Data Base Management System Lab

UCS310

Thapar Institute of Engineering and Technology

Database Management System

- An Database Management System consists of
  - A collection of interrelated and persistent data (usually referred as database).
  - A set of application programs used to access, update and manage that data (usually referred as management system).

Query Language

- SQL (structured query language) is a computer language aimed to store, manipulate, and retrieve data stored in relational databases.
- MySQL is one of the most popular open source SQL database management system.
- It is developed, distributed and supported by Oracle corporation.
- Supports including Windows, Linux, UNIX, Mac…

SQL categorization

SQL commands are mainly categorized into four categories as:

- DDL – Data Definition Language
- DML – Data Manipulation Language
- DQL – Data Query Language
- DCL – Data Control Language

DDL

DDL(Data Definition Language) : Data Definition Language consists of the SQL commands that can be used to **define the database schema**.

- It simply deals with descriptions of the database schema and is used to create and modify the structure of database.

Some examples of DDL commands:

- **CREATE** – is used to create the database or its objects (like table, index, function, views, store procedure and triggers).
- **DROP** – is used to delete objects from the database.
- **ALTER**-is used to alter the structure of the database.
- **TRUNCATE**–is used to remove all records from a table, including all spaces allocated for the records are removed.
- **COMMENT** –is used to add comments to the data dictionary.
- **RENAME** –is used to rename an object existing in the database.

DML

- **DML(Data Manipulation Language) :** The SQL commands that deals with the manipulation of data present in the database belong to Data Manipulation Language.

Examples of DML:

- **INSERT**– is used to insert data into a table.
- **UPDATE**– is used to update existing data within a table.
- **DELETE** – is used to delete records from a database table.

DQL

- **DQL (Data Query Language) :**

The purpose of DQL Command is to get some schema relation based on the query.

Example of DQL:

- **SELECT**– is used to retrieve data from the a database.

DCL

- **DCL(Data Control Language) :** DCL includes commands such as GRANT and REVOKE which mainly deals with the rights, permissions and other controls of the database system.

Examples of DCL commands:

  - **GRANT**-gives user's access privileges to database.
  - **REVOKE**-withdraw user's access privileges given by using the GRANT command.

TCL

- **TCL(transaction Control Language) :** TCL commands deals with the transaction within the database.

Examples of TCL commands:

- **COMMIT**– commits a Transaction.
- **ROLLBACK**– rollbacks a transaction in case of any error occurs.
- **SAVEPOINT**–sets a savepoint within a transaction.
- **SET TRANSACTION**–specify characteristics for the transaction.

Create Database

- The CREATE DATABASE statement is used to create a new SQL database.

Syntax

- CREATE DATABASE *databasename*;

Example:

- CREATE DATABASE testDB;

To check whether the database is present, use following SQL command

- SHOW DATABASES;

Drop Database

- The DROP DATABASE statement is used to drop an existing SQL database.

Syntax

- DROP DATABASE *databasename*;

Note: Deleting a database will result in loss of complete information stored in the database!

Example

- DROP DATABASE testDB;

Tip: You can check it in the list of databases with the following SQL command: SHOW DATABASES;

Use Database

To use the database, we need to write following SQL command:

Syntax

- USE *databasename*;

Example

- USE testDB;

Creating Table

- The CREATE TABLE statement is used to create a new table in a database.

Syntax

- CREATE TABLE *table_name* (
  column1 datatype,
  column2 datatype,
  column3 datatype,
  ....
  );

- The column parameters specify the names of the columns of the table.

- The datatype parameter specifies the type of data the column can hold (e.g. varchar, integer, date, etc.).

