Experiment No. 5

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Semester: 2nd
Subject Name: Technical Training-1

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Date of Performance: 24/02/26
Subject Code: 25CAP-652

Aim:

To gain hands-on experience in creating and using cursors in PostgreSQL for row-by-row data processing, enabling sequential access and manipulation of query results.

Objective:

- To understand the concept and need of cursors in PostgreSQL
- To learn sequential data access using cursors
- To perform row-level manipulation using cursor logic
- To understand cursor lifecycle management
- To handle cursor termination and exceptions.

Tools Used:

PostgreSQL

Procedure:

Step 1: Implementing a Simple Forward-Only Cursor

- Creating a cursor to loop through an employee table and print individual records.

Step 2: Complex Row-by-Row Manipulation

- Using a cursor to update salaries based on a dynamic "Experience-to-Performance" ratio logic.

Step 3: Exception and Status Handling

- Ensuring the cursor handles empty result sets or termination signals gracefully.

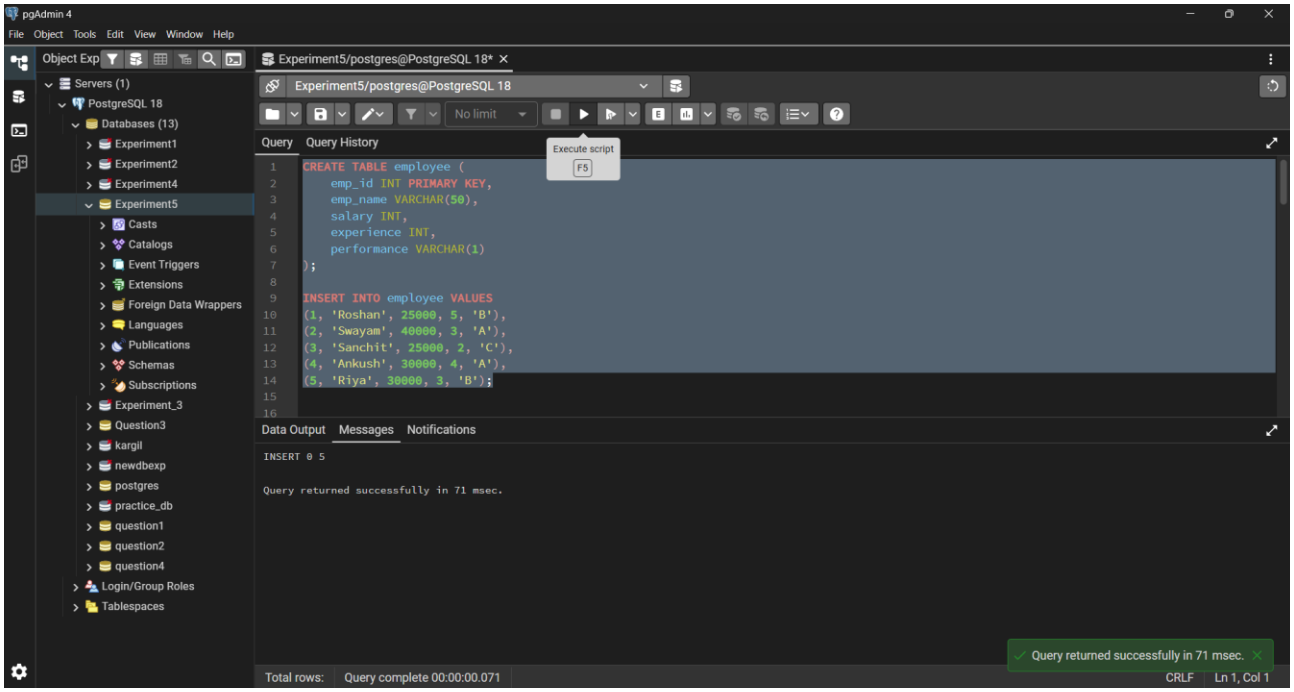
Code:

```
CREATE TABLE employee (
   emp_id INT PRIMARY KEY,
   emp_name VARCHAR(50),
   salary NUMERIC,
   experience INT,
   performance VARCHAR(1)
);

INSERT INTO employee VALUES
(1, 'Roshan', 25000, 5, 'B'),
(2, 'Swayam', 40000, 3, 'A'),
(3, 'Sanchit', 25000, 2, 'C'),
(4, 'Ankush', 30000, 4, 'A'),
(5, 'Riya', 30000, 3, 'B');


--1
DO $$
DECLARE
   emp_cursor CURSOR FOR
      SELECT emp_id, emp_name, salary FROM employee;
   rec RECORD;
BEGIN
   OPEN emp_cursor;

   LOOP
      FETCH emp_cursor INTO rec;
      EXIT WHEN NOT FOUND;
      RAISE NOTICE 'ID: %, Name: %, Salary: %',
        rec.emp_id, rec.emp_name, rec.salary;
    END LOOP;

    CLOSE emp_cursor;
END $$;

--2
DO $$
DECLARE
    emp_cursor CURSOR FOR
        SELECT emp_id, salary, experience, performance FROM employee;
    rec RECORD;
    new_salary NUMERIC;
BEGIN
    OPEN emp_cursor;

    LOOP
        FETCH emp_cursor INTO rec;
        EXIT WHEN NOT FOUND;

        IF rec.experience >= 5 AND rec.performance = 'A' THEN
            new_salary := rec.salary * 1.20;
        ELSIF rec.experience >= 3 AND rec.performance = 'B' THEN
            new_salary := rec.salary * 1.10;
        ELSE
            new_salary := rec.salary * 1.05;
        END IF;

        UPDATE employee
        SET salary = new_salary
        WHERE emp_id = rec.emp_id;
    END LOOP;

    CLOSE emp_cursor;
END $$;
--3
DO $$
DECLARE
    emp_cursor CURSOR FOR SELECT * FROM employee;
    rec RECORD;
BEGIN
```

```
    OPEN emp_cursor;

    LOOP
        FETCH emp_cursor INTO rec;
        EXIT WHEN NOT FOUND;
        RAISE NOTICE 'Processing Employee: %', rec.emp_name;
    END LOOP;

    CLOSE emp_cursor;

EXCEPTION
    WHEN OTHERS THEN
        RAISE NOTICE 'Error occurred: %', SQLERRM;
END $$;
```

