



DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Experiment 7

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MEDIUM LEVEL PROBLEM

Requirements: design a trigger which:

1. Whenever there is a insertion or deletion on student table then, the currently inserted or deleted row should be printed on the console.

CODE:

```
-- create student table for testing
```

```
CREATE TABLE IF NOT EXISTS student
```

```
  ( id SERIAL PRIMARY KEY,
```

```
    name TEXT NOT NULL,
```

```
    age INTEGER,
```

```
    class TEXT
```

```
);
```

```
-- function for student audit (prints inserted/deleted row using RAISE NOTICE)
```

```
CREATE OR REPLACE FUNCTION fn_student_audit()
```

```
RETURNS TRIGGER
```

```
LANGUAGE plpgsql
```

```
AS
```

```
$$ BE
```

```
GIN
```

```
IF TG_OP = 'INSERT' THEN
```

```
    RAISE NOTICE 'Inserted Row -> ID: %, Name: %, Age: %, Class: %!',
```



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```
    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;  
$$;  
  
-- trigger for student table  
DROP TRIGGER IF EXISTS trg_student_audit ON student;  
CREATE TRIGGER trg_student_audit  
AFTER INSERT OR DELETE ON student  
FOR EACH ROW  
EXECUTE FUNCTION fn_student_audit();
```



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HARD LEVEL PROBLEM

Requirements: Design postgresql triggers that:

1. Whenever a new employee is inserted in `tbl_employee`, a record should be added to `tbl_employee_audit`:

"Employee name <emp_name> has been added at <current_time>"

2. Whenever an employee is deleted from `tbl_employee`, a record should be added to `tbl_employee_audit`:

"Employee name <emp_name> has been deleted at <current_time>"

CODE:

```
-- Create employee tables
```

```
CREATE TABLE IF NOT EXISTS tbl_employee
( emp_id SERIAL PRIMARY KEY,
emp_name VARCHAR(100) NOT NULL,
emp_salary NUMERIC
);
```

```
CREATE TABLE IF NOT EXISTS tbl_employee_audit
( sno SERIAL PRIMARY KEY,
message TEXT
);
```

```
-- function to insert audit messages into tbl_employee_audit
```

```
CREATE OR REPLACE FUNCTION audit_employee_changes()
```

```
RETURNS TRIGGER
```

```
LANGUAGE plpgsql
```

```
AS
```

```
$$ BE
```

```
GIN
```



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```
IF TG_OP = 'INSERT' THEN
    INSERT INTO tbl_employee_audit(message)
    VALUES (
        'Employee name ' || NEW.emp_name || ' has been added at ' ||
        to_char(NOW(), 'YYYY-MM-DD HH24:MI:SS')
    );
    RETURN NEW;
ELSIF TG_OP = 'DELETE' THEN
    INSERT INTO tbl_employee_audit(message)
    VALUES (
        'Employee name ' || OLD.emp_name || ' has been deleted at ' ||
        to_char(NOW(), 'YYYY-MM-DD HH24:MI:SS')
    );
    RETURN OLD;
END IF;

RETURN NULL;
END;
$$;

-- trigger for tbl_employee
DROP TRIGGER IF EXISTS trg_employee_audit ON tbl_employee;
CREATE TRIGGER trg_employee_audit
AFTER INSERT OR DELETE ON tbl_employee
FOR EACH ROW
EXECUTE FUNCTION audit_employee_changes();
```



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----- TESTING THE TRIGGERS -----

-- clear tables for a clean test (optional)

```
TRUNCATE TABLE tbl_employee_audit RESTART IDENTITY;
```

```
TRUNCATE TABLE tbl_employee RESTART IDENTITY;
```

```
TRUNCATE TABLE student RESTART IDENTITY;
```

-- Test student trigger (you should see RAISE NOTICE messages in the console)

```
INSERT INTO student(name, age, class) VALUES ('Aniket', 15, '10A');
```

```
INSERT INTO student(name, age, class) VALUES ('Tanmay', 16, '11B');
```

```
DELETE FROM student WHERE name = 'Aniket';
```

-- Test employee trigger

```
INSERT INTO tbl_employee(emp_name, emp_salary) VALUES ('Jyoti', 50000);
```

```
INSERT INTO tbl_employee(emp_name, emp_salary) VALUES ('Neha', 65000);
```

```
DELETE FROM tbl_employee WHERE emp_name = 'Jyoti';
```

-- Check audit logs

```
SELECT * FROM tbl_employee_audit ORDER BY sno;
```

```
psql:commands.sql:42: NOTICE: trigger "trg_student_audit" for relation "student" does not exist, skipping
psql:commands.sql:100: NOTICE: trigger "trg_employee_audit" for relation "tbl_employee" does not exist, skipping
psql:commands.sql:115: NOTICE: Inserted Row -> ID: 1, Name: Aniket, Age: 15, Class: 10A
psql:commands.sql:116: NOTICE: Inserted Row -> ID: 2, Name: Tanmay, Age: 16, Class: 11B
psql:commands.sql:117: NOTICE: Deleted Row -> ID: 1, Name: Aniket, Age: 15, Class: 10A
```