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Worksheet No- 2

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Subject - Technical Training

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Aim / Overview of the Practical

To implement conditional decision-making logic in PostgreSQL using IF–ELSE constructs and CASE expressions for classification, validation, and rule-based data processing.

Software Requirements

- PostgreSQL

Objectives

- To understand conditional execution in SQL
- To implement decision-making logic using CASE expressions
- To simulate real-world rule validation scenarios
- To classify data based on multiple conditions
- To strengthen SQL logic skills required in interviews and backend system

Theory

In real-world database systems, data often needs to be validated, categorized, or transformed based on business rules. Conditional logic allows the database to make decisions dynamically instead of relying solely on application-layer logic.

PostgreSQL supports conditional logic mainly through:

- CASE Expressions (used inside SELECT, UPDATE, INSERT)
- IF–ELSE constructs (used inside PL/pgSQL blocks such as functions and procedures)

CASE Expression

- Evaluates conditions sequentially
- Returns a value based on the first true condition
- Can be used in SELECT, UPDATE, ORDER BY, and WHERE clauses

Types of CASE

- Simple CASE → compares expressions
- Searched CASE → evaluates boolean conditions

Conditional logic is heavily used in:

- Data classification (grades, salary slabs)
- Violation detection
- Status mapping
- Business rule enforcement

Companies like Amazon, SAP, Oracle, and Adobe frequently test CASE-based logic in SQL interviews.

Experiment / Practical Steps

Prerequisite Understanding

Students should first create a table that stores:

- A unique identifier
- A schema or entity name
- A numeric count representing violations or issues

Populate the table with multiple records having different violation counts.

Step 1: Classifying Data Using CASE Expression

Task for Students:

- Retrieve schema names and their violation counts.
- Use conditional logic to classify each schema into categories such as:
    - No Violation
    - Minor Violation
    - Critical Violation

Learning Focus:

- Using **searched CASE**
- Sequential condition checking
- Real-world compliance reporting logic

Step 2: Applying CASE Logic in Data Updates

Task for Students:

- Add a new column to store approval status.
- Update this column based on violation count using conditional rules such as:

    - Approved
    - Needs Review
    - Rejected

Learning Focus:

- Automating decisions inside the database
- Reducing application-side logic
- Using CASE inside UPDATE statements

Step 3: Implementing IF–ELSE Logic Using PL/pgSQL

Task for Students:

- Use a procedural block instead of a SELECT statement.
- Declare a variable representing violation count.
- Display different messages based on the value of the variable using IF–ELSE logic.

Learning Focus:

- Understanding procedural SQL
- ELSE-IF ladder execution
- Backend validation logic in stored procedures

Step 4: Real-World Classification Scenario (Grading System)

Task for Students:

- Create a table to store student names and marks.
- Classify students into grades based on their marks using conditional logic.

Learning Focus:

- Common interview use case
- Data categorization
- Rule-based evaluation

Step 5: Using CASE for Custom Sorting

Task for Students:

- Retrieve schema details.
- Apply conditional priority while sorting records based on violation severity.

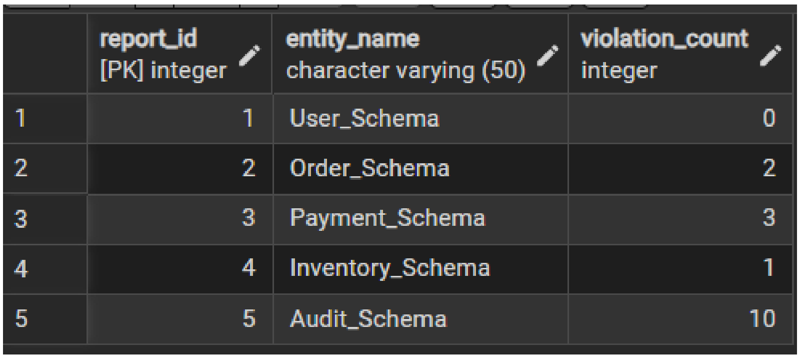
Learning Focus:

- Advanced CASE usage
- Custom ordering logic and Dashboard and reporting scenarios

