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EXPERIMENT – 04

Implementation of Iterative Control Structures using FOR, WHILE, and LOOP in PostgreSQL

Aim

To understand and implement iterative control structures in PostgreSQL conceptually, including FOR loops, WHILE loops, and basic LOOP constructs, for repeated execution of database logic.

Tools Used

- PostgreSQL

Objectives

- To understand why iteration is required in database programming
- To learn the purpose and behavior of FOR, WHILE, and LOOP constructs
- To understand how repeated data processing is handled in databases
- To relate loop concepts to real-world batch processing scenarios
- To strengthen conceptual knowledge of procedural SQL used in enterprise systems

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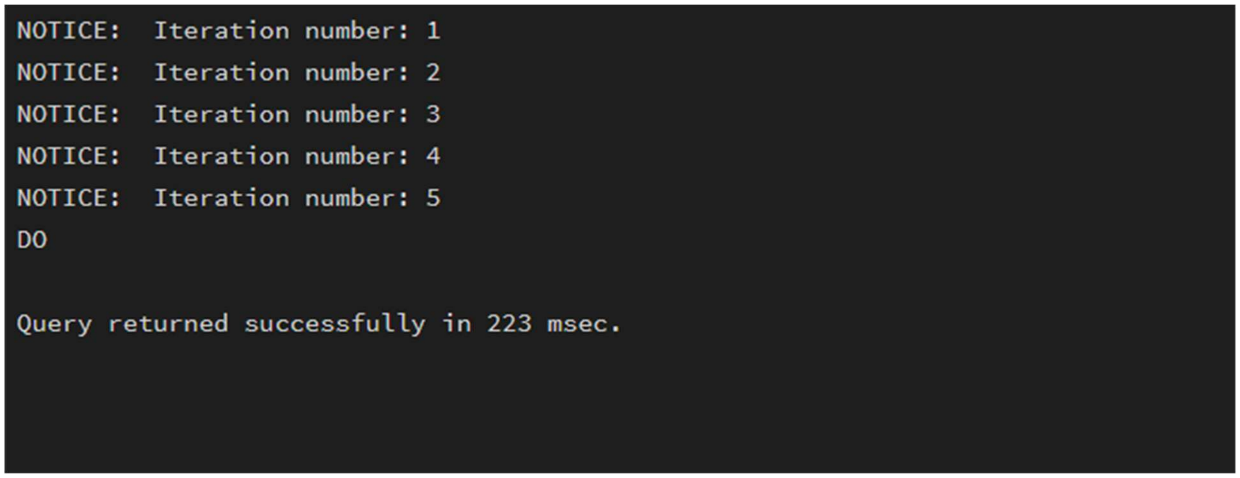
Experiment Steps

Step 1: FOR Loop – Simple Iteration

```
DO $$
BEGIN
   FOR i IN 1..5 LOOP
      RAISE NOTICE 'Iteration number: %', i;
   END LOOP;
END;
$$ ;
```



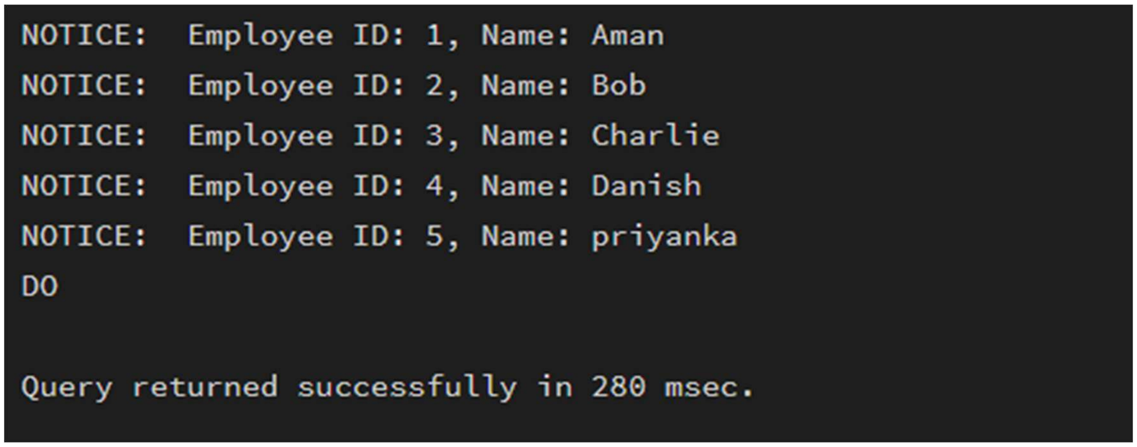
```
NOTICE:  Iteration number: 1
NOTICE:  Iteration number: 2
NOTICE:  Iteration number: 3
NOTICE:  Iteration number: 4
NOTICE:  Iteration number: 5
DO

Query returned successfully in 223 msec.
```

