dictionary is a set of read-only table and views, containing the different information about the data used in the enterprise to ensure that database representation of the data follow one standard as defined in the dictionary.

**Report Writer**

Also referred to as the report generator, it is a program that extracts information from one or more files and presents the information in a specified format. Most report writers allow the user to select records that meet certain conditions and to display selected fields in rows and columns, or also format the data into different charts.

**Characteristics of Database Management System:**

* Provides security and removes redundancy
* Self-describing nature of a database system
* Insulation between programs and data abstraction
* Support of multiple views of the data
* Sharing of data and multiuser transaction processing
* DBMS allows entities and relations among them to form tables.
* It follows the ACID concept ( Atomicity, Consistency, Isolation, and Durability).
* DBMS supports multi-user environment that allows users to access and manipulate data in parallel.

## Uses/Applications of DBMS:

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| **Sector** | **Use of DBMS** |
| Banking | For customer information, account activities, payments, deposits, loans, etc. |
| Airlines | For reservations and schedule information. |
| Universities | For student information, course registrations, colleges and grades. |
| Telecommunication | It helps to keep call records, monthly bills, maintaining balances, etc. |
| Finance | For storing information about stock, sales, and purchases of financial instruments like stocks and bonds. |
| Sales | Use for storing customer product and sales information. |
| Manufacturing | Used for the management of supply chain and for tracking production of items. Inventories status in warehouses. |
| HR Management | For information about employees, salaries, payroll, deduction, generation of paychecks, etc. |