EXPERIMENT 4

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Semester: 4
Subject Name: Database Management System **Subject Code: 24CSH-298**

Experiment 4 – Data Analysis Using SQL and PL/SQL

Experiment
Experiment 4: Creating tables, inserting data, performing conditional queries, and using PL/SQL blocks to analyze schema violations and student grades. This experiment demonstrates table creation, updates, conditional logic, and ordering in Oracle SQL and PL/SQL.

Aim
The aim of this experiment is to practice working with Oracle SQL tables, using conditional logic to determine status and grades, and displaying results using SELECT queries and PL/SQL blocks.

Objective

- To create and populate tables in Oracle SQL.
- To use CASE statements for conditional evaluation of violation counts and student grades.
- To add and update columns based on conditions.
- To use PL/SQL anonymous blocks for status messages.
- To sort query results based on defined criteria.

Software Requirements

- Database: Oracle XE or Oracle Live SQL

Practical / Experiment Steps

1. Create a table schema_violations with columns id, schema_name, and violation_count.
2. Insert data for various departments into the schema_violations table.
3. Select violation status for each department using a CASE statement.

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4. Add a new column approval_status to schema_violations.
5. Update approval_status based on violation count using a CASE statement.
6. Display the updated schema_violations table.
7. Execute a PL/SQL block to print a system status message based on a variable v_count.
8. Create a students table with columns name and marks.