Create Table example

SQL CREATE TABLE Example

- The following example creates a table called "Persons" that contains five columns: PersonID, LastName, FirstName, Address, and City:

Example

- CREATE TABLE Persons (
  PersonID int,
  LastName varchar(255),
  FirstName varchar(255),
  Address varchar(255), City varchar(255)
  );

Popular Data

Data Type Syntax	Explanation
CHAR(*size*)	Maximum size of 255 characters. size is the number of characters to store.
VARCHAR(*size*)	Maximum size of 255 characters. Variable-length string.
TEXT(*size*)	Maximum size of 65,535 characters. Where ***size*** is the number of characters to store.
BINARY(*size*)	Maximum size of 255 characters. Where ***size*** is the number of binary characters to store. Fixed-length strings.
INT(*m*)	Standard integer value. Signed values range from -2147483648 to 2147483647. Unsigned values range from 0 to 4294967295.
FLOAT(*m*,*d*)	Single precision floating point number. Where ***m*** is the total digits and ***d*** is the number of digits after the decimal.
DOUBLE(*m*,*d*)	Double precision floating point number. Where ***m*** is the total digits and ***d*** is the number of digits after the decimal.
DATE	Values range from '1000-01-01' to '9999-12-31'. Displayed as 'YYYY-MM-DD'.
DATETIME	Values range from '1000-01-01 00:00:00' to '9999-12-31 23:59:59'. Displayed as 'YYYY-MM-DD HH:MM:SS'.

Drop Table

- The DROP TABLE statement is used to drop an existing table in a database.

Syntax

- DROP TABLE *table_name*;
- **Note:** Deleting a table will result in loss of complete information stored in the table!

Example:

- DROP TABLE team;

Truncate Table

- The TRUNCATE TABLE statement is used to delete the data inside
  a table, but not the table itself.

Syntax

```
•TRUNCATE TABLE table_name;
```

Example

```
•  TRUNCATE TABLE team;
```

Alter Table

- The ALTER TABLE statement is used to add, delete, or modify columns in an existing table.

- The ALTER TABLE statement is also used to add and drop various constraints on
  an existing table.

ALTER Table - ADD Column

To add a column in a table, use the following syntax:

- ALTER TABLE *table_name*
  ADD *column_name datatype*;

The following SQL adds an "Email" column to the “Persons"

table: Example

- ALTER TABLE Persons
  ADD Email varchar(255);

ALTER Table - DROP Column

To delete a column in a table, use the following syntax (notice that some database
systems don't allow deleting a column):

- ALTER TABLE *table_name*
  DROP COLUMN *column_name*;

•The following SQL deletes the "Email" column from the “Persons" table:

Example

- ALTER TABLE Persons
  DROP COLUMN
  Email;

ALTER Table - ALTER/MODIFY Column

- To change the data type of a column in a table, use the following syntax:

- ALTER TABLE *table_name*
  MODIFY COLUMN *column_name datatype*;

Example

- ALTER TABLE
  Persons ADD
  DateOfBirth date;

- ALTER TABLE Persons
  MODIFY COLUMN DateOfBirth year;

RENAME Table

- RENAME TABLE renames one or more tables. You must have ALTER and DROP privileges for the original table, and CREATE and INSERT privileges for the new table.

Syntax:

- RENAME TABLE tbname TO new_tbname [, tbname2 TO new_tbname2] … ;

Example:

To rename a table named Persons to Employee, use this statement:

- RENAME TABLE Persons TO Employee;

We can also use

- ALTER TABLE Persons RENAME Employee;

RENAME Contd.

- RENAME TABLE, unlike ALTER TABLE, can rename multiple tables within a single statement:
- RENAME TABLE old_table1 TO

  new_table1, old_table2 TO new_table2,

  old_table3 TO new_table3;
- Renaming operations are performed left to right. Thus, to swap two table names, do this (assuming that a table with the intermediary name tmp_table does not already exist):
- RENAME TABLE old_table TO

  tmp_table, new_table TO old_table,

  tmp_table TO new_table;

Add Comment

Add comment corresponding to a colum

- ALTER TABLE Example

MODIFY COLUMN `id`int(10) COMMENT 'Look, I am a comment!';