ASSIGNMENT 3

(DBMS LAB)

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AIM: Study of Database Constraints using SQL
Tool: MySQL Command Prompt

Theory:

1. Explain what is meant by database constraints
2. Explain types of database constraints
    a. Internal/Implied/Implicit constraints
    b. External/Schema based constraints
    c. Application level based constraints

Database Constraints

SQL constraints are used to specify rules for the data in a table.

Constraints are used to limit the type of data that can go into a table. This ensures the accuracy and reliability of the data in the table. If there is any violation between the constraint and the data action, the action is aborted.

Constraints can be column level or table level. Column level constraints apply to a column, and table level constraints apply to the whole table.

The following constraints are commonly used in SQL:

- NOT NULL - Ensures that a column cannot have a NULL value
- UNIQUE - Ensures that all values in a column are different
- PRIMARY KEY - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table
- FOREIGN KEY - Prevents actions that would destroy links between tables
- CHECK - Ensures that the values in a column satisfies a specific condition
- DEFAULT - Sets a default value for a column if no value is specified
- CREATE INDEX - Used to create and retrieve data from the database very quickly

Types of Database constraints:
a) Internal/Implied/Implicit constraint
Constraints that are applied in the data model are called Implicit constraints. For example: duplicate tuples are not allowed in a relation
b) External/Schema based constraint

Constraints that are directly applied in the schemas of the data model, by specifying them in the DDL (Data Definition Language). These are called schema-based constraints or Explicit constraints. For example: schools will only have one Principal

c) Application-level constraint

Constraints that cannot be directly applied in the schemas of the data model. We call these Application based or semantic constraints. For example: this year's salary increase can be no more than last year's

Operations to be Executed:

1. creating primary key while creating table

The PRIMARY KEY constraint uniquely identifies each record in a table.

Primary keys must contain UNIQUE values, and cannot contain NULL values.

A table can have only ONE primary key; and in the table, this primary key can consist of single or multiple columns (fields).

syntax:ALTER TABLE <table identifier>

ADD [CONSTRAINT <constraint identifier>]

PRIMARY KEY (<column name> [{, <column name> }...])

examples

create table customer(cid int,cname char(100), dop date, primary key(cid));

>Creates a table with customer id(cid) as primary key

create table customer1 (cid int auto_increment,cname char(100),primary key(cid));

>Creates a table with customer id(cid) as primary key.this key gets incremented at each insert ie gets implicitly incremented

2. Create primary key by executing alter on a defined table.

The syntax to create a primary key using the ALTER TABLE statement in SQL is:

ALTER TABLE table_name

ADD CONSTRAINT constraint_name

PRIMARY KEY (column1, column2, ... column_n);

table_name

The name of the table to modify. This is the table that you wish to add a primary key to.

constraint_name

The name of the primary key.

column1, column2, ... column_n

The columns that make up the primary key.

3. Check violation for Key/entity integrity constraints

There are mainly three operations that have the ability to change the state of relations, these modifications are given below:
Insert –
To insert new tuples in a relation in the database.
Delete –
To delete some of the existing relation on the database.
Update (Modify) –
To make changes in the value of some existing tuples.
Whenever we apply the above modification to the relation in the database, the constraints on the relational database should not get violated.

Insert operation:
On inserting the tuples in the relation, it may cause violation of the constraints in the following way:
1. Domain constraint :
Domain constraint gets violated only when a given value to the attribute does not appear in the corresponding domain or in case it is not of the appropriate datatype.
Example:
Assume that the domain constraint says that all the values you insert in the relation should be greater than 10, and in case you insert a value less than 10 will cause you violation of the domain constraint, so gets rejected.
2. Entity Integrity constraint :
On inserting NULL values to any part of the primary key of a new tuple in the relation can cause violation of the Entity integrity constraint.

Example:
Insert (NULL, ‘Bikash, ‘M’, ‘Jaipur’, ‘123456’) into EMP
The above insertion violates the entity integrity constraint since there is NULL for the primary key EID, it is not allowed, so it gets rejected.
3. Key Constraints :
On inserting a value in the new tuple of a relation which is already existing in another tuple of the same relation, can cause violation of Key Constraints.
Example:
Insert (’1200’, ‘Arjun’, ‘9976657777’, ‘Mumbai’) into EMPLOYEE

This insertion violates the key constraint if EID=1200 is already present in some tuple in the same relation, so it gets rejected.

Referential integrity :
On inserting a value in the foreign key of relation 1, for which there is no corresponding value in the Primary key which is referred to in relation 2, in such case Referential integrity is violated.
Example:
When we try to insert a value say 1200 in EID (foreign key) of table 1, for which there is no corresponding EID (primary key) of table 2, then it causes violation, so gets rejected.

Solution that is possible to correct such violation is if any insertion violates any of the constraints, then the default action is to reject such operation.
Deletion operation:
On deleting the tuples in the relation, it may cause only violation of Referential integrity constraints.
Referential Integrity Constraints :
It causes violation only if the tuple in relation 1 is deleted which is referenced by foreign key from other tuples of table 2 in the database, if such deletion takes place then the values in the tuple of the foreign key in table 2 will become empty, which will eventually violate Referential Integrity constraint.
Solutions that are possible to correct the violation to the referential integrity due to deletion are listed below:
Restrict –
Here we reject the deletion.
Cascade –
Here if a record in the parent table(referencing relation) is deleted, then the corresponding records in the child table(referenced relation) will automatically be deleted.
Set null or set default –
Here we modify the referencing attribute values that cause violation and we either set NULL or change to another valid value

4. Drop primary key

In SQL, you can drop a primary key using the ALTER TABLE statement.