9. Insert student data into the students table.
10. Display student grades using a CASE statement based on marks.
11. Order schema_violations by severity using a CASE statement in ORDER BY.

Procedure of the Experiment

1. Open Oracle XE or Live SQL and connect to the database.
2. Create the schema_violations and students tables.
3. Insert sample data into both tables.
4. Execute SELECT queries with CASE statements to analyze violation and grade data.
5. Alter and update tables using conditional logic.
6. Write and execute a PL/SQL anonymous block for dynamic status messages.
7. Sort and retrieve data based on defined severity.
8. Observe outputs at each step and take screenshots for documentation.

Input / Output Details

Input

- schema_violations table: id, schema_name, violation_count
- students table: name, marks
- PL/SQL block variable: v_count
- Conditional logic in SELECT and UPDATE statements

Step-wise Output

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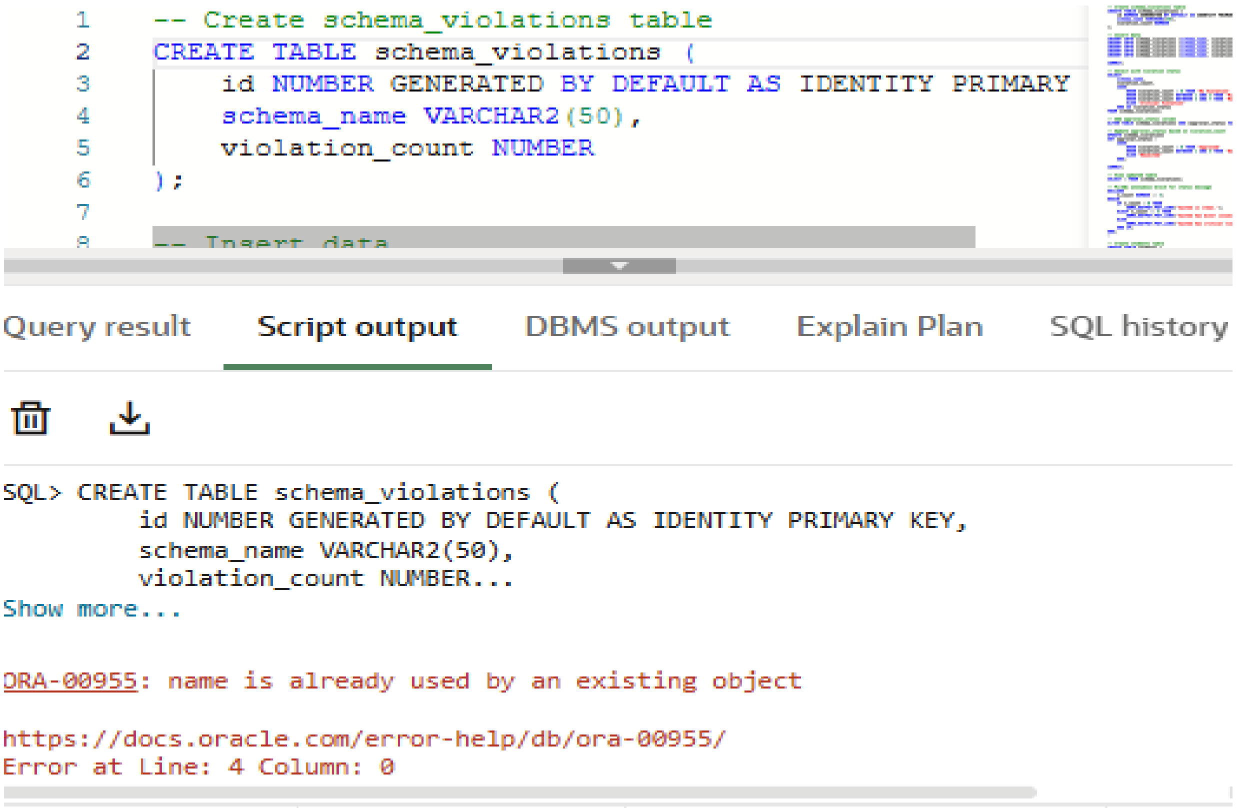
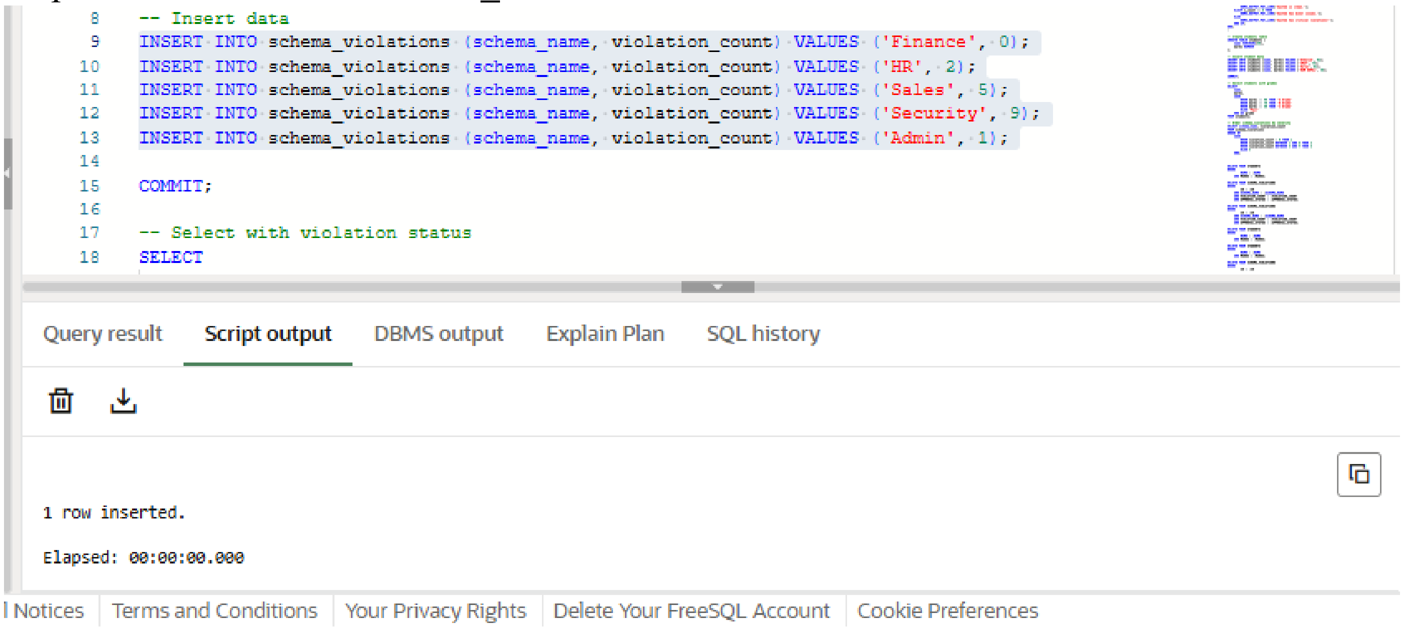
Step 1 – Create schema_violations table



```
-- Create schema_violations table
CREATE TABLE schema_violations (
    id NUMBER GENERATED BY DEFAULT AS IDENTITY PRIMARY
    schema_name VARCHAR2(50),
    violation_count NUMBER
);

-- Insert data
```

```
SQL> CREATE TABLE schema_violations (
        id NUMBER GENERATED BY DEFAULT AS IDENTITY PRIMARY KEY,
        schema_name VARCHAR2(50),
        violation_count NUMBER...
Show more...

ORA-00955: name is already used by an existing object

https://docs.oracle.com/error-help/db/ora-00955/
Error at Line: 4 Column: 0
```

