Rupesh Dharme
Roll No: 31124

Assignment - 7

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Title : Database Triggers.

Problem Statements:

Write a database trigger on library table. The System should keep track of the records that are being updated or deleted. ~~records~~ should The old value of updated or deleted records should be added in library audit table.

Objective :-

- Understand the concept of row level and statement level trigger.
- Understand the concept of trigger initiated against event.

Theory :-

Trigger -

In MySQL, a trigger is a stored program invoked automatically in response to an event such as insert, update or delete that occurs in the associated table for example, you can define a trigger that is invoked automatically before a new row is inserted into a table.

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The SQL standards defines two types of triggers.

→ Row-level triggers = is activated for each row that is inserted, updated or deleted. For example, if a table ~~has~~ has 100 rows inserted, updated/deleted, the trigger is automat-invoked 100 times.

→ statement level triggers = is expected once for each transaction regardless of number of rows affected

Syntax

Create trigger trigger_name {before/after} {Insert/update/delete} on table name for each row
trigger_body

Trigger body can access values of column being affected by DML statement.
To distinguish b/w the value of column before & after the DML has fired use new & old modifies

Trigger Event	old	NEW
insert	x	✓
update	✓	✓
delete	✓	✓

Dropping trigger

Syntax : drop trigger trigger_name ;

Conclusion :-

Successfully implemented the concept of triggers to maintain record of changes in library table.

MySQL 8.0 Command Line Client - Unicode

```
mysql> create database assignment07;
Query OK, 1 row affected (0.01 sec)

mysql>
mysql> use assignment07;
Database changed
mysql>
mysql> create table library(
    ->     id int not null auto_increment,
    ->     name varchar(20) not null,
    ->     name_book varchar(20) not null,
    ->     doi date,
    ->     dor date,
    ->     primary key(id)
    -> );
Query OK, 0 rows affected (0.07 sec)

mysql>
mysql> desc library;
+-----------+-------------+------+-----+---------+----------------+
| Field     | Type        | Null | Key | Default | Extra          |
+-----------+-------------+------+-----+---------+----------------+
| id        | int         | NO   | PRI | NULL    | auto_increment |
| name      | varchar(20) | NO   |     | NULL    |                |
| name_book | varchar(20) | NO   |     | NULL    |                |
| doi       | date        | YES  |     | NULL    |                |
| dor       | date        | YES  |     | NULL    |                |
+-----------+-------------+------+-----+---------+----------------+
5 rows in set (0.03 sec)

mysql>
mysql> create table library_audit(
    ->     id int not null auto_increment,
```

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```
mysql> create table library_audit(
    ->     id int not null auto_increment,
    ->     name varchar(20) not null,
    ->     remark varchar(100),
    ->     primary key(id)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql>
mysql> desc library_audit;
+--------+--------------+------+-----+---------+----------------+
| Field  | Type         | Null | Key | Default | Extra          |
+--------+--------------+------+-----+---------+----------------+
| id     | int          | NO   | PRI | NULL    | auto_increment |
| name   | varchar(20)  | NO   |     | NULL    |                |
| remark | varchar(100) | YES  |     | NULL    |                |
+--------+--------------+------+-----+---------+----------------+
3 rows in set (0.00 sec)

mysql>
mysql> insert into library (name, name_book, doi, dor)
    -> values ('Rupesh', 'Book1', '2020/10/10', '2020/10/11'),
    ->        ('Omkar', 'Book2', '2020/10/10', '2020/10/11'),
    ->        ('Dheeraj', 'Book3', '2020/10/10', '2020/10/11'),
    ->        ('Gayatri', 'Book4', '2020/10/10', '2020/10/11'),
    ->        ('Nikhil', 'Book5', '2020/10/10', '2020/10/11');
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql>
mysql> select * from library;
+----+---------+-----------+------------+------------+
| id | name    | name_book | doi        | dor        |
```

MySQL 8.0 Command Line Client - Unicode

```
mysql> select * from library;
+----+---------+-----------+------------+------------+
| id | name    | name_book | doi        | dor        |
+----+---------+-----------+------------+------------+
|  1 | Rupesh  | Book1     | 2020-10-10 | 2020-10-11 |
|  2 | Omkar   | Book2     | 2020-10-10 | 2020-10-11 |
|  3 | Dheeraj | Book3     | 2020-10-10 | 2020-10-11 |
|  4 | Gayatri | Book4     | 2020-10-10 | 2020-10-11 |
|  5 | Nikhil  | Book5     | 2020-10-10 | 2020-10-11 |
+----+---------+-----------+------------+------------+
5 rows in set (0.00 sec)

mysql>
mysql> delimiter //
mysql>
mysql> create trigger delete_trigger
    -> after delete on library
    -> for each row
    -> begin
    ->     insert into library_audit(name, remark) values (old.name, 'This record was deleted.');
    -> end;
    -> //
Query OK, 0 rows affected (0.02 sec)

mysql>
mysql> create trigger update_trigger
    -> after update on library
    -> for each row
    -> begin
    -> insert into library_audit(name, remark) values (old.name, 'This record was updated');
    -> end;
    -> //
Query OK, 0 rows affected (0.02 sec)
```

MySQL 8.0 Command Line Client - Unicode

```
mysql> delimiter ;
mysql>
mysql> delete from library where name = 'Rupesh';
Query OK, 1 row affected (0.02 sec)

mysql> select * from library_audit;
+----+--------+--------------------------+
| id | name   | remark                   |
+----+--------+--------------------------+
|  1 | Rupesh | This record was deleted. |
+----+--------+--------------------------+
1 row in set (0.00 sec)

mysql>
mysql> delete from library where name = 'Omkar';
Query OK, 1 row affected (0.01 sec)

mysql> select * from library_audit;
+----+--------+--------------------------+
| id | name   | remark                   |
+----+--------+--------------------------+
|  1 | Rupesh | This record was deleted. |
|  2 | Omkar  | This record was deleted. |
+----+--------+--------------------------+
2 rows in set (0.00 sec)

mysql>
mysql> update library
    -> set doi = curdate()
    -> where name = 'Nikhil';
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

MySQL 8.0 Command Line Client - Unicode

```
mysql> update library
    -> set doi = curdate()
    -> where name = 'Nikhil';
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from library_audit;
+----+--------+--------------------------+
| id | name   | remark                   |
+----+--------+--------------------------+
|  1 | Rupesh | This record was deleted. |
|  2 | Omkar  | This record was deleted. |
|  3 | Nikhil | This record was updated  |
+----+--------+--------------------------+
3 rows in set (0.00 sec)

mysql>
mysql> update library
    -> set dor = curdate()
    -> where name = 'Gayatri';
Query OK, 1 row affected (0.03 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from library_audit;
+----+---------+--------------------------+
| id | name    | remark                   |
+----+---------+--------------------------+
|  1 | Rupesh  | This record was deleted. |
|  2 | Omkar   | This record was deleted. |
|  3 | Nikhil  | This record was updated  |
|  4 | Gayatri | This record was updated  |
+----+---------+--------------------------+
4 rows in set (0.00 sec)
```