Syntax

The syntax to drop a primary key in SQL is:

```
ALTER TABLE table_name

  DROP PRIMARY KEY;
```

table_name

The name of the table to modify. This is the table whose primary key you wish to drop.

examples:

```
alter table customer drop primary key;
```

deletes a primary key using ALTER

5. Create foreign key while creating the table.

The **FOREIGN KEY** in SQL is used to join the record of two tables in the database. The column defined as the FOREIGN KEY in one table must be the PRIMARY KEY in another table in the same database.

We can easily add foreign key to the column in the following two ways:

1. Add foreign key using Create table statement
2. Add foreign key using Alter Table statement

If you want to add a FOREIGN KEY to the column into the SQL table, you have to follow the below steps in the given sequence:

1. Create the database in the system.
2. Create two tables in the same database.
3. View Table structure before foreign key addition.
4. Add a foreign key to the table.
5. View the table structure.

If you want to add the foreign key at the time of table creation, then you have to use the following CREATE TABLE syntax in SQL:

```
CREATE TABLE table_name1
(
Column_Name_1 data type (size of the column_1),
Column_Name_2 data type (size of the column_2),
.....,
Column_Name_N data type (size of the column_N) FOREIGN KEY
REFERENCES Table_Name2 (Column_Name)
) ;
```

6. Create foreign key by executing alter on a defined table.

If you want to add the foreign key to the existing table, you have to use the following ALTER syntax in SQL:

```
ALTER TABLE Table_Name1 ADD CONSTRAINT ForeignKey_Name FOREIGN KEY
(Column_Name) REFERENCES Table_Name2 (Column_Name);
```

7. Check violation of referential integrity constraints

   Referential integrity :
   On inserting a value in the foreign key of relation 1, for which there is no corresponding value in the Primary key which is referred to in relation 2, in such case Referential integrity is violated.
   Example:
   When we try to insert a value say 1200 in EID (foreign key) of table 1, for which there is no corresponding EID (primary key) of table 2, then it causes violation, so gets rejected.
   Solution that is possible to correct such violation is if any insertion violates any of the constraints, then the default action is to reject such operation.
   Deletion operation:
   On deleting the tuples in the relation, it may cause only violation of Referential integrity constraints.
   Referential Integrity Constraints :
   It causes violation only if the tuple in relation 1 is deleted which is referenced by foreign key from other tuples of table 2 in the database, if such deletion takes place then the values in the tuple of the foreign key in table 2 will become empty, which will eventually violate Referential Integrity constraint.
   Solutions that are possible to correct the violation to the referential integrity due to deletion are listed below:
   - Restrict –
     Here we reject the deletion.
   - Cascade –
     Here if a record in the parent table(referencing relation) is deleted, then the corresponding records in the child table(referenced relation) will automatically be deleted.
   - Set null or set default –
     Here we modify the referencing attribute values that cause violation and we either set NULL or change to another valid value

8. Drop foreign key

If you want to delete the foreign key from the column of the table, you have to use the following **ALTER** syntax in SQL:

```
ALTER TABLE Table_Name DROP FOREIGN KEY Foreign_Key_Name;
```

9. Apply default constraint on a table while creating the table

The DEFAULT Constraint is used to fill a column with a default and fixed value. The value will be added to all new records when no other value is provided.

Using DEFAULT on CREATE TABLE :
Syntax :
CREATE TABLE tablename (
Columnname DEFAULT 'defaultvalue');

10. Apply default constraint on a table while executing alter operation on the table

The DEFAULT Constraint is used to fill a column with a default and fixed value. The value will be added to all new records when no other value is provided.

Using DEFAULT on CREATE TABLE :
Syntax :
CREATE TABLE tablename (
Columnname DEFAULT 'defaultvalue');

11. Check violation of default constraint on table.

This constraint is used to provide a default value for the fields. That is, if at the time of entering new records in the table if the user does not specify any value for these fields then the default value will be assigned to them.
For example, the below query will create a table named Student and specify the default value for the field AGE as 18.

```
CREATE TABLE Student
(
ID int(6) NOT NULL,
NAME varchar(10) NOT NULL,
AGE int DEFAULT 18
);
```

12. Drop default constraint

Dropping the default constraint will not affect the current data in the table, it will only apply to new rows.
Syntax :

```
ALTER TABLE tablename
ALTER COLUMN columnname
DROP DEFAULT;
```

13. Apply check constraint on a table while creating the table

A CHECK constraint is defined on a column or set of columns to limit the range of values, that can be inserted into these columns, using a

predefined condition. The CHECK constraint comes into action to evaluate the inserted or modified values, where the value that satisfies the condition will be inserted into the table, otherwise, the insert operation will be discarded. It is allowed to specify multiple CHECK constraints for the same column.

Defining the CHECK constraint condition is somehow similar to writing the WHERE clause of a query, using the different comparison operators, such as AND, OR, BETWEEN, IN, LIKE and IS NULL to write its Boolean expression that will return TRUE, FALSE or UNKNOWN. The CHECK constraint will return UNKNOWN value when a NULL value is present in the condition. The CHECK constraint is used mainly to enforce the domain integrity by limiting the inserted values to the ones that follow the defined values, range or format rules.