Step 2 – Insert data into schema_violations



```
-- Insert data
INSERT INTO schema_violations (schema_name, violation_count) VALUES ('Finance', 0);
INSERT INTO schema_violations (schema_name, violation_count) VALUES ('HR', 2);
INSERT INTO schema_violations (schema_name, violation_count) VALUES ('Sales', 5);
INSERT INTO schema_violations (schema_name, violation_count) VALUES ('Security', 9);
INSERT INTO schema_violations (schema_name, violation_count) VALUES ('Admin', 1);

COMMIT;

-- Select with violation status
SELECT
```

```
1 row inserted.

Elapsed: 00:00:00.000
```

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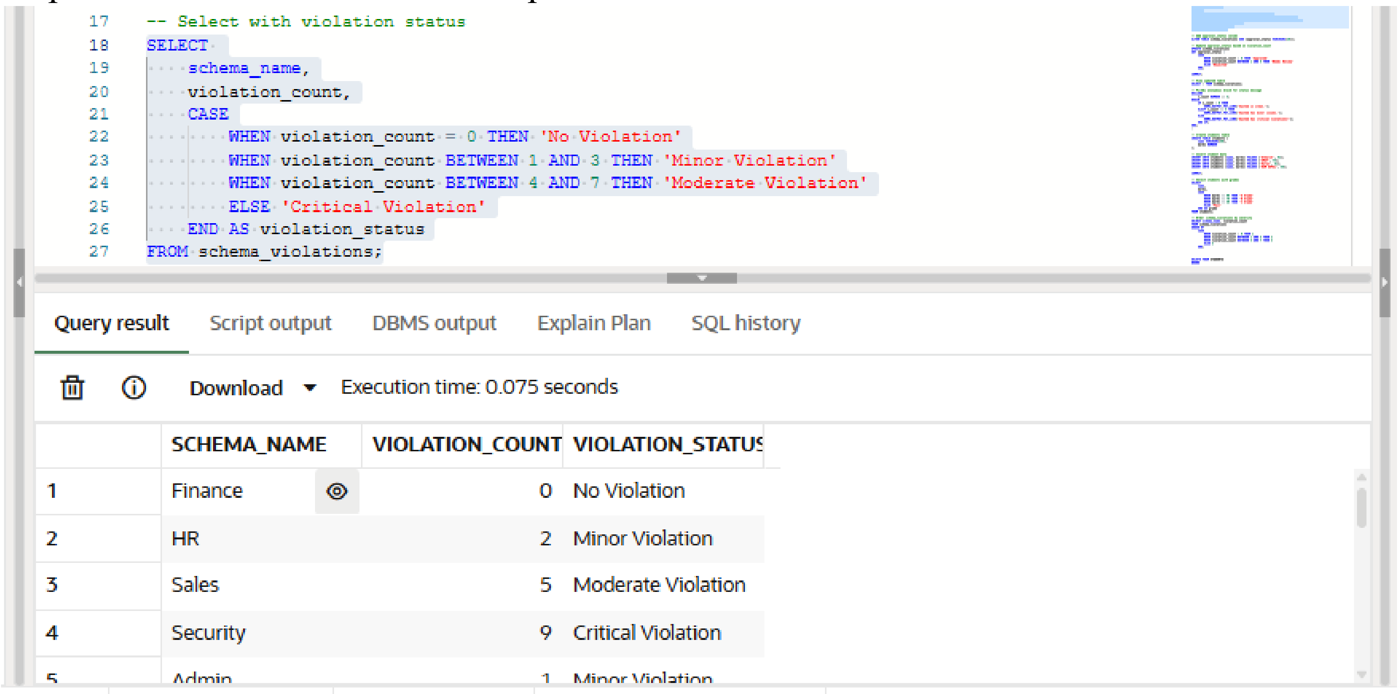
Step 3 – Violation status of each department



```
-- Select with violation status
SELECT
    schema_name,
    violation_count,
    CASE
        WHEN violation_count = 0 THEN 'No Violation'
        WHEN violation_count BETWEEN 1 AND 3 THEN 'Minor Violation'
        WHEN violation_count BETWEEN 4 AND 7 THEN 'Moderate Violation'
        ELSE 'Critical Violation'
    END AS violation_status
FROM schema_violations;
```

Execution time: 0.075 seconds

	SCHEMA_NAME	VIOLATION_COUNT	VIOLATION_STATUS
1	Finance	0	No Violation
2	HR	2	Minor Violation
3	Sales	5	Moderate Violation
4	Security	9	Critical Violation
5	Admin	1	Minor Violation

schema_name	violation_count	violation_status
Finance	0	No Violation
HR	2	Minor Violation
Sales	5	Moderate Violation
Security	9	Critical Violation
Admin	1	Minor Violation

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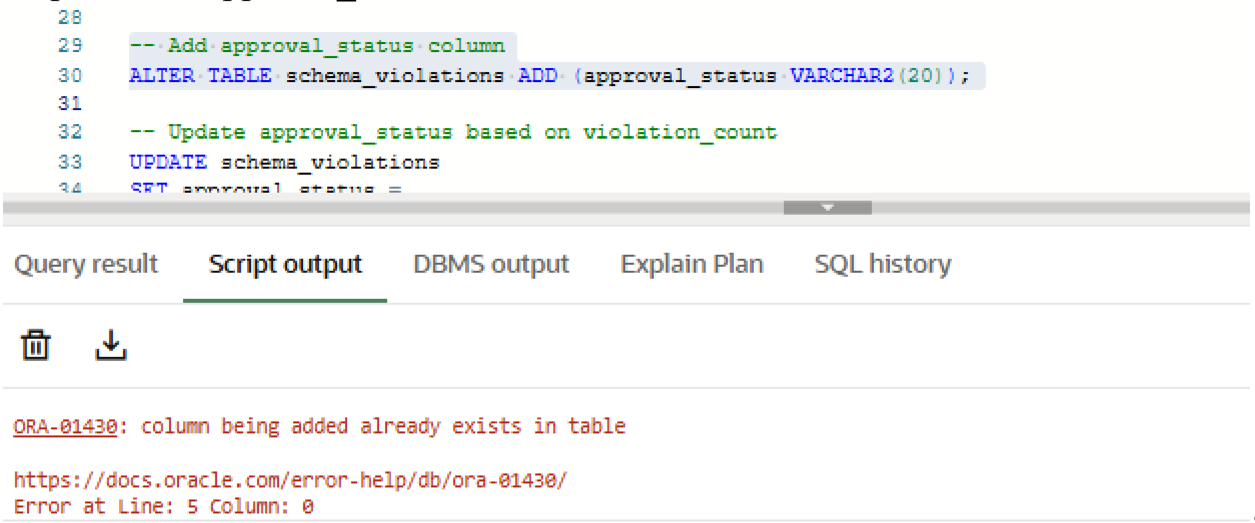
Step 4 – Add approval_status column



