CLASS: F.Y. MCA   **SEM: I**

COURSE CODE: MC504   **SUBJECT NAME: DATABASE MANAGEMENT SYSTEM LAB**

ROLL NO. : 2022510034   **BATCH: B**

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EXPERIMENT NO: 07

EXPERIMENT TITLE: To examine integrity of database using Triggers

MYSQL Triggers

A trigger in MySQL is a set of SQL statements that reside in a system catalog. It is a special type of stored procedure that is invoked automatically in response to an event. Each trigger is associated with a table, which is activated on any DML statement such as INSERT, UPDATE, or DELETE.

Types of Triggers in MySQL
We can define the maximum six types of actions or events in the form of triggers:

Before Insert: It is activated before the insertion of data into the table.
After Insert: It is activated after the insertion of data into the table.
Before Update: It is activated before the update of data in the table.
After Update: It is activated after the update of the data in the table.
Before Delete: It is activated before the data is removed from the table.
After Delete: It is activated after the deletion of data from the table.

Syntax:
CREATE TRIGGER trigger_name
  (AFTER | BEFORE) (INSERT | UPDATE | DELETE)
    ON table_name FOR EACH ROW
    BEGIN
    --variable declarations
    --trigger code
    END;

Outputs:-

1. After trigger with Insert

```
mysql> -- After trigger with insert
mysql>
mysql> delimiter $
mysql>
mysql> CREATE TRIGGER calculate_perc
    -> AFTER INSERT ON marks
    -> FOR EACH ROW
    -> BEGIN
    -> DECLARE total INT;
    -> DECLARE perc INT;
    -> SELECT SUM(English)+SUM(Maths)+SUM(Geography)+SUM(History) into total FROM marks WHERE student_name = NEW.student_name;
    -> SET perc = (total / 400) * 100;
    -> INSERT INTO student_percentage(name,percentage) VALUES (NEW.student_name, perc);
    -> END $
Query OK, 0 rows affected (0.02 sec)

mysql>
mysql> delimiter ;
mysql>
mysql> insert into marks values
    -> ('Rishi',70,40,60,50);
Query OK, 1 row affected (0.01 sec)

mysql> select * from marks;
+--------------+---------+-------+-----------+---------+
| student_name | English | Maths | Geography | History |
+--------------+---------+-------+-----------+---------+
| Rishi        |      70 |    40 |        60 |      50 |
+--------------+---------+-------+-----------+---------+
1 row in set (0.01 sec)

mysql> select * from student_percentage;
+-------+------------+
| name  | percentage |
+-------+------------+
| Rishi |         55 |
+-------+------------+
1 row in set (0.00 sec)

mysql>
```

2. After Trigger with Update

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

mysql> use fymca;
Database changed
mysql>
mysql> -- After trigger with Update
mysql>
mysql> delimiter $
mysql> CREATE TRIGGER update_perc
    -> AFTER UPDATE ON marks
    -> FOR EACH ROW
    -> BEGIN
    -> DECLARE total INT;
    -> DECLARE perc INT;
    -> SELECT SUM(NEW.English)+SUM(NEW.Maths)+SUM(NEW.Geography)+SUM(NEW.History) into total FROM marks WHERE student_name = OLD.student_name;
    -> SET perc = (total / 400) * 100;
    -> UPDATE student_percentage SET percentage = perc WHERE name = OLD.student_name;
    -> END $
Query OK, 0 rows affected (0.01 sec)

mysql> delimiter ;
mysql>
mysql> update marks set Maths = 94 where student_name = "Rishi";
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from marks;
+--------------+---------+-------+-----------+---------+
| student_name | English | Maths | Geography | History |
+--------------+---------+-------+-----------+---------+
| Rishi        |      70 |    94 |        60 |      50 |
+--------------+---------+-------+-----------+---------+
1 row in set (0.00 sec)

mysql> select * from student_percentage;
+-------+------------+
| name  | percentage |
+-------+------------+
| Rishi |         69 |
+-------+------------+
```

3. After Trigger with Delete

```
Your MySQL connection id is 26
Server version: 8.0.31 MySQL Community Server - GPL

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

mysql>
mysql> use fymca;
Database changed
mysql>
mysql> -- After trigger with Delete
mysql>
mysql> delimiter $
mysql>
mysql> CREATE TRIGGER delete_perc
    -> AFTER DELETE ON marks
    -> FOR EACH ROW
    -> BEGIN
    -> DELETE FROM student_percentage WHERE name = OLD.student_name;
    -> END $
Query OK, 0 rows affected (0.01 sec)

mysql>
mysql> delimiter ;
mysql>
mysql> delete from marks where student_name = 'Rishi';
Query OK, 0 rows affected (0.01 sec)

mysql> select * from marks;
Empty set (0.00 sec)

mysql> select * from student_percentage;
Empty set (0.00 sec)