Let us create a new simple table that has three columns; the ID column that is considered as the PRIMARY KEY of that table, Name, and Salary. A CHECK constraint is defined on the Salary column to make sure that no zero or negative values are inserted into that column. The CHECK constraint is defined within CREATE TABLE T-SQL statement below:

```
CREATE TABLE ConstraintDemo4
(
      ID INT PRIMARY KEY,
          Name VARCHAR(50) NULL,
          Salary INT CHECK (Salary>0)
)
```

14. Apply check constraint on a table while executing alter operation on the table

CHECK constraint can be dropped using the ALTER TABLE T-SQL statement. Using the CHCEK constraint name we got previously, the below command can be used to drop the CHECK constraint on the ConstraintDemo4 table:

```
ALTER TABLE ConstraintDemo4
DROP CONSTRAINT  CK__Constrain__Salar__0F624AF8;
```

15. Check violation of check constraint on table.

we will delete the above table using the below statement:

```
mysql> DROP TABLE IF EXISTS vehicle;
```

Next, we will create the same table name vehicle again with one more check constraint using the below statement:

```
CREATE TABLE vehicle (
    vehicle_no VARCHAR(18) PRIMARY KEY,
```

```
    model_name VARCHAR(45),
    cost_price DECIMAL(10,2 ) NOT NULL CHECK (cost_price >= 0),
    sell_price DECIMAL(10,2) NOT NULL CHECK (sell_price >= 0),
    CONSTRAINT vehicle_chk_sp_gt_cp CHECK(sell_price > cost_price)
```

16. Drop check constraint

We can drop the check constraint from the table or column by using the following statements:

```
ALTER TABLE table_name DROP CHECK constraint_name;
ALTER TABLE table_name DROP CONSTRAINT constraint_name;
```

17. Apply unique constraint on a table while creating the table

The UNIQUE constraint ensures that all values in a column are different.

Both the UNIQUE and PRIMARY KEY constraints provide a guarantee for uniqueness for a column or set of columns.

A PRIMARY KEY constraint automatically has a UNIQUE constraint.

However, you can have many UNIQUE constraints per table, but only one PRIMARY KEY constraint per table.

```
CREATE TABLE Persons (
    ID int NOT NULL,
    LastName varchar(255) NOT NULL,
    FirstName varchar(255),
    Age int,
    UNIQUE (ID)
);
```

18. Apply unique constraint on a table while executing alter operation on the table

To create a UNIQUE constraint on the "ID" column when the table is already created, use the following SQL:

```
ALTER TABLE Persons
ADD UNIQUE (ID);
```

19. Check violation of unique constraint on table.

If you don't have a unique key on col_b, col_c, col_d of table_b, this will result in a violation when copying over. You can identify problematic rows with a query like this:

```
SELECT col_b, col_c, col_d FROM table_b GROUP BY col_b, col_c, col_d
HAVING COUNT(*) > 1
```

A similar query can be run on table_a joined to table_b, but the specific queries to run will depend on which columns will be updated in table_a. For the insert case, a useful technique might be to use a MINUS between table_a and the proposed inserted row.

20. Drop unique constraint

DROP Unique Constraints Query

```
ALTER TABLE Employee
DROP CONSTRAINT unique_id;
```

21. Apply Not Null constraint on a table.

constraints are some set of rules that are applied to the data type of the specified table. Or we can say that using constraints we can apply limits on the type of data that can be stored in the particular column of the table. Constraints are typically placed specified along with CREATE statement. By default, a column can hold null values.

Syntax:

```
CREATE TABLE table_Name
(
column1 data_type(size) NOT NULL,
column2 data_type(size) NOT NULL,
....
);
```

22. Check violation of Not Null constraint on table.

When the NOT NULL constraint is defined for a column, a row containing the null value in that column cannot be added, nor can a row be updated so as to set the null value in that column. A column for which the NOT NULL constraint is defined must have a definite value in every row. An attempt to set the null value in such a column results in a constraint violation.

23. Use of decimal data type.

basic syntax of SQL Decimal Data type first. It is denoted as below:

```
decimal [(p [,s])]
```

Where,

- p stands for Precision, the total number of digits in the value, i.e. on both sides of the decimal point
- s stands for Scale, number of digits after the decimal point

The default value of p is 18 and s is 0 and for both these values, the minimum is 1 and the maximum is 38.

In short, by defining parameters in the SQL Decimal data type, we are estimating how many digits a column or a variable will have and also the number of digits to the right of the decimal point.

Code:

```
211070009@ltsp181:~/Desktop$ mysql -u user119 -h 172.69.57.18 -p
Enter password:
^C
211070009@ltsp181:~/Desktop$ mysql -u user119 -h 172.18.69.57 -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 149
Server version: 10.6.11-MariaDB-0ubuntu0.22.04.1 Ubuntu 22.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input
statement.

MariaDB [(none)]> show databases;
+----------------------------+
| Database                   |
+----------------------------+
| AGLA_sem_PHODENGE          |
| AaryanDB                   |
| Ashneer                    |
| Assignment02               |
| Atharvadb                  |
| B1_001                     |
| B1_006                     |
| B1_007                     |
| B1_009                     |
| B1_011                     |
| B1_012                     |
```

| B1_013 |
| B1_014 |
| B1_015 |
| B1_017 |
| B1_018 |
| B1_020 |
| B2_021 |
| B2_022 |
| B2_023 |
| B2_024 |
| B2_026 |
| B2_027 |
| B2_028 |
| B2_032 |
| B2_033 |
| B2_035 |
| B2_037 |
| B2_038 |
| B2_040 |
| B2_041 |
| DONT_OPEN_THIS |
| Devayani03 |
| HelloWorld |
| Hetvi01 |
| Hetvi02 |
| JKflipflop |
| LORDDB |
| LORDDB2 |
| MOngoOP |
| OB1_knoby |
| Oxford |
| Pract1 |
| Preetdb |
| PritK99 |
| Rohan1 |
| Rohan2 |
| Rohan3 |
| Rushikesh |
| STUDENT |
| Shark |
| Thor |
| VJTI |
| VJti |
| Vaibhav |
| Vjti |
| Waffles |
| abduldb |
| abhii84 |
| abhii8493 |
| adeshDB |
| adwait |