Example 2: FOR Loop with Query (Row-by-Row Processing)

```
CREATE TABLE employees (
   employee_id SERIAL PRIMARY KEY,
   employee_name VARCHAR(50),
   salary NUMERIC(10,2)
);
INSERT INTO employees (employee_name, salary) VALUES
('Aman', 40000),
('Bob', 55000),
('Charlie', 48000),
('Danish', 60000),
('priyanka', 52000);
```

```
DO $$
DECLARE
   emp_rec RECORD;
BEGIN
   FOR emp_rec IN
      SELECT employee_id, employee_name FROM employees
   LOOP
      RAISE NOTICE 'Employee ID: %, Name: %', emp_rec.employee_id,
emp_rec.employee_name;
   END LOOP;
END;
$$;
```

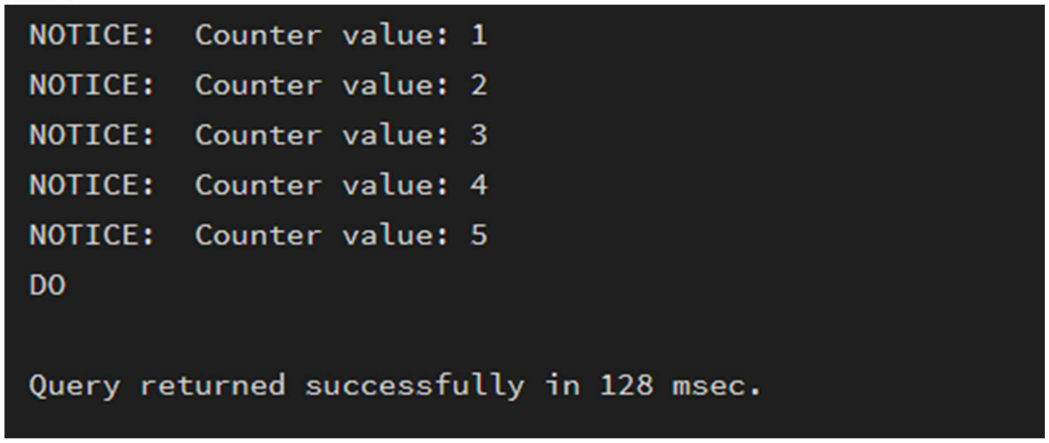


```
NOTICE:  Employee ID: 1, Name: Aman
NOTICE:  Employee ID: 2, Name: Bob
NOTICE:  Employee ID: 3, Name: Charlie
NOTICE:  Employee ID: 4, Name: Danish
NOTICE:  Employee ID: 5, Name: priyanka
DO

Query returned successfully in 280 msec.
```