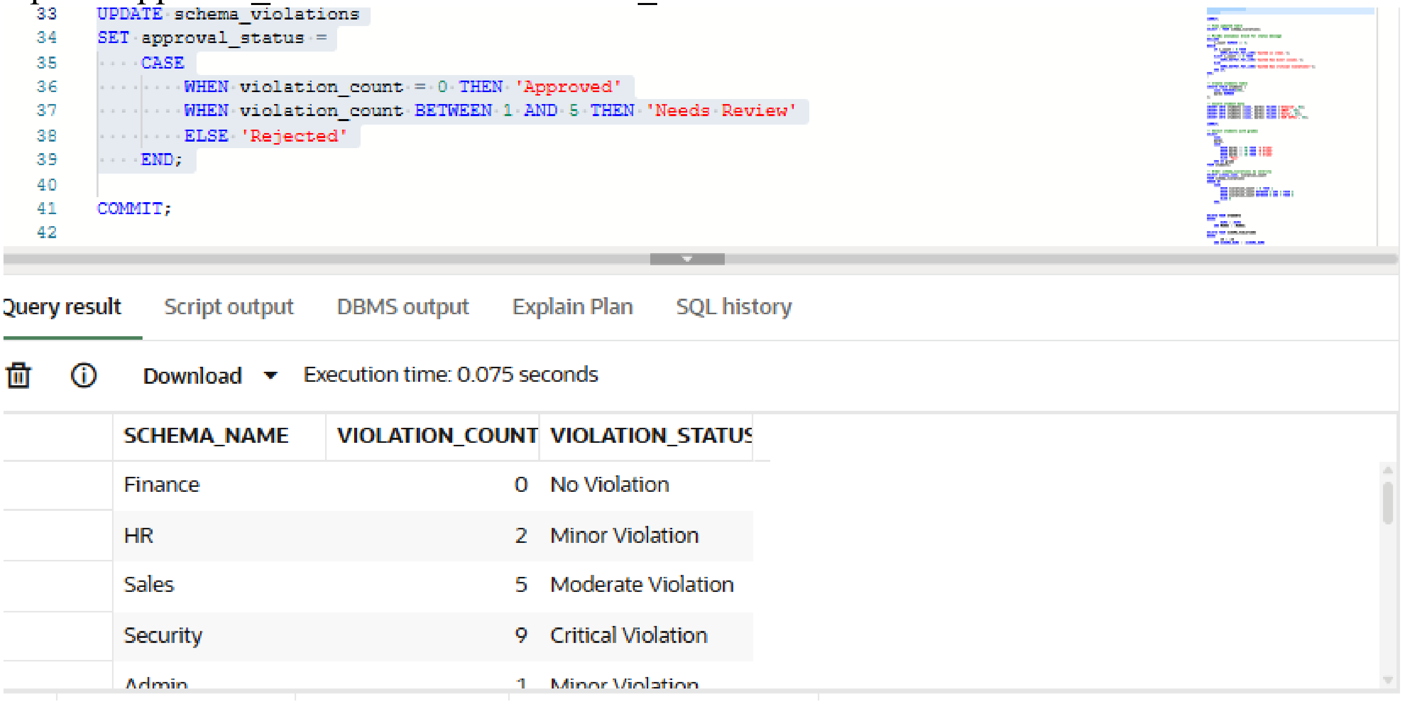
```
-- Add approval_status column
ALTER TABLE schema_violations ADD (approval_status VARCHAR2(20));

-- Update approval_status based on violation_count
UPDATE schema_violations
SET approval_status =
```

```
ORA-01430: column being added already exists in table

https://docs.oracle.com/error-help/db/ora-01430/
Error at Line: 5 Column: 0
```

Step 5 – Update approval_status based on violation_count



```
UPDATE schema_violations
SET approval_status =
    CASE
        WHEN violation_count = 0 THEN 'Approved'
        WHEN violation_count BETWEEN 1 AND 5 THEN 'Needs Review'
        ELSE 'Rejected'
    END;

COMMIT;
```

SCHEMA_NAME	VIOLATION_COUNT	VIOLATION_STATUS
Finance	0	No Violation
HR	2	Minor Violation
Sales	5	Moderate Violation
Security	9	Critical Violation
Admin	1	Minor Violation

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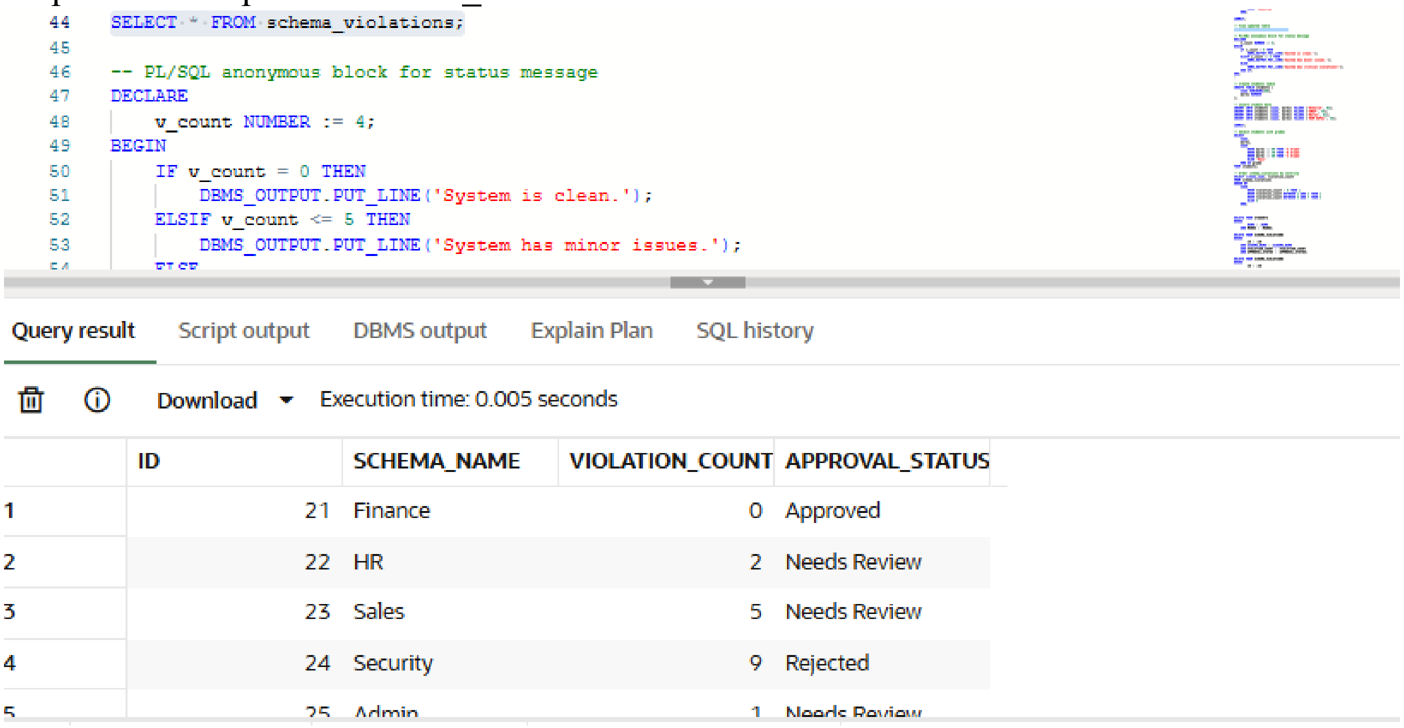
Step 6 – View updated schema_violations table



```
SELECT * FROM schema_violations;

-- PL/SQL anonymous block for status message
DECLARE
    v_count NUMBER := 4;
BEGIN
    IF v_count = 0 THEN
        DBMS_OUTPUT.PUT_LINE('System is clean.');
    ELSIF v_count <= 5 THEN
        DBMS_OUTPUT.PUT_LINE('System has minor issues.');
```