| agla_quiz_top_marege |
| ajdb |
| ajdbnew |
| akanksha |
| akash73 |
| anuj |
| aom |
| aomdb |
| arya_108 |
| ashok |
| assg2 |
| assgn1 |
| assignment2 |
| at2 |
| at_database1 |
| ath544 |
| bookstore |
| database544 |
| databaseath |
| databaseuser1 |
| databaseuser77 |
| day2 |
| db |
| db0302 |
| db09 |
| db1 |
| db121 |
| db15 |
| db16 |
| db18 |
| db2 |
| db21 |
| db22 |
| db23 |
| db24 |
| db29 |
| db3 |
| db34 |
| db69 |
| db77 |
| db87 |
| db99 |
| dbNarayani |
| dbShaun |
| dbdb |
| dbms2 |
| dbsahil |
| dbz |
| dev |
| dishankdb |
| ds9 |

| employee |
| gg |
| gp123 |
| gp24 |
| information_schema |
| jenil38DB |
| ji |
| kavan0 |
| khudka_database_dekho_re |
| lab2 |
| lalit |
| lalitdb |
| land |
| mahesh |
| manas |
| manav1 |
| mihir_db |
| mohitSyMyDB |
| muskaan |
| myDB |
| myDatabase |
| myDb |
| myProj30 |
| mysql |
| netra |
| new |
| nishant |
| performance_schema |
| preet |
| preeti |
| rechecking_kr |
| rishiDB |
| shakira |
| shardulDB |
| shaunak |
| shubham |
| shubham2 |
| siddhesh_DB |
| sk23 |
| sneha |
| soham_db |
| sr |
| sunit2 |
| sys |
| tan1 |
| timepass |
| tp |
| vasaiKaHero |
| vedant_1 |
| vedant_2_ws_never_released |
| vedant_3 |

```
| viewsdb38                  |
| vikhroli_ak                |
| vjti_sk                    |
| vjti_students              |
| yatharth2                  |
| yatharth_db                |
+----------------------------+
170 rows in set (0.006 sec)

MariaDB [(none)]> use Rohan1;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [Rohan1]> Ctrl-C -- exit!
Aborted
211070009@ltsp181:~/Desktop$ create database Rohan4;
bash: create: command not found
211070009@ltsp181:~/Desktop$ create database Rohan4;
bash: create: command not found
211070009@ltsp181:~/Desktop$ mysql -u user119 -h 172.69.57.18 -p
Enter password:
root

^C
211070009@ltsp181:~/Desktop$ mysql -u user119 -h 172.69.57.18 -p
Enter password:



^C
211070009@ltsp181:~/Desktop$ mysql -u user119 -h 172.18.69.57 -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 176
Server version: 10.6.11-MariaDB-0ubuntu0.22.04.1 Ubuntu 22.04

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input
statement.

MariaDB [(none)]> create database Rohan4;
Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]> use Rohan4;
Database changed
MariaDB [Rohan4]> create table customer(cid int,cname char(20),dop
date,primary key(cid))
    -> ;
Query OK, 0 rows affected (0.008 sec)
```

```
MariaDB [Rohan4]> desc customer;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| cid   | int(11)  | NO   | PRI | NULL    |       |
| cname | char(20) | YES  |     | NULL    |       |
| dop   | date     | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.003 sec)

MariaDB [Rohan4]> insert into customer values(1,"Rohan","2022-12-01");
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> select * from customer;
+-----+-------+------------+
| cid | cname | dop        |
+-----+-------+------------+
|   1 | Rohan | 2022-12-01 |
+-----+-------+------------+
1 row in set (0.001 sec)

MariaDB [Rohan4]> insert into customer values(1,"Rohans","2022-12-01");
ERROR 1062 (23000): Duplicate entry '1' for key 'PRIMARY'
MariaDB [Rohan4]> insert into customer values(NULL,"Rohans","2022-12-01");
ERROR 1048 (23000): Column 'cid' cannot be null
MariaDB [Rohan4]> create table customer1(cid int auto_increment,cname
char(30),primary key(cid));
Query OK, 0 rows affected (0.007 sec)

MariaDB [Rohan4]> desc customer1;
+-------+----------+------+-----+---------+----------------+
| Field | Type     | Null | Key | Default | Extra          |
+-------+----------+------+-----+---------+----------------+
| cid   | int(11)  | NO   | PRI | NULL    | auto_increment |
| cname | char(30) | YES  |     | NULL    |                |
+-------+----------+------+-----+---------+----------------+
2 rows in set (0.003 sec)

MariaDB [Rohan4]> insert into customer1 (cname) values ("Rohan");
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> select * from customer1;
+-----+-------+
| cid | cname |
+-----+-------+
|   1 | Rohan |
+-----+-------+
1 row in set (0.001 sec)
```

```
MariaDB [Rohan4]> insert into customer1 (cname) values
("Tanaya"),("Adwait"),("Om");
Query OK, 3 rows affected (0.002 sec)
Records: 3  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> select * from customer1;
+-----+--------+
| cid | cname  |
+-----+--------+
|   1 | Rohan  |
|   2 | Tanaya |
|   3 | Adwait |
|   4 | Om     |
+-----+--------+
4 rows in set (0.001 sec)

MariaDB [Rohan4]> select * from customer1;
+-----+--------+
| cid | cname  |
+-----+--------+
|   1 | Rohan  |
|   2 | Tanaya |
|   3 | Adwait |
|   4 | Om     |
+-----+--------+
4 rows in set (0.001 sec)

MariaDB [Rohan4]> insert into customer1 values (6, "Pranav");
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> insert into customer1 (cname) values ("Kunal");
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> select * from customer1;
+-----+--------+
| cid | cname  |
+-----+--------+
|   1 | Rohan  |
|   2 | Tanaya |
|   3 | Adwait |
|   4 | Om     |
|   6 | Pranav |
|   7 | Kunal  |
+-----+--------+
6 rows in set (0.001 sec)

MariaDB [Rohan4]> alter table customer1 drop primary key;
ERROR 1075 (42000): Incorrect table definition; there can be only one auto
column and it must be defined as a key
MariaDB [Rohan4]> alter table customer drop primary key;
Query OK, 1 row affected (0.014 sec)
```

```
Records: 1  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc customer;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| cid   | int(11)  | NO   |     | NULL    |       |
| cname | char(20) | YES  |     | NULL    |       |
| dop   | date     | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.003 sec)