Practical / Experiment Steps

```
CREATE TABLE SCHEMA_ANALYSIS(
report_id INT PRIMARY KEY,
   entity_name VARCHAR(50) NOT NULL,
   violation_count INT NOT NULL
);
INSERT INTO SCHEMA_ANALYSIS VALUES
(1, 'User_Schema', 0),
(2, 'Order_Schema', 2),
(3, 'Payment_Schema', 3),
(4, 'Inventory_Schema', 1),
(5, 'Audit_Schema', 10);
```

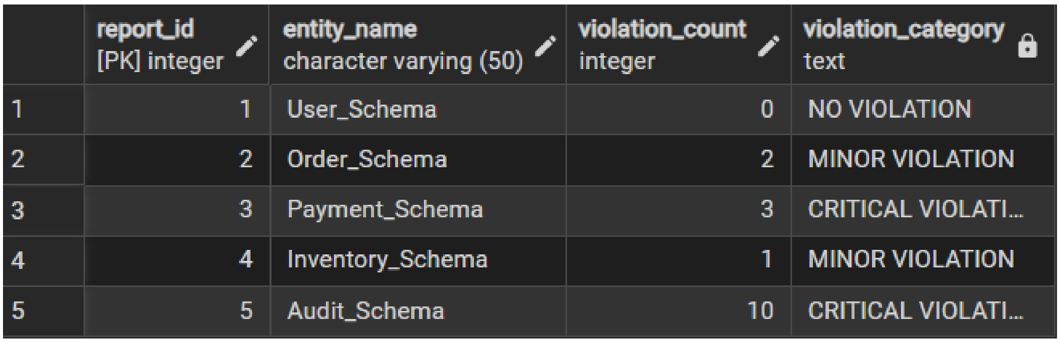
SELECT*FROM SCHEMA_ANALYSIS;



	report_id [PK] integer	entity_name character varying (50)	violation_count integer
1	1	User_Schema	0
2	2	Order_Schema	2
3	3	Payment_Schema	3
4	4	Inventory_Schema	1
5	5	Audit_Schema	10

-- EXAMPLE 1 : CLASSIFYING DATA USING CASE EXPRESSION

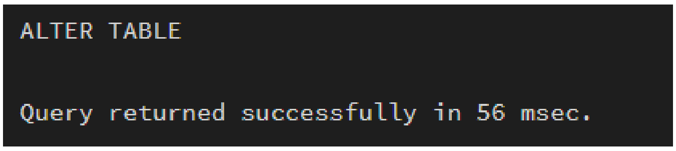
```
SELECT *,
CASE
   WHEN violation_count = 0 THEN 'NO VIOLATION'
   WHEN violation_count BETWEEN 1 AND 2 THEN 'MINOR VIOLATION'
   ELSE 'CRITICAL VIOLATION'
END AS VIOLATION_CATEGORY
FROM SCHEMA_ANALYSIS;
```



	report_id [PK] integer	entity_name character varying (50)	violation_count integer	violation_category text
1	1	User_Schema	0	NO VIOLATION
2	2	Order_Schema	2	MINOR VIOLATION
3	3	Payment_Schema	3	CRITICAL VIOLATI...
4	4	Inventory_Schema	1	MINOR VIOLATION
5	5	Audit_Schema	10	CRITICAL VIOLATI...

-- Example 2: Applying CASE Logic in Data Updates

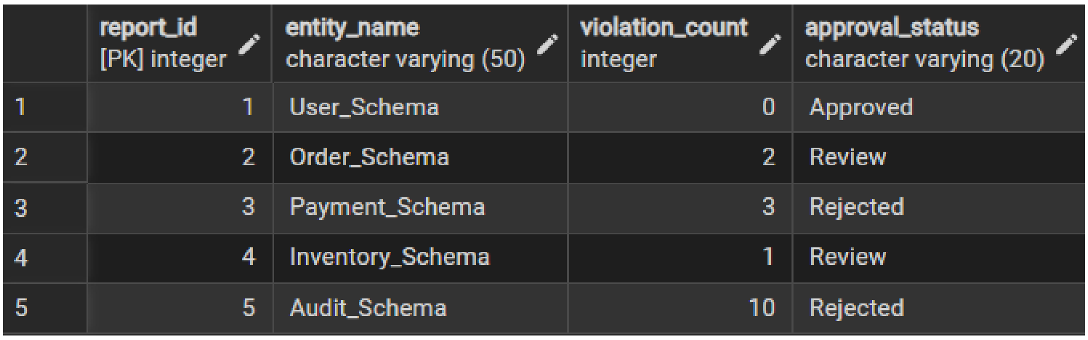
```
ALTER TABLE SCHEMA_ANALYSIS
ADD COLUMN approval_status VARCHAR(20);
```



```
ALTER TABLE

Query returned successfully in 56 msec.
```