Execution time: 0.005 seconds

	ID	SCHEMA_NAME	VIOLATION_COUNT	APPROVAL_STATUS
1	21	Finance	0	Approved
2	22	HR	2	Needs Review
3	23	Sales	5	Needs Review
4	24	Security	9	Rejected
5	25	Admin	1	Needs Review

id	schema_name	violation_count	violation_status	approval_status
1	Finance	0	No Violation	Approved
2	HR	2	Minor Violation	Needs Review
3	Sales	5	Moderate Violation	Needs Review
4	Security	9	Critical Violation	Rejected
5	Admin	1	Minor Violation	Needs Review

Step 7 – PL/SQL anonymous block for status message
Screenshot: s7.png
Output:

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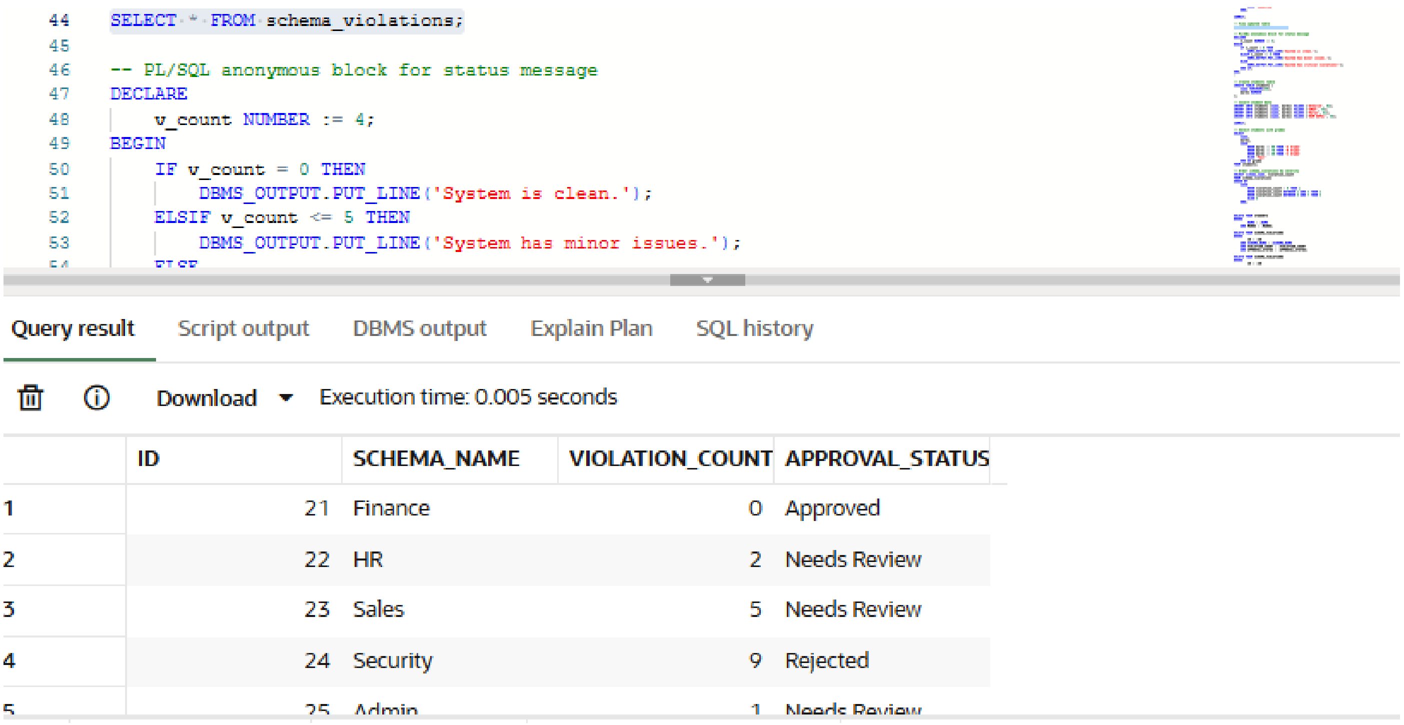