MariaDB [Rohan4]> alter table customer add primary key(cid);
Query OK, 0 rows affected (0.012 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc customer;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| cid   | int(11)  | NO   | PRI | NULL    |       |
| cname | char(20) | YES  |     | NULL    |       |
| dop   | date     | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.002 sec)

MariaDB [Rohan4]> alter table customer add pk primary key(cid,cname);
ERROR 4161 (HY000): Unknown data type: 'primary'
MariaDB [Rohan4]> alter table customer drop primary key;
Query OK, 1 row affected (0.011 sec)
Records: 1  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> alter table customer add pk primary key(cid,cname);
ERROR 4161 (HY000): Unknown data type: 'primary'
MariaDB [Rohan4]> desc customer;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| cid   | int(11)  | NO   |     | NULL    |       |
| cname | char(20) | YES  |     | NULL    |       |
| dop   | date     | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.004 sec)

MariaDB [Rohan4]> alter table customer drop primary key;
ERROR 1091 (42000): Can't DROP INDEX `PRIMARY`; check that it exists
MariaDB [Rohan4]> alter table customer add constraint pk primary
key(cid,cname);

Query OK, 0 rows affected, 1 warning (0.015 sec)
Records: 0  Duplicates: 0  Warnings: 1
```

```
MariaDB [Rohan4]> desc customer;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| cid   | int(11)  | NO   | PRI | NULL    |       |
| cname | char(20) | NO   | PRI | NULL    |       |
| dop   | date     | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.003 sec)

MariaDB [Rohan4]> create table orders(oid int,c_id int,oname
char(30),primary key(oid),foreign key(c_id) references customer(cid));
Query OK, 0 rows affected (0.010 sec)

MariaDB [Rohan4]> desc orders;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| oid   | int(11)  | NO   | PRI | NULL    |       |
| c_id  | int(11)  | YES  | MUL | NULL    |       |
| oname | char(30) | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.002 sec)

MariaDB [Rohan4]> select * from customer;
+-----+-------+------------+
| cid | cname | dop        |
+-----+-------+------------+
|   1 | Rohan | 2022-12-01 |
+-----+-------+------------+
1 row in set (0.001 sec)

MariaDB [Rohan4]> insert into customer
values("Tanaya","2021-02-01"),("John","2022-12-05");
ERROR 1136 (21S01): Column count doesn't match value count at row 1
MariaDB [Rohan4]> insert into customer
values(2,"Tanaya","2021-02-01"),(3,"John","2022-12-05");
Query OK, 2 rows affected (0.005 sec)
Records: 2  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> select * from customer;
+-----+--------+------------+
| cid | cname  | dop        |
+-----+--------+------------+
|   1 | Rohan  | 2022-12-01 |
|   2 | Tanaya | 2021-02-01 |
|   3 | John   | 2022-12-05 |
+-----+--------+------------+
3 rows in set (0.001 sec)
```

```
MariaDB [Rohan4]> insert into orders values(111,4,"Mobile");
ERROR 1452 (23000): Cannot add or update a child row: a foreign key
constraint fails (`Rohan4`.`orders`, CONSTRAINT `orders_ibfk_1` FOREIGN
KEY (`c_id`) REFERENCES `customer` (`cid`))
MariaDB [Rohan4]> insert into orders values(111,2,"Mobile");
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> delete from customer where cid=2;
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key
constraint fails (`Rohan4`.`orders`, CONSTRAINT `orders_ibfk_1` FOREIGN
KEY (`c_id`) REFERENCES `customer` (`cid`))
MariaDB [Rohan4]> delete from customer where cid=3;
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> update table customer set cid = 5 where cid= 2;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual
that corresponds to your MariaDB server version for the right syntax to
use near 'table customer set cid = 5 where cid= 2' at line 1
MariaDB [Rohan4]> update table customer set cid = 5 where cname="Rohan";
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual
that corresponds to your MariaDB server version for the right syntax to
use near 'table customer set cid = 5 where cname="Rohan"' at line 1
MariaDB [Rohan4]> update table customer set cid = 5 where cid= 1;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual
that corresponds to your MariaDB server version for the right syntax to
use near 'table customer set cid = 5 where cid= 1' at line 1
MariaDB [Rohan4]> update customer set cid = 5 where cid= 2;
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key
constraint fails (`Rohan4`.`orders`, CONSTRAINT `orders_ibfk_1` FOREIGN
KEY (`c_id`) REFERENCES `customer` (`cid`))
MariaDB [Rohan4]> update customer set cid = 5 where cid= 1;
Query OK, 1 row affected (0.002 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [Rohan4]> select * from customer;
+-----+--------+------------+
| cid | cname  | dop        |
+-----+--------+------------+
|   2 | Tanaya | 2021-02-01 |
|   5 | Rohan  | 2022-12-01 |
+-----+--------+------------+
2 rows in set (0.001 sec)

MariaDB [Rohan4]> alter table orders drop foreign key;
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual
that corresponds to your MariaDB server version for the right syntax to
use near '' at line 1
MariaDB [Rohan4]> show create table orders;
+--------+-----------------------------------------------------------------
-----------------------------------------------------------------------
-----------------------------------------------------------------------
```

```
----------------------------------------------------------------------
---------------------+
| Table  | Create Table
|
+--------+-------------------------------------------------------------
----------------------------------------------------------------------
----------------------------------------------------------------------