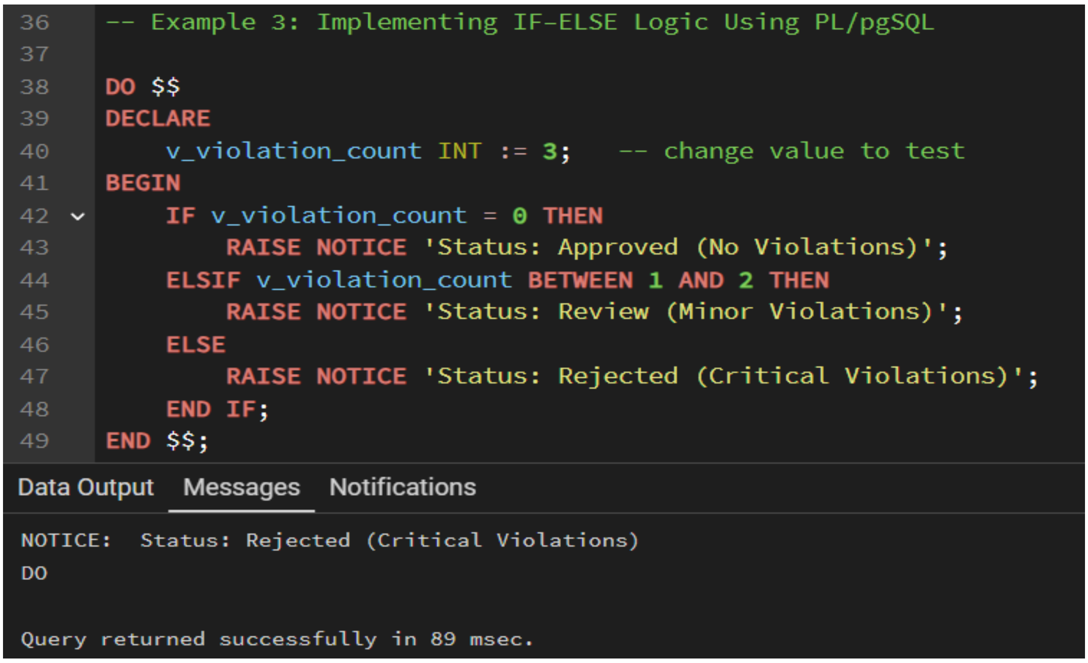
```
UPDATE SCHEMA_ANALYSIS
SET approval_status =
CASE
   WHEN violation_count = 0 THEN 'Approved'
   WHEN violation_count BETWEEN 1 AND 2 THEN 'Review'
   ELSE 'Rejected'
END;
```



	report_id [PK] integer	entity_name character varying (50)	violation_count integer	approval_status character varying (20)
1	1	User_Schema	0	Approved
2	2	Order_Schema	2	Review
3	3	Payment_Schema	3	Rejected
4	4	Inventory_Schema	1	Review
5	5	Audit_Schema	10	Rejected

-- Example 3: Implementing IF–ELSE Logic Using PL/pgSQL

```
DO $$
DECLARE
   v_violation_count INT := 0;   -- change value to test
BEGIN
   IF v_violation_count = 0 THEN
      RAISE NOTICE 'Status: Approved (No Violations)';
   ELSIF v_violation_count BETWEEN 1 AND 2 THEN
      RAISE NOTICE 'Status: Review (Minor Violations)';
   ELSE
      RAISE NOTICE 'Status: Rejected (Critical Violations)';
   END IF;
END $$;
```