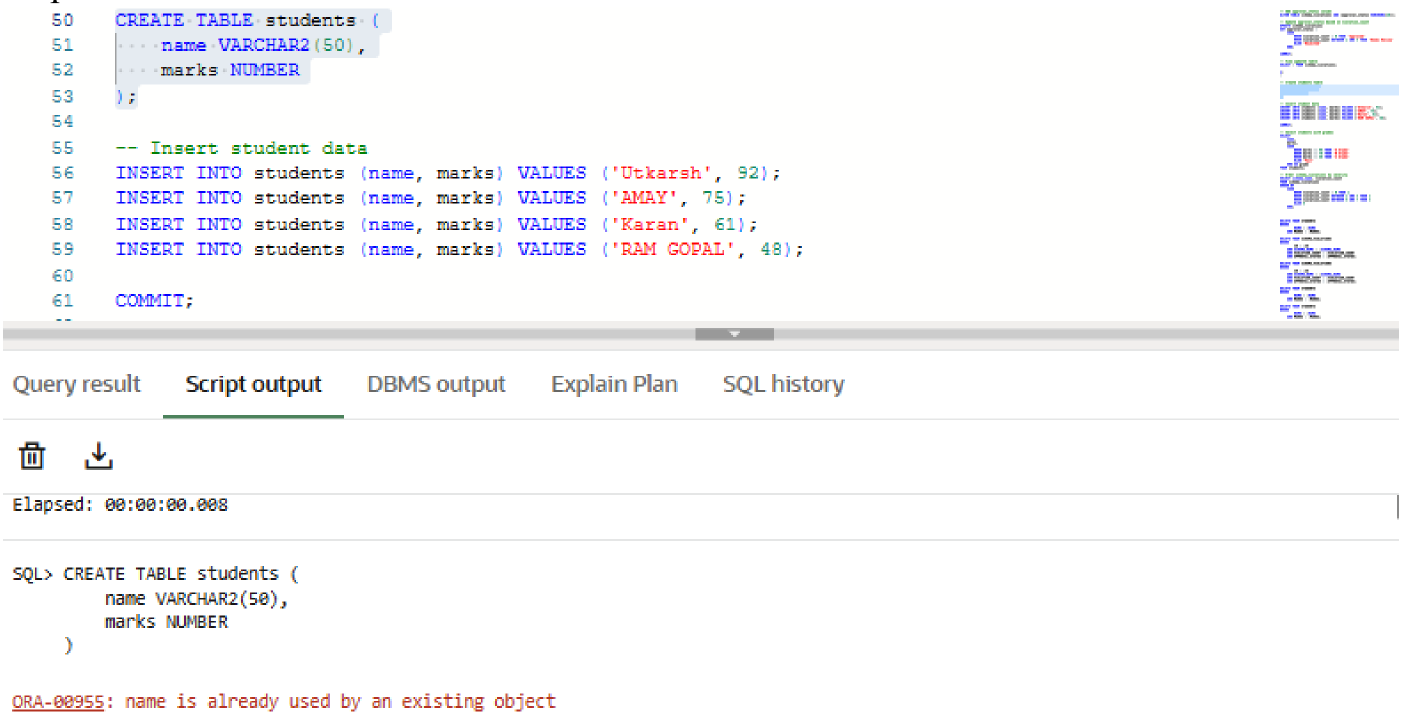
```
SELECT * FROM schema_violations;

-- PL/SQL anonymous block for status message
DECLARE
    v_count NUMBER := 4;
BEGIN
    IF v_count = 0 THEN
        DBMS_OUTPUT.PUT_LINE('System is clean.');
    ELSIF v_count <= 5 THEN
        DBMS_OUTPUT.PUT_LINE('System has minor issues.');
    ELSE
```

Execution time: 0.005 seconds

	ID	SCHEMA_NAME	VIOLATION_COUNT	APPROVAL_STATUS
1	21	Finance	0	Approved
2	22	HR	2	Needs Review
3	23	Sales	5	Needs Review
4	24	Security	9	Rejected
5	25	Admin	1	Needs Review

System has minor issues.

Step 8 – Create students table



```
CREATE TABLE students (
    name VARCHAR2(50),
    marks NUMBER
);

-- Insert student data
INSERT INTO students (name, marks) VALUES ('Utkarsh', 92);
INSERT INTO students (name, marks) VALUES ('AMAY', 75);
INSERT INTO students (name, marks) VALUES ('Karan', 61);
INSERT INTO students (name, marks) VALUES ('RAM GOPAL', 48);

COMMIT;
```

```
Elapsed: 00:00:00.008

SQL> CREATE TABLE students (
         name VARCHAR2(50),
         marks NUMBER
     )

ORA-00955: name is already used by an existing object
```