----------------------------------------------------------------------
---------------------+
| orders | CREATE TABLE `orders` (
  `oid` int(11) NOT NULL,
  `c_id` int(11) DEFAULT NULL,
  `oname` char(30) DEFAULT NULL,
  PRIMARY KEY (`oid`),
  KEY `c_id` (`c_id`),
  CONSTRAINT `orders_ibfk_1` FOREIGN KEY (`c_id`) REFERENCES `customer`
(`cid`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci |
+--------+-------------------------------------------------------------
----------------------------------------------------------------------
----------------------------------------------------------------------
----------------------------------------------------------------------
---------------------+
1 row in set (0.001 sec)

MariaDB [Rohan4]> alter table orders drop constraint orders_ibfk_1;
Query OK, 0 rows affected (0.007 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc orders;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| oid   | int(11)  | NO   | PRI | NULL    |       |
| c_id  | int(11)  | YES  | MUL | NULL    |       |
| oname | char(30) | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.003 sec)

MariaDB [Rohan4]> show create table orders;
+--------+-------------------------------------------------------------
----------------------------------------------------------------------
----------------------------------------------------------------------
---------------+
| Table  | Create Table
|
+--------+-------------------------------------------------------------
----------------------------------------------------------------------
----------------------------------------------------------------------
---------------+
| orders | CREATE TABLE `orders` (
```

```
  `oid` int(11) NOT NULL,
  `c_id` int(11) DEFAULT NULL,
  `oname` char(30) DEFAULT NULL,
  PRIMARY KEY (`oid`),
  KEY `c_id` (`c_id`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci |
+--------+------------------------------------------------------------------
------------------------------------------------------------------------------
------------------------------------------------------------------------------
---------------+
1 row in set (0.001 sec)

MariaDB [Rohan4]> alter table orders add constraint fk foreign key(c_id)
references customer(cid);
Query OK, 1 row affected (0.017 sec)
Records: 1  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> show create table orders;
+--------+------------------------------------------------------------------
------------------------------------------------------------------------------
------------------------------------------------------------------------------
------------------------------------------------------------------------------
---------+
| Table  | Create Table
|
+--------+------------------------------------------------------------------
------------------------------------------------------------------------------
------------------------------------------------------------------------------
------------------------------------------------------------------------------
---------+
| orders | CREATE TABLE `orders` (
  `oid` int(11) NOT NULL,
  `c_id` int(11) DEFAULT NULL,
  `oname` char(30) DEFAULT NULL,
  PRIMARY KEY (`oid`),
  KEY `fk` (`c_id`),
  CONSTRAINT `fk` FOREIGN KEY (`c_id`) REFERENCES `customer` (`cid`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci |
+--------+------------------------------------------------------------------
------------------------------------------------------------------------------
------------------------------------------------------------------------------
------------------------------------------------------------------------------
---------+
1 row in set (0.002 sec)

MariaDB [Rohan4]> alter table orders drop constraint fk;
Query OK, 0 rows affected (0.007 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> show create table orders;
```

```
+--------+-------------------------------------------------------------------
-------------------------------------------------------------------------
-------------------------------------------------------------------------
-------------+
| Table  | Create Table
|
+--------+-------------------------------------------------------------------
-------------------------------------------------------------------------
-------------------------------------------------------------------------
-------------+
| orders | CREATE TABLE `orders` (
  `oid` int(11) NOT NULL,
  `c_id` int(11) DEFAULT NULL,
  `oname` char(30) DEFAULT NULL,
  PRIMARY KEY (`oid`),
  KEY `fk` (`c_id`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci |
+--------+-------------------------------------------------------------------
-------------------------------------------------------------------------
-------------------------------------------------------------------------
-------------+
1 row in set (0.001 sec)

MariaDB [Rohan4]> create table employees(eid int,ename char(30),age int
default
18);
Query OK, 0 rows affected (0.006 sec)

MariaDB [Rohan4]> desc employees;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| eid   | int(11)  | YES  |     | NULL    |       |
| ename | char(30) | YES  |     | NULL    |       |
| age   | int(11)  | YES  |     | 18      |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.003 sec)

MariaDB [Rohan4]> insert into employees values(1,"Rohan",20);
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> insert into employees(eid,ename) values(2,"Roh");
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> select * from employees;
+------+-------+------+
| eid  | ename | age  |
+------+-------+------+
|    1 | Rohan |   20 |
|    2 | Roh   |   18 |
+------+-------+------+
```