Output:

Table create and data insert

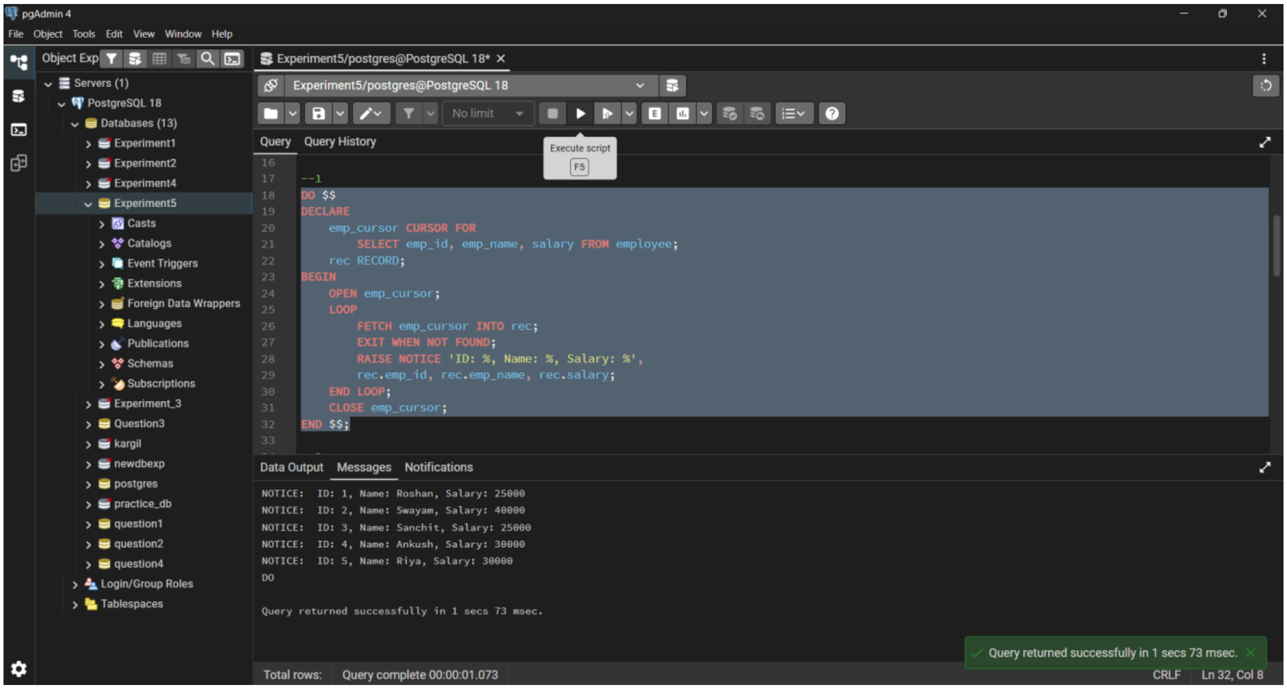


```
CREATE TABLE employee (
    emp_id INT PRIMARY KEY,
    emp_name VARCHAR(50),
    salary INT,
    experience INT,
    performance VARCHAR(1)
);

INSERT INTO employee VALUES
(1, 'Roshan', 25000, 5, 'B'),
(2, 'Swayam', 40000, 3, 'A'),
(3, 'Sanchit', 25000, 2, 'C'),
(4, 'Ankush', 30000, 4, 'A'),
(5, 'Riya', 30000, 3, 'B');
```

```
INSERT 0 5

Query returned successfully in 71 msec.
```

Query returned successfully in 71 msec.

