

WORKSHEET 7

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Branch: CSE(3rd Year) Section/Group: Krg-1-A

Semester: 5th Date of Performance: 09/10/25

Subject Name: ADBMS Subject Code: 23CSP-333

1. AIM:

i)Triggers: Student Data Change Monitoring (Medium)

EduSmart Institute wants to monitor all insertions and deletions in the student database.

Whenever a new student record is inserted or deleted from the student table, the details of that record should be displayed on the PostgreSQL console window.

Objective:

Design a PostgreSQL trigger that:

- 1. Prints the complete details of the inserted or deleted student record using RAISE NOTICE.
- 2. Activates automatically after every INSERT or DELETE operation on the student table.

ii) Triggers: Employee Activity Logging (Hard)

TechSphere Solutions wants to maintain an automatic audit trail for all employee additions and deletions in the company database.

Whenever a new employee is added or removed from the tbl_employee table, an entry should be recorded in the tbl_employee_audit table for tracking purposes.

Objective:

Design a PostgreSQL trigger that:

- 1. Inserts a message in tbl employee audit whenever a new employee is added or deleted.
- 2. The message should include the employee's name and the current timestamp.
- 3. Activates automatically after every INSERT or DELETE operation on tbl employee.

2. Tools Used: PostGres

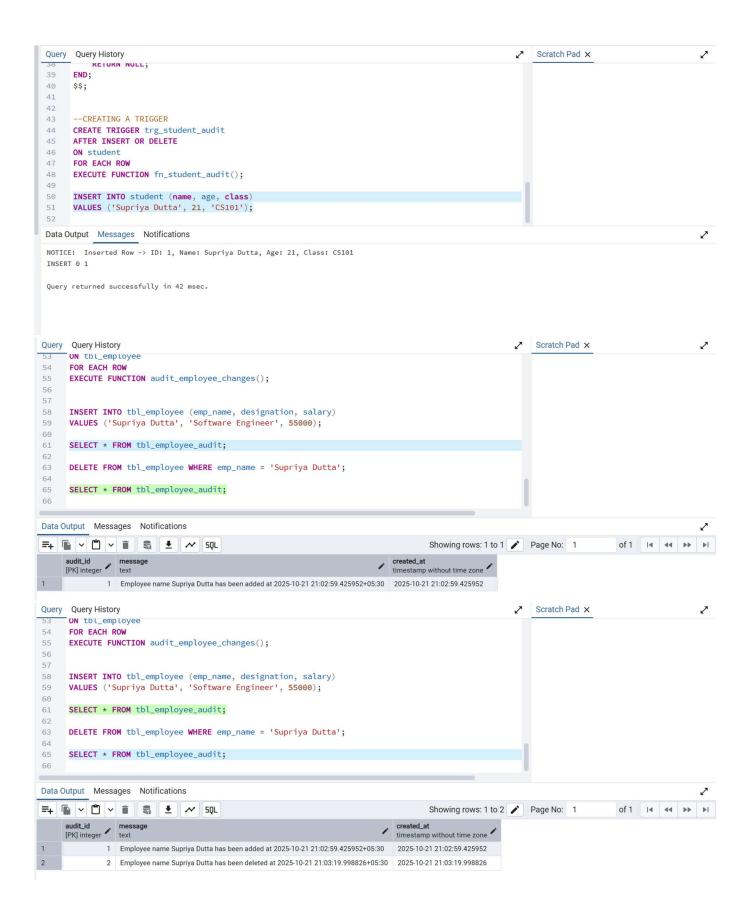
Solutions:

Q1)

--CREATING A TABLE

```
CREATE TABLE student (
  id SERIAL PRIMARY KEY,
  name VARCHAR(100),
  age INT,
  class VARCHAR(50)
);
--TRIGGER FUNCTION
CREATE OR REPLACE FUNCTION fn student audit()
RETURNS TRIGGER
LANGUAGE plpgsql
AS
$$
BEGIN
  IF TG OP = 'INSERT' THEN
    RAISE NOTICE 'Inserted Row -> ID: %, Name: %, Age: %, Class: %',
          NEW.id, NEW.name, NEW.age, NEW.class;
    RETURN NEW;
  ELSIF TG OP = 'DELETE' THEN
    RAISE NOTICE 'Deleted Row -> ID: %, Name: %, Age: %, Class: %',
          OLD.id, OLD.name, OLD.age, OLD.class;
    RETURN OLD;
  END IF;
  RETURN NULL;
END;
$$;
-- CREATING A TRIGGER
CREATE TRIGGER trg student audit
AFTER INSERT OR DELETE
ON student
FOR EACH ROW
EXECUTE FUNCTION fn student audit();
Q2)
CREATE TABLE tbl employee (
  emp id SERIAL PRIMARY KEY,
  emp name VARCHAR(100),
  designation VARCHAR(50),
  salary NUMERIC(10,2)
);
```

```
CREATE TABLE tbl employee audit (
     audit id SERIAL PRIMARY KEY,
     message TEXT,
     created at TIMESTAMP DEFAULT CURRENT TIMESTAMP
   );
   CREATE OR REPLACE FUNCTION audit employee changes()
   RETURNS TRIGGER
   LANGUAGE plpgsql
   AS
   $$
   BEGIN
     IF TG OP = 'INSERT' THEN
       INSERT INTO tbl employee audit(message)
       VALUES ('Employee name ' || NEW.emp name || ' has been added at ' || NOW());
       RETURN NEW;
     ELSIF TG OP = 'DELETE' THEN
       INSERT INTO tbl employee audit(message)
       VALUES ('Employee name ' || OLD.emp name || ' has been deleted at ' || NOW());
       RETURN OLD;
     END IF;
     RETURN NULL;
   END:
   $$;
   CREATE TRIGGER trg employee audit
   AFTER INSERT OR DELETE
   ON tbl employee
   FOR EACH ROW
   EXECUTE FUNCTION audit employee changes();
   INSERT INTO tbl employee (emp name, designation, salary)
   VALUES ('Supriya Dutta', 'Software Engineer', 55000);
   SELECT * FROM tbl employee audit;
   DELETE FROM tbl employee WHERE emp name = 'Supriya Dutta';
   SELECT * FROM tbl employee audit;
3. Output:
```



4. Learning Outcomes:

- 1. Understand the concept and purpose of database triggers in PostgreSQL.
- 2. Learn how to automate data tracking using AFTER INSERT and AFTER DELETE triggers.
- 3. Gain hands-on experience with trigger functions written in PL/pgSQL.
- 4. Develop the ability to implement audit logging for real-time database monitoring.
- 5. Enhance skills in maintaining data integrity and traceability in relational databases.