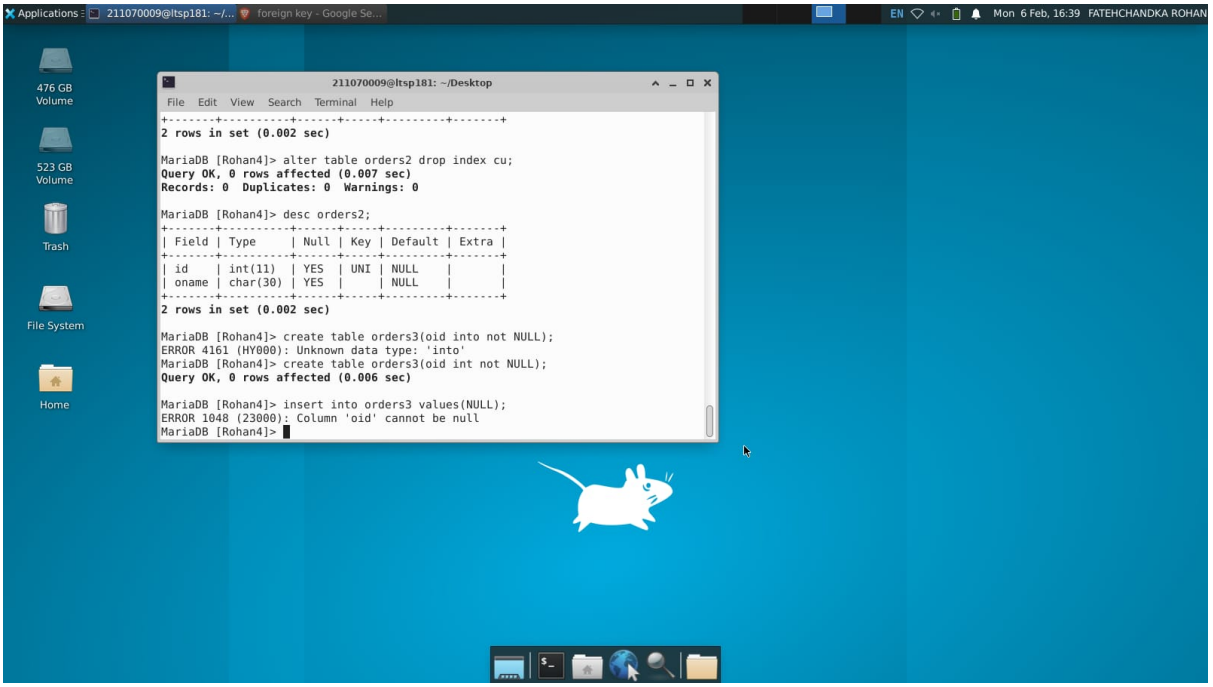
```
2 rows in set (0.001 sec)

MariaDB [Rohan4]> alter table employees alter age drop default;
Query OK, 0 rows affected (0.007 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc employees;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| eid   | int(11)  | YES  |     | NULL    |       |
| ename | char(30) | YES  |     | NULL    |       |
| age   | int(11)  | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.002 sec)

MariaDB [Rohan4]> alter table employees alter age set default 18;
Query OK, 0 rows affected (0.006 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc employees;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| eid   | int(11)  | YES  |     | NULL    |       |
| ename | char(30) | YES  |     | NULL    |       |
| age   | int(11)  | YES  |     | 18      |       |
+-------+----------+------+-----+---------+-------+
3 rows in set (0.002 sec)

MariaDB [Rohan4]> create table payment(pid int check(pid>1));
Query OK, 0 rows affected (0.006 sec)

MariaDB [Rohan4]> desc payment;
+-------+---------+------+-----+---------+-------+
| Field | Type    | Null | Key | Default | Extra |
+-------+---------+------+-----+---------+-------+
| pid   | int(11) | YES  |     | NULL    |       |
+-------+---------+------+-----+---------+-------+
1 row in set (0.003 sec)

MariaDB [Rohan4]> insert into payment values(1);
ERROR 4025 (23000): CONSTRAINT `payment.pid` failed for `Rohan4`.`payment`
MariaDB [Rohan4]> insert into payment values(2);
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> alter table payment modify pid int;
Query OK, 0 rows affected (0.007 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> insert into payment values(1);
```

