Lab 2

DCL AND TCL statements in SQL

Objective:

- ✓ To be familiar with DCL and TCL statements in SQL

Theory:

DCL (Data Control Languages)

- ✓ DCL includes commands such as GRANT and REVOKE which mainly deals with the rights, permissions and other controls of the database system.
- ✓ It used to give and withdraw specific privileges (as defined by query) to the user in a multi-user database.
- ✓ By setting up the permission, user can prevent unauthorized access to the database.

DCL commands are:

- GRANT
- REVOKE

GRANT:

- ✓ This is a SQL command which is used to provide privileges/permissions to modify and retrieve database objects like tables, views, indexes etc.
- ✓ It can be used to grant SELECT, INSERT, UPDATE, DELETE etc. privileges to a user.

Syntax:

GRANT <privilege list> on <relation or view> to <user>;

Example: GRANT INSERT, SELECT,UPDATE on student_info to ram;

REVOKE:

- ✓ It revokes the given access to the user.

syntax:

REVOKE<privilege list> on <relation or view> from <user>;

Example: REVOKE UPDATE on student_info from ram;

TCL (Transaction Control Language)

- ✓ Transaction Control Language (TCL) is a set of special commands that deal with the transactions within the database.
- ✓ Basically, they are used to manage transactions within the database.
- ✓ TCL commands are also used for maintaining the consistency of the database.
- ✓ These commands are generally used along with the DML commands such as INSERT, UPDATE and DELETE.
- ✓ The changes made by DML commands are either committed or rolled back by TCL commands.
- ✓ There is another TCL command that can place a save point in the transactions which makes it possible to rollback all the transaction till the last save point.

COMMIT:

Commit command make the changes made to the database permanent.

Syntax:

```
COMMIT;
```

Here's the syntax demonstrating the use of the COMMIT command with a transaction in MySQL:

```
START TRANSACTION;

{a set of SQL statements};

COMMIT;
```

The parameters used in the syntax are:

- ✓ START TRANSACTION: It is used for marking the beginning of changes or operations in a transaction.
- ✓ {a set of SQL statements}: It is used for mentioning the task that is supposed to be completed.
- ✓ COMMIT: It is used to save transactional changes made by SQL statements.

Example:

```
BEGIN TRANSACTION;

DELETE FROM student_info

WHERE sid = 11;

COMMIT ;
```

ROLLBACK:

- ✓ Rollback command is used to undo the changes that have been made to the database temporarily.
- ✓ The important point to note here is that the changes saved using COMMIT command cannot be undone using ROLLBACK command.

Example:

```
UPDATE student_info SET location='Dharan' WHERE name='ram';

ROLLBACK;
```

SAVEPOINT:

It's used to roll back a transaction to a specific point rather than the complete transaction.

Syntax:

SAVEPOINT SavepointName;

- ✓ Among all transactions, this command is exclusively used to create SAVEPOINT.
- ✓ ROLLBACK is a command that is used to undo a set of transactions.

The syntax for rollback to savepoint command:

ROLLBACK TO SavepointName;

Example:

```
UPDATE student_info
SET program = 'BBA'
WHERE sid = 5;
Savepoint A;

UPDATE student_info
SET name = 'ram'
WHERE location = 'pokhara;
SAVEPOINT B;
```

Now if we want to roll back the certain DML commands, we can do so by using Rollback like this:
This will rollback the transaction till save point A:
Rollback to A;

Solution:

- Open MySQL and Apache xampp control panel
- Open the command prompt
- Change directory to xampp\mysql\bin
- Now, xampp\mysql\bin>mysql –u root –p –h localhost and it will ask for password
- Press Enter
- Now, you can perform below operations

1) Create a database named eemc _db

```
create database eemc_db;
```

//database named eemc_db will be created

2) select database named eemc_db

```
Use  eemc_db;
```

3) Create a table named employee_info with following columns and data type

Eid	Name	address	department
Int	varchar(30)	varchar(30)	varchar(30)

```
create table employee_info(eid int,name varchar(30),address varchar(30),department varchar(30));
```

3) Now insert minimum 5 records into table named employee_info

Start transaction;

```
insert into employee_info values(1,'anish', 'kathmandu','civil');

insert into employee_info values(2,'Roshan', 'pokhara','computer');

insert into employee_info values(3,'rojina','kathmandu','computer');

insert into employee_info values (4,'ramesh','bhaktapur','it');

insert into employee_info values(5,'hari','pokhara','it');
```

//you can see that no any changes is reflected in database while opening localhost phpmyadmin
//But changes is made locally, you can see this by using following query

```
select * from employee_info;
```

Now commit the transaction

commit ;

Now, you can see changes is reflected in database while opening localhost phpmyadmin

4) Now update the department to civil whose location is kathmandu

start transaction

update employee_info set department='civil' where address='kathmandu';

To see records

*select * from employee_info;*

Note: Update is not reflected in database

5) **Now revert the operation of step(4)**

rollback;

//Rollback operation will cancelled the above operation

To see records

select * from employee_info;

//We can see the previous record that is not committed

6) **Now again update the department to civil whose location is kathmandu**

Start transaction

update employee_info set department='civil' where address='kathmandu';

7) **Commit the transaction**

Commit;

//we can see that the above updation is reflected in database

8)Update the address of employee to kathmandu whose name is 'hari'

Start transaction;

update employee_info set address='kathmandu' where name='hari';

savepoint **update_hari;**

9) **Delete the information of employee whose department is civil**

```
delete from employee_info where  department='civil';

savepoint delete_civil;
```

select *from employee_info;

//We can see the information is deleted but it is not reflected in database

10) **Rollback the transaction to step(8)**

```
Rollback to update_hari;
```

11**) Commit the transaction**

```
Commit;
```

12) Create two users named Anish and Rita with following privilege to performing operations on database

Anish: SELECT, UPDATE, INSERT

Sita: SELECT,INSERT, DELETE

create user anish identified by 'anish@123';

create user sita identified by 'sita@123';

grant select ,update, insert on employee_info to anish;

grant select,insert,delete on employee_info to sita;

quit;

mysql -u anish –p

anish@123

use eemc_db;

13) **Now, try to perform the above operations that is given privilege to user anish**

insert into employee_info values(6,'pradip','palpa','computer');

14) Try to perform the above operations that is not given privilege to user anish

delete from employee_info where address='kathmandu';

quit;

15) **Now, try to perform the above operations that is given privilege to user sita**

delete from employee_info where address='kathmandu';

16) **Try to perform the above operations that is not given privilege to user sita**

update employee_info set deparment='civil' where address='palpa';

this operation cannot be done

17) Revoke delete operation that is given to sita.

quit;

mysql -u root –p;

revoke delete on employee_info from sita;

18)Now try to perform delete operation by sita

Quit;

Mysql –u sita -p;

sita@123;

use eemc_db;

We can see that operation is not allowed.