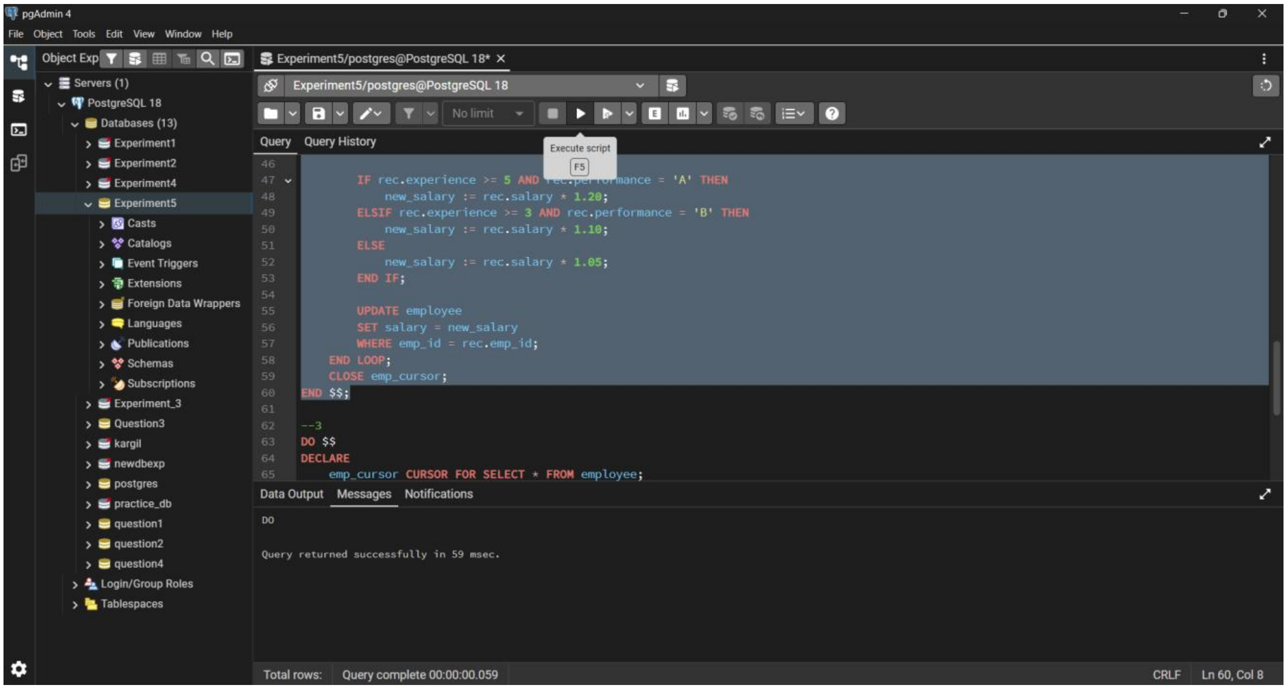
Step1: Implementing a Simple Forward-Only Cursor



```
--1
DO $$
DECLARE
    emp_cursor CURSOR FOR
        SELECT emp_id, emp_name, salary FROM employee;
    rec RECORD;
BEGIN
    OPEN emp_cursor;
    LOOP
        FETCH emp_cursor INTO rec;
        EXIT WHEN NOT FOUND;
        RAISE NOTICE 'ID: %, Name: %, Salary: %',
        rec.emp_id, rec.emp_name, rec.salary;
    END LOOP;
    CLOSE emp_cursor;
END $$;
```

```
NOTICE:  ID: 1, Name: Roshan, Salary: 25000
NOTICE:  ID: 2, Name: Swayam, Salary: 40000
NOTICE:  ID: 3, Name: Sanchit, Salary: 25000
NOTICE:  ID: 4, Name: Ankush, Salary: 30000
NOTICE:  ID: 5, Name: Riya, Salary: 30000
DO

Query returned successfully in 1 secs 73 msec.
```