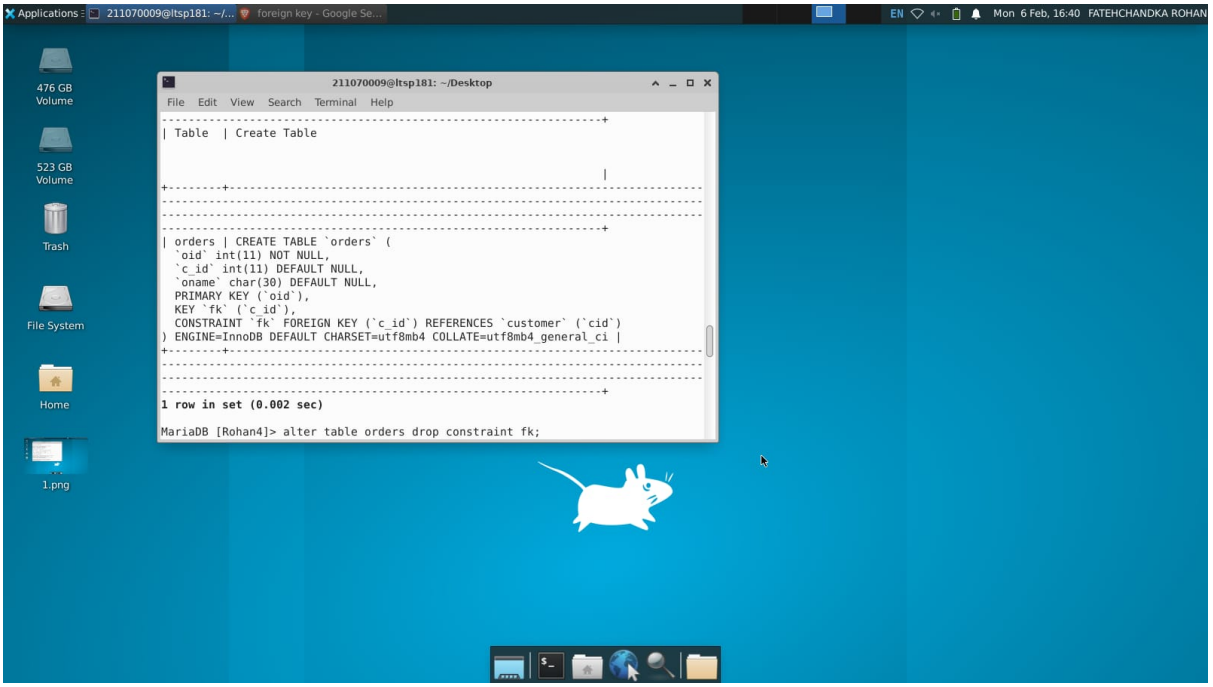
```
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> create table payment1(pid int);
Query OK, 0 rows affected (0.009 sec)

MariaDB [Rohan4]> alter table payment1 add constraint ch check(pid>1);
Query OK, 0 rows affected (0.015 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> show create table payment1;
+----------+-------------------------------------------------------------------
-------------------------------------------------------------------------------
------------------------+
| Table    | Create Table
|
+----------+-------------------------------------------------------------------
-------------------------------------------------------------------------------
------------------------+
| payment1 | CREATE TABLE `payment1` (
  `pid` int(11) DEFAULT NULL,
  CONSTRAINT `ch` CHECK (`pid` > 1)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci |
+----------+-------------------------------------------------------------------
-------------------------------------------------------------------------------
------------------------+
1 row in set (0.002 sec)

MariaDB [Rohan4]> create table orders2(id int unique);
Query OK, 0 rows affected (0.011 sec)

MariaDB [Rohan4]> desc orders2;
+-------+---------+------+-----+---------+-------+
| Field | Type    | Null | Key | Default | Extra |
+-------+---------+------+-----+---------+-------+
| id    | int(11) | YES  | UNI | NULL    |       |
+-------+---------+------+-----+---------+-------+
1 row in set (0.003 sec)

MariaDB [Rohan4]> insert into orders2 values(1);
Query OK, 1 row affected (0.002 sec)

MariaDB [Rohan4]> insert into orders2 values(1);
ERROR 1062 (23000): Duplicate entry '1' for key 'id'
MariaDB [Rohan4]> alter table orders2 add oname char(30);
Query OK, 0 rows affected (0.009 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc orders2;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
```

```
| id    | int(11)  | YES  | UNI | NULL    |       |
| oname | char(30) | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
2 rows in set (0.003 sec)

MariaDB [Rohan4]> alter table orders add constraint cu unique(oname);
Query OK, 0 rows affected (0.013 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc orders2;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| id    | int(11)  | YES  | UNI | NULL    |       |
| oname | char(30) | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
2 rows in set (0.003 sec)

MariaDB [Rohan4]> alter table orders2 add constraint cu unique(oname);
Query OK, 0 rows affected (0.011 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc orders2;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| id    | int(11)  | YES  | UNI | NULL    |       |
| oname | char(30) | YES  | UNI | NULL    |       |
+-------+----------+------+-----+---------+-------+
2 rows in set (0.002 sec)

MariaDB [Rohan4]> alter table orders2 drop index cu;
Query OK, 0 rows affected (0.007 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc orders2;
+-------+----------+------+-----+---------+-------+
| Field | Type     | Null | Key | Default | Extra |
+-------+----------+------+-----+---------+-------+
| id    | int(11)  | YES  | UNI | NULL    |       |
| oname | char(30) | YES  |     | NULL    |       |
+-------+----------+------+-----+---------+-------+
2 rows in set (0.002 sec)

MariaDB [Rohan4]> create table orders3(oid into not NULL);
ERROR 4161 (HY000): Unknown data type: 'into'
MariaDB [Rohan4]> create table orders3(oid int not NULL);
Query OK, 0 rows affected (0.006 sec)

MariaDB [Rohan4]> insert into orders3 values(NULL);
ERROR 1048 (23000): Column 'oid' cannot be null
```

```
MariaDB [Rohan4]> alter table orders3 modify oid int;
Query OK, 0 rows affected (0.011 sec)
Records: 0  Duplicates: 0  Warnings: 0

MariaDB [Rohan4]> desc orders3;
+-------+---------+------+-----+---------+-------+
| Field | Type    | Null | Key | Default | Extra |
+-------+---------+------+-----+---------+-------+
| oid   | int(11) | YES  |     | NULL    |       |
+-------+---------+------+-----+---------+-------+
1 row in set (0.003 sec)
```

Screenshots:





Conclusion:

Performed operations of DDL and DML based on views in MySQL Software. Studied assignment successfully.

END OF ASSIGNMENT