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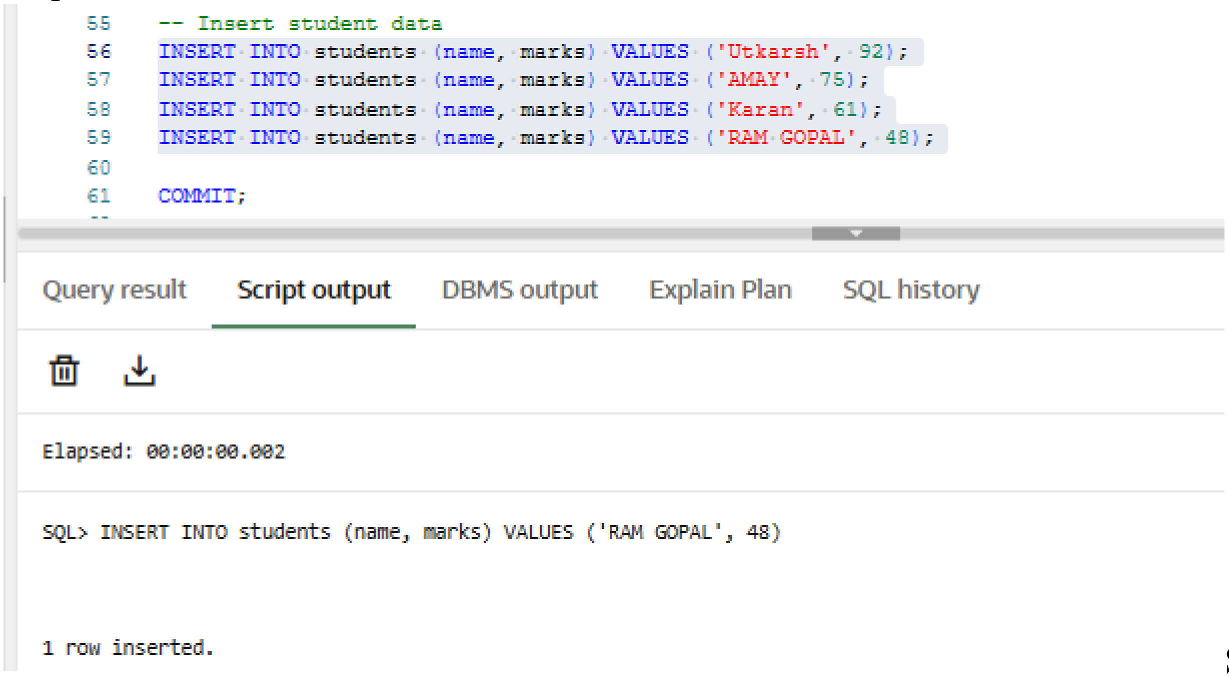
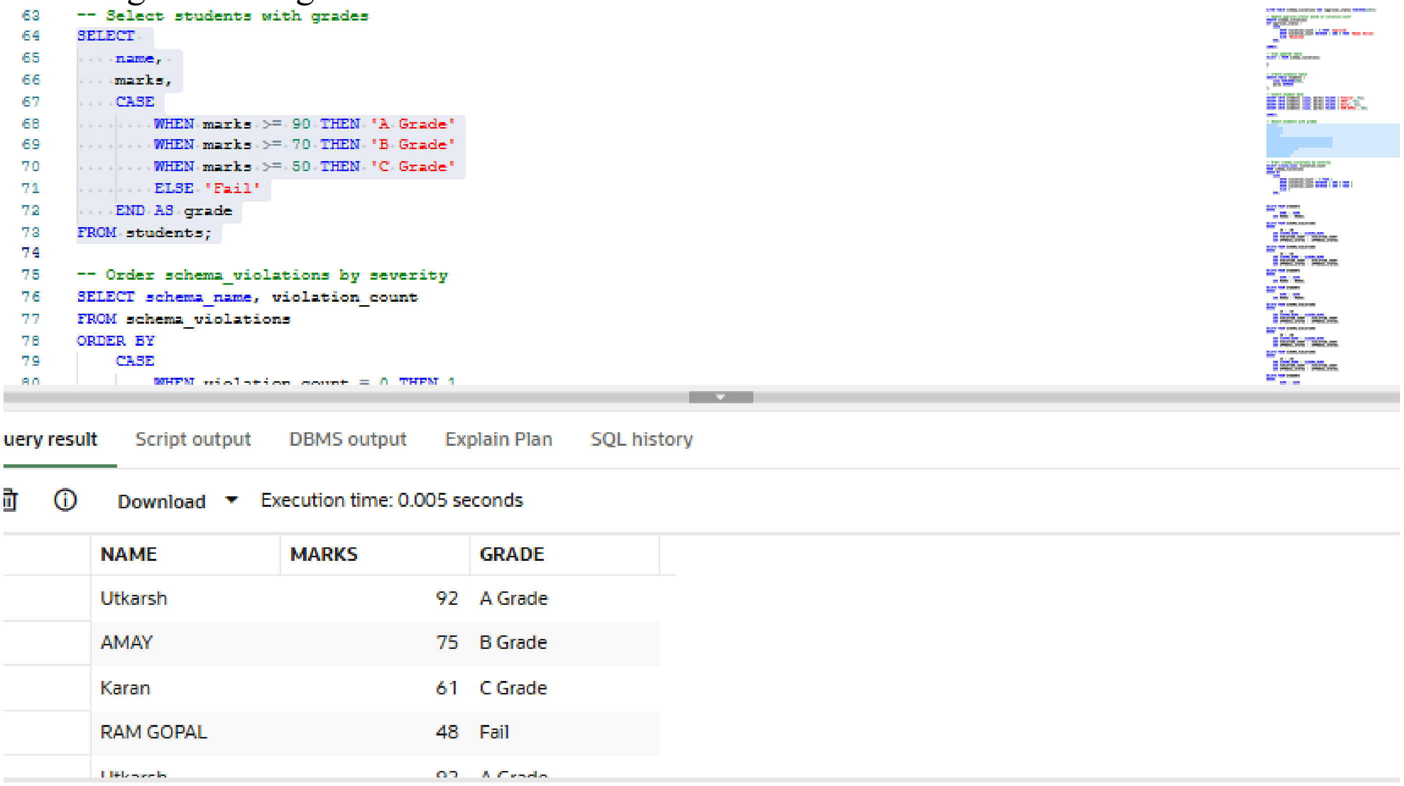
Step 9 – Insert student data



```
-- Insert student data
INSERT INTO students (name, marks) VALUES ('Utkarsh', 92);
INSERT INTO students (name, marks) VALUES ('AMAY', 75);
INSERT INTO students (name, marks) VALUES ('Karan', 61);
INSERT INTO students (name, marks) VALUES ('RAM GOPAL', 48);

COMMIT;
```

```
Elapsed: 00:00:00.002

SQL> INSERT INTO students (name, marks) VALUES ('RAM GOPAL', 48)


1 row inserted.
```