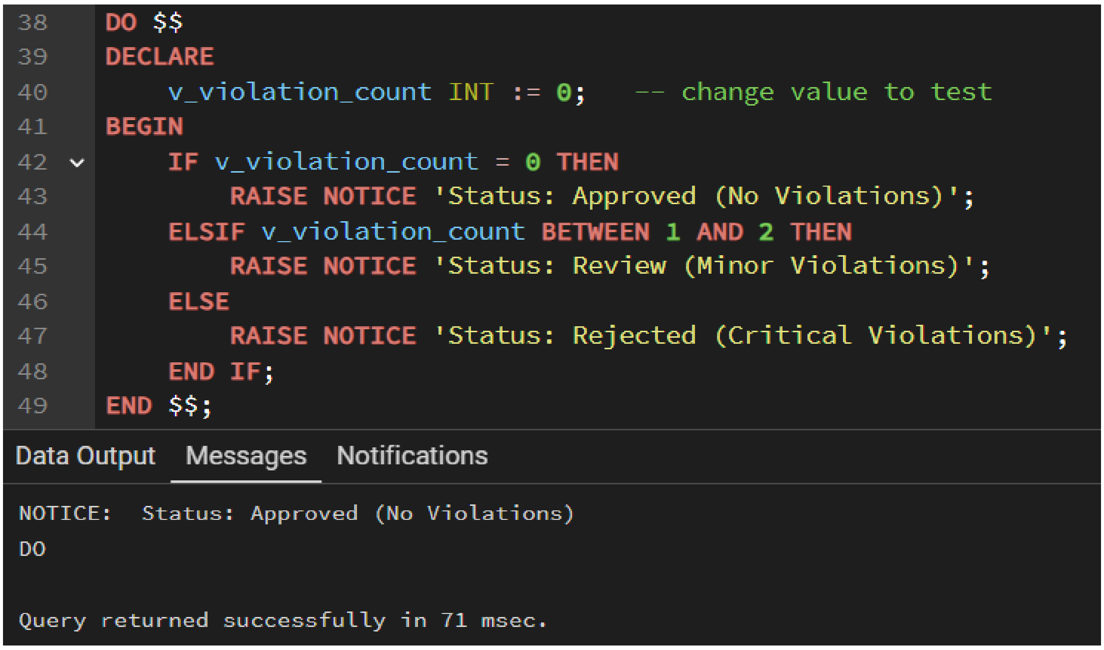


```
-- Example 3: Implementing IF-ELSE Logic Using PL/pgSQL

DO $$
DECLARE
    v_violation_count INT := 3;    -- change value to test
BEGIN
    IF v_violation_count = 0 THEN
        RAISE NOTICE 'Status: Approved (No Violations)';
    ELSIF v_violation_count BETWEEN 1 AND 2 THEN
        RAISE NOTICE 'Status: Review (Minor Violations)';
    ELSE
        RAISE NOTICE 'Status: Rejected (Critical Violations)';
    END IF;
END $$;
```

```
NOTICE:  Status: Rejected (Critical Violations)
DO

Query returned successfully in 89 msec.
```



```
DO $$
DECLARE
    v_violation_count INT := 0;    -- change value to test
BEGIN
    IF v_violation_count = 0 THEN
        RAISE NOTICE 'Status: Approved (No Violations)';
    ELSIF v_violation_count BETWEEN 1 AND 2 THEN
        RAISE NOTICE 'Status: Review (Minor Violations)';
    ELSE
        RAISE NOTICE 'Status: Rejected (Critical Violations)';
    END IF;
END $$;
```

```
NOTICE:  Status: Approved (No Violations)
DO

Query returned successfully in 71 msec.
```

5. Learning Outcome

This experiment demonstrates how conditional logic is implemented in PostgreSQL using **CASE expressions** and **IF–ELSE constructs**.

Students gain strong command over **rule-based SQL logic**, which is essential for:

- Backend systems
- Analytics
- Compliance reporting
- Placement and technical interviews