**Name – Shahane Akash Dilip Roll No – C32260 Class – TE Div:2**

**Batch – T8 Subject - DBMS**

**Assignment No – 7**

**Title:** Design the Database Trigger For All Types Row Level and Statement Level: Write a database trigger on the Library table. The System should keep track of the records that are being updated or deleted. The old value of updated or deleted records should be added in the Library\_Audit table.

**----------------------------------------------------------------**

**1. Library Table(B\_id, title, author varchar(20), edition, no\_of\_copies)**

mysql> CREATE TABLE library(B\_id int,title varchar (20), authors varchar(20), edition int, no\_of\_copies int);

Query OK, 0 rows affected (0.01 sec)

mysql> desc library;

+--------------+-------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+--------------+-------------+------+-----+---------+-------+

| B\_id | int | YES | | NULL | |

| title | varchar(20) | YES | | NULL | |

| authors | varchar(20) | YES | | NULL | |

| edition | int | YES | | NULL | |

| no\_of\_copies | int | YES | | NULL | |

+--------------+-------------+------+-----+---------+-------+

5 rows in set (0.00 sec)

**2. Library\_Audit Table(B\_id, title, edition, no\_of\_copies, date\_of\_mod, type of operation, user who performed the operation)**

mysql> CREATE TABLE lib\_audit(B\_id int, title varchar(20), edition int, no\_of\_copies int, date\_of\_mod datetime, type\_of\_op varchar(20), username varchar(20));

Query OK, 0 rows affected (0.02 sec)

mysql> desc lib\_audit;

+--------------+-------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+--------------+-------------+------+-----+---------+-------+

| B\_id | int | YES | | NULL | |

| title | varchar(20) | YES | | NULL | |

| edition | int | YES | | NULL | |

| no\_of\_copies | int | YES | | NULL | |

| date\_of\_mod | datetime | YES | | NULL | |

| type\_of\_op | varchar(20) | YES | | NULL | |

| username | varchar(20) | YES | | NULL | |

+--------------+-------------+------+-----+---------+-------+

7 rows in set (0.00 sec)

**3. Transaction Table(Transaction\_id, B\_id, Issue or return, no of copies issued or return)**

mysql> CREATE TABLE transaction (t\_id int, B\_id int, i\_r varchar(10), no\_of\_copies int);

Query OK, 0 rows affected (0.02 sec)

mysql> DESC transaction;

+---------+-------------+------+-----+---------+-------+

| Field | Type | Null | Key | Default | Extra |

+---------+-------------+------+-----+---------+-------+

| t\_id | int | YES | | NULL | |

| B\_id | int | YES | | NULL | |

| i\_r | varchar(10) | YES | | NULL | |

| no\_of\_c | int | YES | | NULL | |

+---------+-------------+------+-----+---------+-------+

4 rows in set (0.00 sec)

mysql> INSERT INTO library VALUES

-> (1, "TOC", "V.V.Richard", 2, 4),

-> (2, "CN", "Forouzan", 4, 5),

-> (3, "ISEE", "Rahul De", 3, 5),

-> (4, "DBMS", "Silberschatz", 3, 2),

-> (5, "SEPM", "Pressman", 5, 6);

Query OK, 5 rows affected (0.00 sec)

Records: 5 Duplicates: 0 Warnings: 0

mysql> select \* from library;

+------+-------+--------------+---------+--------------+

| B\_id | title | author | edition | no\_of\_copies |

+------+-------+--------------+---------+--------------+

| 1 | TOC | V.V.Richard | 2 | 4 |

| 2 | CN | Forouzan | 4 | 5 |

| 3 | ISEE | Rahul De | 3 | 5 |

| 4 | DBMS | Silberschatz | 3 | 2 |

| 5 | SEPM | Pressman | 5 | 6 |

+------+-------+--------------+---------+--------------+

5 rows in set (0.00 sec)

**QUERIES:-**

**1. Create a trigger to keep the track of records that are updated or deleted from the library table. The old values of updated or deleted record should be added in library audit table along with the date of modification, type of modification and the user who performed the modification.**

**For Update-**

mysql> CREATE TRIGGER t\_d AFTER DELETE ON library

-> FOR EACH ROW

-> BEGIN

-> DECLARE b VARCHAR(20);

-> SET b = 'deleted';

-> INSERT INTO lib\_audit (B\_id, title, edition, no\_of\_copies, date\_of\_mod, type\_of\_op, username)

-> VALUES (OLD.B\_id, OLD.title, OLD.edition, OLD.no\_of\_copies, CURDATE(), b, CURRENT\_USER());