Step 10 – Student grades using CASE statement



```
-- Select students with grades
SELECT
    name,
    marks,
    CASE
        WHEN marks >= 90 THEN 'A Grade'
        WHEN marks >= 70 THEN 'B Grade'
        WHEN marks >= 50 THEN 'C Grade'
        ELSE 'Fail'
    END AS grade
FROM students;

-- Order schema_violations by severity
SELECT schema_name, violation_count
FROM schema_violations
ORDER BY
    CASE
        WHEN violation_count = 0 THEN 1
```

Execution time: 0.005 seconds

NAME	MARKS	GRADE
Utkarsh	92	A Grade
AMAY	75	B Grade
Karan	61	C Grade
RAM GOPAL	48	Fail
Utkarsh	92	A Grade

```
name          marks grade

Utkarsh       92      A Grade
```

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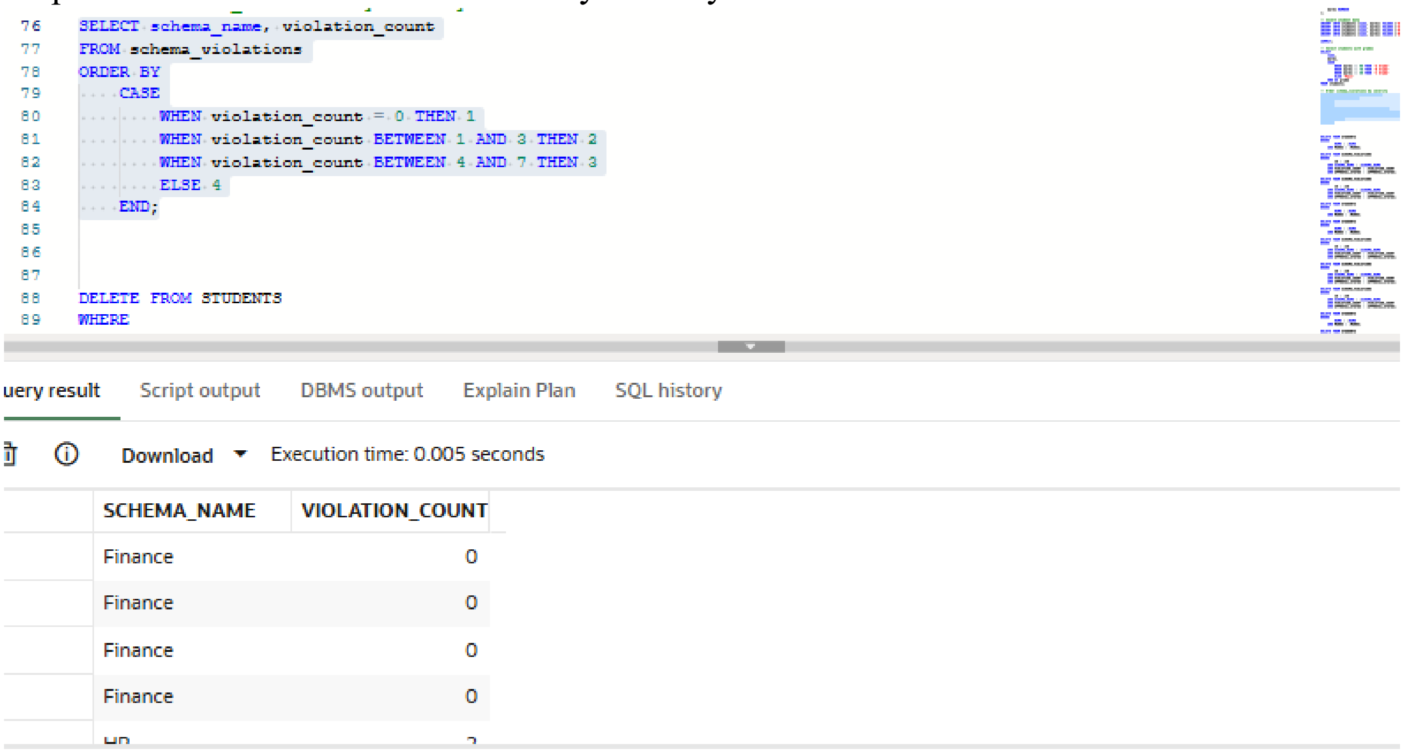
name	marks	grade
AMAY	75	B Grade
Karan	61	C Grade
RAM GOPAL	48	Fail

Step 11 – Schema violations ordered by severity



```
SELECT schema_name, violation_count
FROM schema_violations
ORDER BY
    CASE
        WHEN violation_count = 0 THEN 1
        WHEN violation_count BETWEEN 1 AND 3 THEN 2
        WHEN violation_count BETWEEN 4 AND 7 THEN 3
        ELSE 4
    END;



DELETE FROM STUDENTS
WHERE
```

Execution time: 0.005 seconds

SCHEMA_NAME	VIOLATION_COUNT
Finance	0
Finance	0
Finance	0
Finance	0

schema_name	violation_count
Finance	0
HR	2
Admin	1
Sales	5
Security	9

Learning Outcome
After completing this experiment, the student will be able to:

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- Create and populate tables in Oracle SQL.
- Use CASE statements to evaluate conditions in queries.
- Update table data based on conditional logic.
- Write PL/SQL blocks for dynamic status messages.
- Sort query results using CASE statements in ORDER BY.
- Analyze data and assign grades or approval statuses automatically.
- Interpret step-wise outputs for better understanding of database operations.