Lecture 4

Database Management System

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Lesson 1: Introduction to DBMS (5hrs)

1. Overview of Database and DBMS
2. Characteristics and Applications
3. Data Abstraction and Independence
4. Database Users and Administrator
5. Application Architecture
6. **Basics of Database Language (DDL, DML, DCL) + Lab**

Database Language

- A DBMS has appropriate languages and interfaces to express database queries and updates.
- Database languages can be used to read, store and update the data in the database.
- Types of database languages are :
  - **DDL – Data Definition Language**
  - **DML – Data Manipulation Language**
  - **DCL – Data Control Language**
  - **TCL – Transaction Control Language**

DDL – Data Definition Language

Definition: DDL is used to define and manage the structure of the database.

Content:

- Creating tables, views, and indexes.
- Modifying the structure of existing tables.
- Defining constraints (e.g., primary keys, foreign keys).
- Data definition language is used to store the information of metadata like the number of tables and schemas, their names, indexes, columns in each table, constraints, etc.

DDL – Data Definition Language

Here are some tasks that come under DDL:

- **Create**: It is used to create database and its objects in the database.
- **Alter**: It is used to alter the structure of the existing database.
- **Drop**: It is used to delete objects from the database.
- **Truncate**: It is used to remove all records from a table.
- **Rename**: It is used to rename an object.
- **Comment**: It is used to comment on the data dictionary.

These commands are used to update the database schema that's why they come under Data definition language.

DML – Data Manipulation Language

Definition: DML is responsible for manipulating data stored in the database.

- It is used for accessing and manipulating data in a database.
- It handles user requests.
- It includes operations like SELECT, INSERT, UPDATE, and DELETE.
- DML establishes communication between user and database.

DML – Data Manipulation Language

There are two types of DML

(a) **Procedural DML**: user required to specify what data are needed and how they get those data.

(b) **Nonprocedural** (**Declarative**) **DML**: user only required to what data needed without specifying how to get those data.

Declarative DMLs are usually easier to learn and use than procedural DMLs. However, since a user does not have to specify how to get data, the database system must figure out an efficient means of accessing data. The DML component of SQL is nonprocedural.

DML – Data Manipulation Language

Here are some tasks that come under DML

- **Select**: It is used to retrieve data from a database.
- **Insert**: It is used to insert data into a table.
- **Update**: It is used to update existing data within a table.
- **Delete**: It is used to delete all records from a table.
- **Merge**: It performs UPSERT operation, i.e., insert or update operations.
- **Call**: It is used to call a structured query language or a Java subprogram.
- **Explain Plan**: It has the parameter of explaining data or data access path.
- **Lock Table**: It controls concurrency.

DCL – Data Control Language

Definition: DCL is focused on managing access control and permissions within the database.

- It is used to retrieve the stored or saved data.
- It gives different levels of access to the objects in the database.
- The DCL execution is transactional. It also has rollback parameters.
- (But in Oracle database, the execution of data control language does not have the feature of rolling back.)

DCL – Data Control Language

Here are some tasks that come under DCL:

- **Grant**: It is used to give user access privileges to a database.
- **Revoke**: It is used to take back permissions from the user.

There are the following operations which have the authorization of Revoke:

- CONNECT, INSERT, USAGE, EXECUTE, DELETE, UPDATE and SELECT.

TCL – Transaction Control Language

- TCL is used to run the changes made by the DML statement.
- TCL can be grouped into a logical transaction.

Here are some tasks that come under TCL:

- **Commit**: It is used to save the transaction on the database.
- **Rollback**: It is used to restore the database to original since the last Commit.
- **Save Point**: It is used to save the data on the temporary basis in the database

END OF LECTURE 4

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PREVIEW FOR LECTURE 5

LAB SESSION

DATA MODEL