-> END$

Query OK, 0 rows affected (0.01 sec)

mysql> UPDATE library

-> SET authors = 'Kapil Mishra',

-> title = 'TOC',

-> edition = 2,

-> no\_of\_copies = 4

-> WHERE B\_id = 1;

Query OK, 1 row affected (0.01 sec)

Rows matched: 1 Changed: 1 Warnings: 0

mysql> SELECT \* FROM lib\_audit;

+----+-----+-------+------------+-----------+----------+--------------+

|B\_id|title|edition|no\_of\_copies|date\_of\_mod|type\_of\_op|username |

+----+-----+-------+------------+-----------+----------+--------------+

| 1 | TOC | 2 | 4 | 2023-10-12| updated |root@localhost|

+----+-----+-------+------------+-----------+----------+--------------+

1 row in set (0.00 sec)

**For Delete -**

mysql> CREATE TRIGGER t\_d AFTER DELETE ON library

-> FOR EACH ROW

-> BEGIN

-> DECLARE b VARCHAR(20);

-> SET b = 'deleted';

-> INSERT INTO lib\_audit (B\_id, title, edition, no\_of\_copies, date\_of\_mod, type\_of\_op, username)

-> VALUES (OLD.B\_id, OLD.title, OLD.edition, OLD.no\_of\_copies, CURDATE(), b, CURRENT\_USER());

-> END$

Query OK, 0 rows affected (0.01 sec)

mysql> DELETE FROM library where B\_id = 2;

Query OK, 1 row affected (0.00 sec)

mysql> select \* from lib\_audit;

+----+-----+-------+------------+-----------+----------+--------------+

|B\_id|title|edition|no\_of\_copies|date\_of\_mod|type\_of\_op|username |

+----+-----+-------+------------+-----------+----------+--------------+

| 1 | TOC | 2 | 4 |2023-10-12 |updated |root@localhost|

| 2 | CN | 4 | 5 |2023-10-12 |deleted |root@localhost|

+----+-----+-------+------------+-----------+----------+--------------+

2 rows in set (0.00 sec)

**2. To create a trigger to check the number of copies available before issuing a book if number of copies issuing > the number of books available then issue the number of books which are available.**

mysql> CREATE TRIGGER t2 BEFORE INSERT ON transaction

-> FOR EACH ROW

-> BEGIN

-> DECLARE no INT;

-> IF NEW.i\_r = 'I' THEN

-> SELECT no\_of\_copies INTO no FROM library WHERE B\_id = NEW.B\_id;

-> IF NEW.no\_of\_copies > no THEN

-> SET NEW.no\_of\_copies = no;

-> END IF;

-> END IF;

-> END$

Query OK, 0 rows affected (0.01 sec)

mysql> INSERT INTO transaction VALUES (10, 1, 'I', 3);

Query OK, 1 row affected (0.01 sec)

mysql> select \* from transaction;

+------+------+------+--------------+

| t\_id | B\_id | i\_r | no\_of\_copies |

+------+------+------+--------------+

| 10 | 1 | I | 3 |

+------+------+------+--------------+

1 row in set (0.00 sec)

**3.** **To update the number of copies available after the book is issued or returned delete from transaction.**

mysql> CREATE TRIGGER t3 AFTER INSERT ON transaction

-> FOR EACH ROW

-> BEGIN

-> IF NEW.i\_r = 'I' THEN

-> UPDATE library

-> SET no\_of\_copies = no\_of\_copies - NEW.no\_of\_copies

-> WHERE B\_id = NEW.B\_id;

-> ELSE

-> UPDATE library

-> SET no\_of\_copies = no\_of\_copies + NEW.no\_of\_copies

-> WHERE B\_id = NEW.B\_id;

-> END IF;

-> END$

Query OK, 0 rows affected (0.08 sec)

mysql> INSERT INTO transaction VALUES(10,2,"I",7);

Query OK, 1 row affected (0.03 sec)

mysql> select \* from library;

+------+-------+--------------+---------+--------------+

| B\_id | title | authors | edition | no\_of\_copies |

+------+-------+--------------+---------+--------------+

| 1 | TOC | Kapil Mishra | 2 | 4 |

| 3 | ISEE | Rahul De | 3 | 5 |

| 4 | DBMS | Silberschatz | 3 | 2 |

| 5 | SEPM | Pressman | 5 | 6 |

+------+-------+--------------+---------+--------------+

4 rows in set (0.00 sec)