mysql>
```

4. Before Trigger with Insert

```
mysql>
mysql> use fymca;
Database changed
mysql>
mysql> -- Before trigger with insert
mysql>
mysql> delimiter $
mysql>
mysql> CREATE TRIGGER before_insert
    -> BEFORE INSERT ON marks
    -> FOR EACH ROW
    -> BEGIN
    -> DECLARE total INT;
    -> DECLARE perc INT;
    -> DECLARE resultV VARCHAR(10);
    -> SET total = NEW.English + NEW.Maths + NEW.Geography + NEW.History;
    -> SET perc = (total / 400) * 100;
    -> IF perc < 35 THEN
    -> SET resultV = 'Fail';
    -> ELSEIF perc > 35 THEN
    -> SET resultV = 'Pass';
    -> END IF;
    -> INSERT INTO student_result(name, result) VALUES(NEW.student_name, resultV);
    -> END $
Query OK, 0 rows affected (0.02 sec)

mysql>
mysql> delimiter ;
mysql>
mysql> insert into marks values ('Rishi',70,40,30,60);
Query OK, 1 row affected (0.02 sec)

mysql> select * from marks;
+--------------+---------+-------+-----------+---------+
| student_name | English | Maths | Geography | History |
+--------------+---------+-------+-----------+---------+
| Rishi        |      70 |    40 |        30 |      60 |
+--------------+---------+-------+-----------+---------+
1 row in set (0.00 sec)
```

```
    -> IF perc < 35 THEN
    -> SET resultV = 'Fail';
    -> ELSEIF perc > 35 THEN
    -> SET resultV = 'Pass';
    -> END IF;
    -> INSERT INTO student_result(name, result) VALUES(NEW.student_name, resultV);
    -> END $
Query OK, 0 rows affected (0.02 sec)

mysql>
mysql> delimiter ;
mysql>
mysql> insert into marks values ('Rishi',70,40,30,60);
Query OK, 1 row affected (0.02 sec)

mysql> select * from marks;
+--------------+---------+-------+-----------+---------+
| student_name | English | Maths | Geography | History |
+--------------+---------+-------+-----------+---------+
| Rishi        |      70 |    40 |        30 |      60 |
+--------------+---------+-------+-----------+---------+
1 row in set (0.00 sec)

mysql> select * from student_percentage;
+-------+------------+
| name  | percentage |
+-------+------------+
| Rishi |         50 |
+-------+------------+
1 row in set (0.00 sec)

mysql> select * from student_result;
+-------+--------+
| name  | result |
+-------+--------+
| Rishi | Pass   |
+-------+--------+
1 row in set (0.00 sec)

mysql>
```

5. Before trigger with Update

```
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 35
Server version: 8.0.31 MySQL Community Server - GPL

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

mysql> use fymca;
Database changed
mysql>
mysql> -- Before trigger with update
mysql>
mysql> delimiter $
mysql>
mysql> CREATE TRIGGER bef_update_perc
    -> BEFORE UPDATE ON marks
    -> FOR EACH ROW
    -> BEGIN
    -> DECLARE total INT;
    -> DECLARE perc INT;
    -> DECLARE resultV varchar(10);
    -> SELECT SUM(NEW.English)+SUM(NEW.Maths)+SUM(NEW.Geography)+SUM(NEW.History) into total FROM marks WHERE OLD.student_name = NEW.student_name;
    -> SET perc = (total / 400) * 100;
    -> IF perc < 35 THEN
    -> SET resultV = 'Fail';
    -> ELSEIF perc > 35 THEN
    -> SET resultV = 'Pass';
    -> END IF;
    -> UPDATE student_result SET result = resultV WHERE name = NEW.student_name;
    -> END $
Query OK, 0 rows affected (0.02 sec)

mysql>
mysql> delimiter ;
mysql>
```

```
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owners.

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

mysql> use fymca;
Database changed
mysql>
mysql> update marks set English = 20, History = 20 where student_name = 'Rishi';
Query OK, 1 row affected (0.02 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from marks;
+--------------+---------+-------+-----------+---------+
| student_name | English | Maths | Geography | History |
+--------------+---------+-------+-----------+---------+
| Rishi        |      20 |    40 |        30 |      20 |
+--------------+---------+-------+-----------+---------+
1 row in set (0.00 sec)

mysql> select * from student_percentage;
+-------+------------+
| name  | percentage |
+-------+------------+
| Rishi |         28 |
+-------+------------+
1 row in set (0.00 sec)

mysql> select * from student_result;
+-------+--------+
| name  | result |
+-------+--------+
| Rishi | Fail   |
+-------+--------+
1 row in set (0.00 sec)

mysql>
```

6. Before trigger with Delete

```
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owners.

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

mysql> use fymca;
Database changed
mysql>
mysql> -- Before trigger with delete
mysql>
mysql> delimiter $
mysql>
mysql> CREATE TRIGGER bef_del_perc
    -> BEFORE DELETE ON marks
    -> FOR EACH ROW
    -> BEGIN
    -> DELETE FROM student_result where name = OLD.student_name;
    -> END $
Query OK, 0 rows affected (0.03 sec)

mysql>
mysql> delimiter ;
mysql>
mysql> delete from marks where student_name = 'Rishi';
Query OK, 1 row affected (0.01 sec)

mysql> select * from student_result;
Empty set (0.00 sec)

mysql> select * from marks;
Empty set (0.00 sec)

mysql> select * from student_percentage;
Empty set (0.00 sec)

mysql>
```