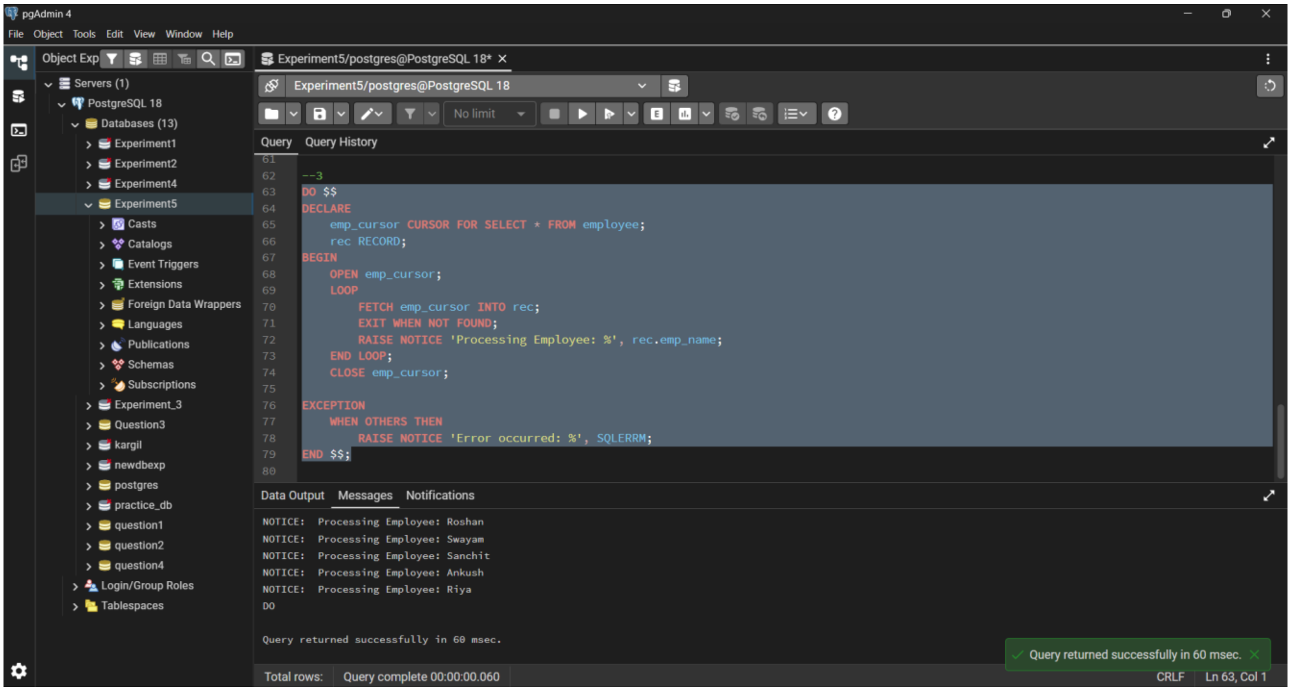
Step2: Complex Row-by-Row Manipulation



```

        IF rec.experience >= 5 AND rec.performance = 'A' THEN
            new_salary := rec.salary * 1.20;
        ELSIF rec.experience >= 3 AND rec.performance = 'B' THEN
            new_salary := rec.salary * 1.10;
        ELSE
            new_salary := rec.salary * 1.05;
        END IF;

        UPDATE employee
        SET salary = new_salary
        WHERE emp_id = rec.emp_id;
    END LOOP;
    CLOSE emp_cursor;
END $$;

--3
DO $$
DECLARE
    emp_cursor CURSOR FOR SELECT * FROM employee;
```

```
DO

Query returned successfully in 59 msec.
```

Step3: Exception and Status Handling



```
--3
DO $$
DECLARE
    emp_cursor CURSOR FOR SELECT * FROM employee;
    rec RECORD;
BEGIN
    OPEN emp_cursor;
    LOOP
        FETCH emp_cursor INTO rec;
        EXIT WHEN NOT FOUND;
        RAISE NOTICE 'Processing Employee: %', rec.emp_name;
    END LOOP;
    CLOSE emp_cursor;

EXCEPTION
    WHEN OTHERS THEN
        RAISE NOTICE 'Error occurred: %', SQLERRM;
END $$;
```

```
NOTICE:  Processing Employee: Roshan
NOTICE:  Processing Employee: Swayam
NOTICE:  Processing Employee: Sanchit
NOTICE:  Processing Employee: Ankush
NOTICE:  Processing Employee: Riya
DO

Query returned successfully in 60 msec.
```

Total rows: Query complete 00:00:00.060

Learning Outcomes:

- Understood cursor-based row-by-row processing
- Learnt cursor lifecycle in PostgreSQL
- Applied complex conditional logic using cursors
- Handled cursor termination and exceptions
- Gained confidence in writing procedural SQL programs.