Example 3: WHILE Loop – Conditional Iteration

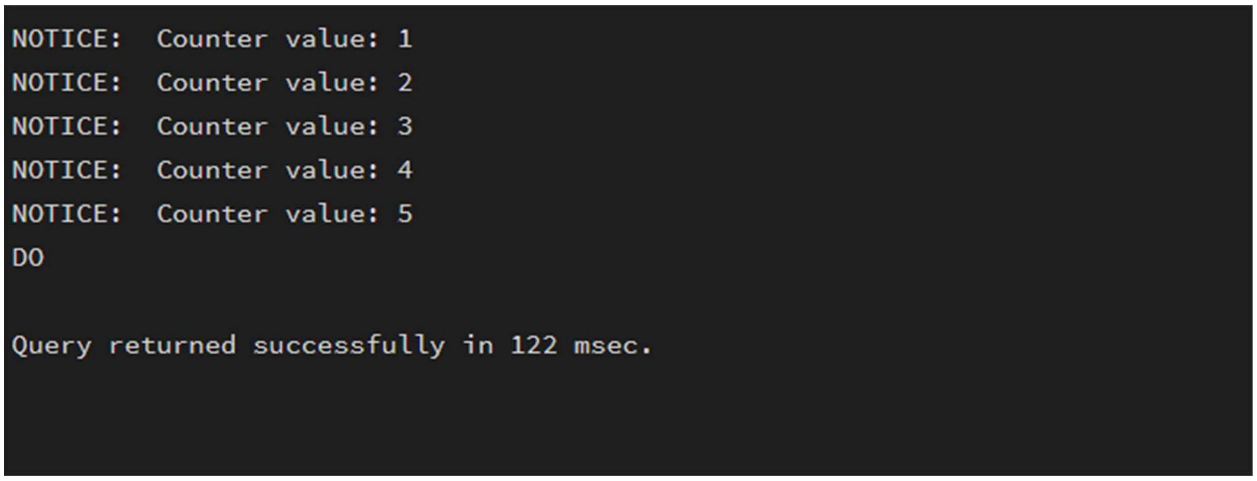
```
DO $$
DECLARE
   counter INT := 1;
BEGIN
   WHILE counter <= 5 LOOP
      RAISE NOTICE 'Counter value: %', counter;
      counter := counter + 1;
   END LOOP;
END;
$$ ;
```


```
NOTICE:  Counter value: 1
NOTICE:  Counter value: 2
NOTICE:  Counter value: 3
NOTICE:  Counter value: 4
NOTICE:  Counter value: 5
DO

Query returned successfully in 128 msec.
```

Example 4: LOOP with EXIT WHEN

```
DO $$
DECLARE
   counter INT := 1;
BEGIN
   LOOP
      RAISE NOTICE 'Counter value: %', counter;
      counter := counter + 1;
      EXIT WHEN counter > 5;
   END LOOP;
END;
$$ ;
```

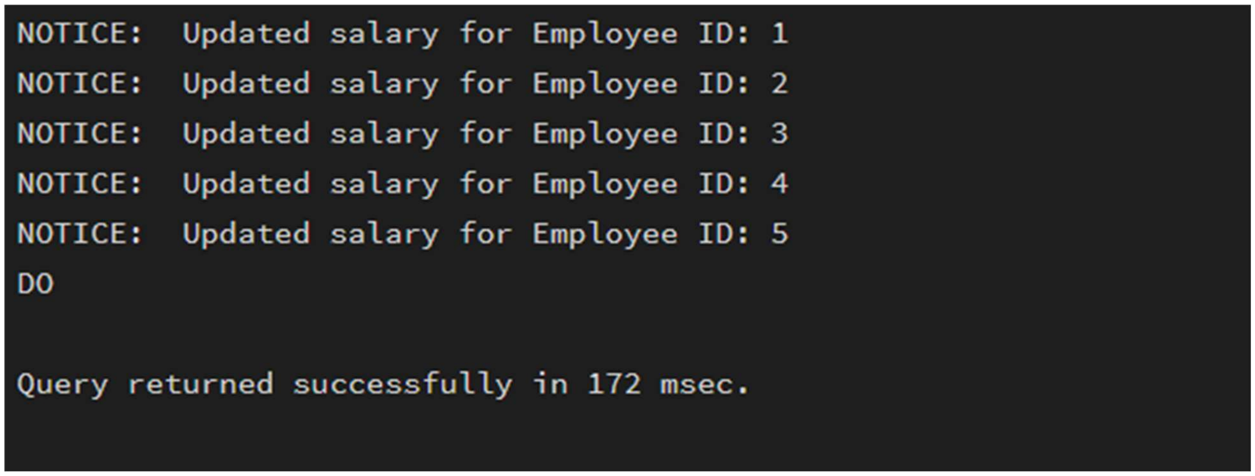

```
NOTICE:  Counter value: 1
NOTICE:  Counter value: 2
NOTICE:  Counter value: 3
NOTICE:  Counter value: 4
NOTICE:  Counter value: 5
DO

Query returned successfully in 122 msec.
```

