11.Database Trigger (After update and After delete) Write a database trigger on borrower (Rollin int, name varchar (30), dateofissue date, nameofbook varchar (30), status char (10)). The System should keep track of the records thatare being updated or deleted. The old value of updated or deleted records should be added in the Library\_Audit (Rollin int, name char (10), dateofissue date, nameofbook char (10), status char, ts timestamp

CREATE TABLE borrower ( rollin INT, name VARCHAR(30), dateofissue DATE, nameofbook VARCHAR(30), status CHAR(10) );

INSERT INTO borrower (rollin, name, dateofissue, nameofbook, status) VALUES (101, 'abc', '2017-07-16', 'dbms', 'r'), (102, 'abc1', '2017-07-16', 'cn', 'i'), (103, 'abc3', '2017-07-18', 'toc', 'i'), (104, 'abc4', '2017-07-20', 'ds', 'i'), (105, 'abc5', '2017-07-23', 'daa', 'r'), (106, 'nisha', '2017-08-10', 'splm', 'r');

select \* from borrower;

CREATE TABLE Library\_Audit ( Rollin INT, name CHAR(10), dateofissue DATE, nameofbook CHAR(10), status CHAR, ts TIMESTAMP DEFAULT CURRENT\_TIMESTAMP );

DELIMITER //

CREATE TRIGGER after\_delete

AFTER DELETE ON borrower

FOR EACH ROW

BEGIN

INSERT INTO Library\_Audit (Rollin, name, dateofissue, nameofbook, status, ts)

VALUES (OLD.rollin, OLD.name, OLD.dateofissue, OLD.nameofbook, OLD.status, CURRENT\_TIMESTAMP());

END //

DELIMITER ;

DELETE FROM borrower WHERE rollin = 105;

select \* from borrower;

select \* from library\_audit;

DELIMITER //

CREATE TRIGGER after\_update

AFTER UPDATE ON borrower

FOR EACH ROW

BEGIN

INSERT INTO Library\_Audit (Rollin, name, dateofissue, nameofbook, status, ts)

VALUES (OLD.rollin, OLD.name, OLD.dateofissue, OLD.nameofbook, OLD.status, CURRENT\_TIMESTAMP());

END //

DELIMITER ;

UPDATE borrower

SET status = 'r'

WHERE rollin = 104;

select \* from borrower;

select \* from library\_audit;

Alternate code

CREATE TABLE Borrower (

Rollin INT PRIMARY KEY, -- Rollin (Student ID)

name VARCHAR2(30), -- Name of the student

dateofissue DATE, -- Date when the book was issued

nameofbook VARCHAR2(30), -- Name of the book

status CHAR(10) -- Status of the book (e.g., 'Issued', 'Returned')

);

drop table Library\_Audit;

CREATE TABLE Library\_Audit (

Rollin INT, -- Rollin (Student ID)

name CHAR(10), -- Name of the student (limited to 10 chars)

dateofissue DATE, -- Date when the book was issued

nameofbook CHAR(10), -- Name of the book (limited to 10 chars)

status CHAR(10), -- Status of the book (e.g., 'Issued', 'Returned')

ts TIMESTAMP DEFAULT CURRENT\_TIMESTAMP -- Timestamp of the change

);

-- Insert sample data into Borrower table

INSERT INTO Borrower (Rollin, name, dateofissue, nameofbook, status)

VALUES (101, 'Alice', TO\_DATE('2024-10-01', 'YYYY-MM-DD'), 'Database Systems', 'Issued');

INSERT INTO Borrower (Rollin, name, dateofissue, nameofbook, status)

VALUES (102, 'Bob', TO\_DATE('2024-09-15', 'YYYY-MM-DD'), 'Algorithms', 'Issued');

INSERT INTO Borrower (Rollin, name, dateofissue, nameofbook, status)

VALUES (103, 'Charlie', TO\_DATE('2024-08-10', 'YYYY-MM-DD'), 'Operating Systems', 'Issued');

select \* from borrower;

select \* from Library\_Audit;

-- Trigger for After Update on Borrower Table

CREATE OR REPLACE TRIGGER after\_update\_borrower

AFTER UPDATE ON Borrower

FOR EACH ROW

BEGIN

-- Insert old values (before the update) into the Library\_Audit table

INSERT INTO Library\_Audit (Rollin, name, dateofissue, nameofbook, status, ts)

VALUES (:OLD.Rollin, :OLD.name, :OLD.dateofissue, :OLD.nameofbook, :OLD.status, CURRENT\_TIMESTAMP);

END;

/

-- Trigger for After Delete on Borrower Table

CREATE OR REPLACE TRIGGER after\_delete\_borrower

AFTER DELETE ON Borrower

FOR EACH ROW

BEGIN

-- Insert old values (before the delete) into the Library\_Audit table

INSERT INTO Library\_Audit (Rollin, name, dateofissue, nameofbook, status, ts)

VALUES (:OLD.Rollin, :OLD.name, :OLD.dateofissue, :OLD.nameofbook, :OLD.status, CURRENT\_TIMESTAMP);

END;

/

-- Update status of the book for Rollin = 101

UPDATE Borrower

SET status = 'Returned'

WHERE Rollin = 101 AND nameofbook = 'Database Systems';

select

ALTER TABLE Library\_Audit MODIFY nameofbook VARCHAR2(30);

-- Delete the record for Rollin = 101 and nameofbook = 'Database Systems'

DELETE FROM Borrower

WHERE Rollin = 101 AND nameofbook = 'Database Systems';