



MySQL

MANUAL V8.3

MODULE CODE:

ANUDIP FOUNDATION





ICONS AND THEIR MEANING



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Introduction to Database (DB)

Objective: After completing this lesson you will be able to :

- * Gain an understanding of database management and types of database

Materials Required:

1. Computer
2. Internet access

Theory Duration: 90 minutes

Practical Duration: 0 minute

Total Duration: 90 minutes

Chapter 5

What is Database Management System (DBMS)?

DBMS

A database management system (DBMS) is a software system for storing and accessing user data. A DBMS comes with adequate security measures and offers several features for database manipulation. A DBMS accepts data requests from an application, and proceeds to fetch the relevant data from the operating system. DBMS also helps users and third party applications to store and fetch data.

Using a DBMS helps users to build their own databases based on specific requirements. The term DBMS encompasses a database user and several application programs. A database management system offers an interface connecting the software application to the data.

To understand the DBMS, we can use the example of the database used by a university. The database has information regarding the university's students, grades, courses and more. In this particular database, there are some files including -

- The STUDENT file - It contains the data for each student
- The COURSE file - It contains the data of each university course
- The SECTION file - It stores section-related information for a particular course
- The GRADE file - It contains the grades received by students across different sections
- The TUTOR file - It stores information about the tutors of the university.

Defining a database system:

- Users have to specify the record structures of every file, by defining different data element types stored within each record.
- A coding scheme can be used for representing a data item's values.
- The database will have 5 tables along with a foreign key amidst the tables.

Database Management System Characteristics

- DBMS offers security and eliminates redundancy
- A database system is self-describing
- There is insulation between data abstraction and programs
- Multiple data views are supported
- DBMS supports data sharing and processing of multi-user transactions
- DBMS enables entities and entity relations to create tables
- DBMS offers multi-user environment support and enables users to access and change data.

- A DBMS follows the concept of Atomicity, Consistency, Isolation, and Durability.

Advantages of DBMS

- DBMS provides many techniques for storing and accessing data
- It provides uniform administration processes for data.
- DBMS is a handler for balancing the requirements of multiple applications that use the same data.
- DBMS can help to prevent the exposure of data storage and representation details to programmers
- A DBMS provides convenient storage and access of data within a database.
- Users can gain better security and data integrity with a DBMS.
- Integrity constraints are implied by DBMS to effectively prevent events of prohibited data access.
- Application development time is reduced with a DBMS
- Simultaneous data access can be scheduled by a DBMS to let a single user access data at any given time

Types of DBMS

1. NoSQL Database

A NoSQL database, or non-relational database, is a database that does not follow SQL. It can also be referred to as non-SQL. In NoSQL, data is not governed by the table relationships within reference databases. NoSQL databases are utilized across big data and real-time web applications and have many other uses.

NoSQL databases do not have any defined schemes. Hence, they are considered to be more suitable for evolving development environments. NoSQL enables developers to implement fast changes without having any negative effect on applications. NoSQL systems are also referred to as 'not only SQL' because it also supports query languages such as SQL.

2. ER Model

The ER database management system model is a popular database type. Every table row in this model is a representation of a single entity instance in a simple relational database. Each field in such a table represents the type of the attribute.

3. Relational Database

Relational databases possess key fields in each table. A key field indicates each row and it can be utilized for connecting its data table to another. Users can easily group data in columns to compare details with a similar database. The uniform nature of the databases is used by a relational database to create new tables using the required information from currently available tables. A relational database utilizes similar data to raise the efficiency and speed of a database.

4. Document Database

The NoSQL database which stores the data in the type of documents is also a document database. A document database links to data elements and each document is used for representing data attributes. A document database is widely used due to its NoSQL properties and document storage features. NoSQL data storage offers faster search and storage for documents.

5. Network Database

Network database management systems (network DBMSs) utilize a network structure for creating entity relationships. This type of DBMS is hierarchical and generally used for digital computers. A network node may have a link to numerous entities, which is different from hierarchic databases where one node can have only one parent. A network database is similar to an interlinked network of records. The approval of the Network Data Model is similar to data hierarchy. In a network database, data is organized across many relationships.

6. Graph Database

Graph databases are NoSQL system databases that utilize the semiconductor query graph structure. A graph database node represents an entity or object within it. A node can be considered similar to a record. In graph databases, the connection of nodes is known as an edge.

7. Hierarchical Database

A hierarchical database management system that performs data storage under a parent-child relationship record. This type of database has a parent/child group relationship information, along with the data. Hierarchical databases are used for the creation of efficient telecommunication and open banking applications. This database can be accessed easily and effortlessly modified as it is similar to a tree structure. It helps to establish the relationship between records.

Instructions: The progress of students will be assessed with the exercises mentioned below.

MCQ

1. What is used for accessing data?

- a) database
- b) DBMS
- c) Data application
- d) none of the mentioned

2. A database management system is used for retrieving data from a _____ system.

- a) database
- b) operating
- c) both a and b
- d) none of the mentioned

3. A database management system connects software application to _____.

- a) database
- b) data
- c) programs
- d) none of the mentioned

4. A DBMS offers support for _____ transactions.

- a) multi-user
- b) single-user
- c) both a and b
- d) none of the mentioned

5. How many data views can be utilized with a database management system?

- a) one

- b) two
- c) multiple
- d) both b and c
6. Prohibited data access can be prevented by DBMS using _____.
- a) access constraints
- b) integrity constraints
- c) data constraints
- d) none of the mentioned
7. A NoSQL database is also known as a _____.
- a) relational database
- b) non-relational database
- c) both a and b
- d) none of the mentioned
8. In an ER DBMS model each field in a table represents _____ type.
- a) data
- b) attribute
- c) reference
- d) none of the mentioned
9. A network database is _____.
- a) non-hierarchical
- b) hierarchical
- c) non-entity
- d) none of the mentioned
10. A graph DBMS utilizes a _____ query graph language.

- a) semiconductor
- b) conductor
- c) relational
- d) none of the mentioned