Example 5: Salary Increment Using FOR Loop

```
DO $$
DECLARE
        emp_rec RECORD;
BEGIN
   FOR emp_rec IN
      SELECT employee_id, salary FROM employees
   LOOP
      UPDATE employees
      SET salary = salary * 1.10
      WHERE employee_id = emp_rec.employee_id;

      RAISE NOTICE 'Updated salary for Employee ID: %', emp_rec.employee_id;
   END LOOP;
END;
$$ ;
```



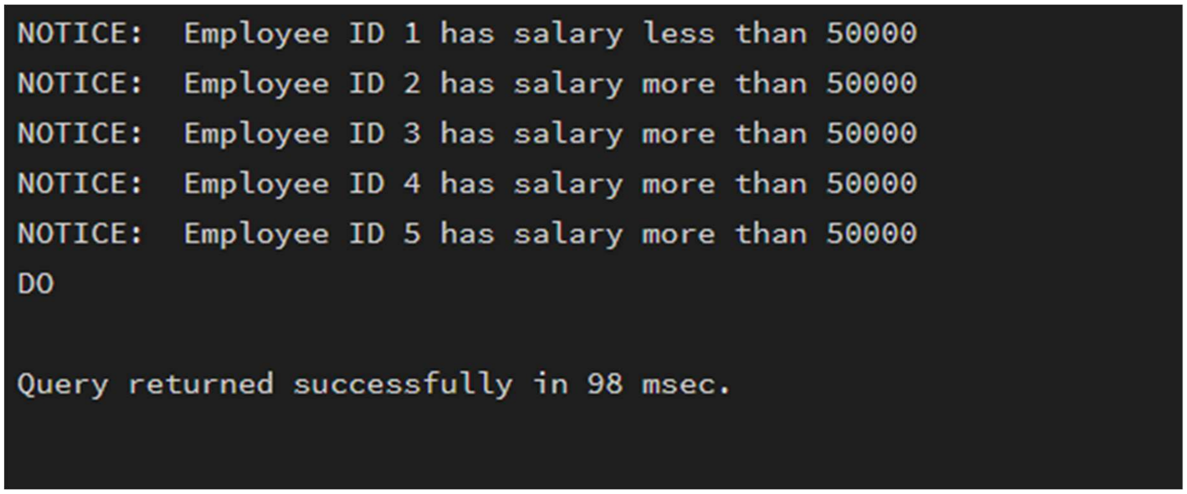
```
NOTICE:  Updated salary for Employee ID: 1
NOTICE:  Updated salary for Employee ID: 2
NOTICE:  Updated salary for Employee ID: 3
NOTICE:  Updated salary for Employee ID: 4
NOTICE:  Updated salary for Employee ID: 5
DO

Query returned successfully in 172 msec.
```

Example 6: Combining LOOP with IF Condition

```
DO $$
DECLARE
        emp_rec RECORD;

BEGIN
   FOR emp_rec IN
      SELECT employee_id, salary FROM employees
   LOOP
      IF emp_rec.salary > 50000 THEN
         RAISE NOTICE 'Employee ID % has salary more than 50000', emp_rec.employee_id;
      ELSE
         RAISE NOTICE 'Employee ID % has salary less than 50000', emp_rec.employee_id;
      END IF;
   END LOOP;
END;
$$;
```



```
NOTICE:  Employee ID 1 has salary less than 50000
NOTICE:  Employee ID 2 has salary more than 50000
NOTICE:  Employee ID 3 has salary more than 50000
NOTICE:  Employee ID 4 has salary more than 50000
NOTICE:  Employee ID 5 has salary more than 50000
DO

Query returned successfully in 98 msec.
```

Learning Outcome

- Understand the need for iteration in database applications.
- Identify and use different loop types (FOR, WHILE, LOOP).
- Implement fixed and query-based repetition for row processing.
- Apply conditional and exit-controlled loops for automation tasks.
- Use PL/pgSQL loops in real-world scenarios like payroll, reporting, and batch processing.

Result

This experiment helps students understand how iterative control structures work in PostgreSQL at a conceptual level. Students learn where and why loops are used in database systems and gain foundational knowledge required for writing procedural logic in enterprise-grade applications.