

Practical 7

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Aim: Exercise 3: Search conditions, Summary queries, Sub- queries.

Theory:

A Subquery or Inner query or a Nested query is a query within another SQL query and embedded within the WHERE clause.

A subquery is used to return data that will be used in the main query as a condition to further restrict the data to be retrieved.

Subqueries can be used with the SELECT, INSERT, UPDATE, and DELETE statements along with the operators like =, <, >, >=, <=, IN, BETWEEN, etc.

Syntax:

```
SELECT column_name  
FROM table_name  
WHERE column_name expression operator  
(SELECT COLUMN_NAME from TABLE_NAME WHERE ...);
```

Subqueries are used as search conditions in order to filter results.

They specify the conditions for the rows returned from the containing query's select-list, a query expression, or the subquery itself.

Program/Queries:

SQL Script 1:

```
SELECT Students.RegID, Students.FirstName, Students.LastName,  
       Faculties.TechID, Faculties.FirstName, Faculties.LastName  
FROM Students, Faculties  
WHERE Students.TGID = Faculties.TechID  
AND Faculties.TechID IN (SELECT MAX (Faculties.TechID) FROM Faculties);
```

Output 1:

The screenshot shows a PostgreSQL SQL Editor window titled "Query - Practical 7 A58 on postgres@localhost:5432". The SQL Editor contains the following script:

```
ALTER TABLE Students RENAME COLUMN ContactDetails TO ContactNumber;
ALTER TABLE Students ADD Age INT;
ALTER TABLE Students ADD CHECK (Age > 10);
ALTER TABLE Students ADD TGID INT;

INSERT INTO Students VALUES
('2019AAIE1111007', 'Shivam', 'Tawari', '2001-10-07', 4, 1, 7020282332, 19, 201),
('2019AAIE1111010', 'Ajay', 'Sandhu', '2000-05-15', 4, 2, 9452195859, 21, 101),
('2020AAIE1111117', 'Abhishek', 'Ingle', '2001-04-12', 2, 1, 8689738291, 20, 201),
('2019AAIE1111234', 'Rajat', 'Sharma', '2001-09-18', 4, 1, 9523654715, 19, 101),
('2019AAIE111123', 'Rohit', 'Bumar', '2001-01-05', 6, 3, 9686940294, 20, 60),
('2019AAIE1111445', 'Elon', 'Morgan', '2001-11-09', 4, 1, 7685949322, 19, 201),
('2020AAIE1111001', 'Kumar', 'Sangameshwar', '2001-10-21', 2, 2, 6909029310, 19, 101);

SELECT Students.RegID, Students.FirstName, Students.LastName,
       Faculties.TechID, Faculties.FirstName, Faculties.LastName
FROM Students, Faculties
WHERE Students.TGID = Faculties.TechID
AND Faculties.TechID IN (SELECT MAX (Faculties.TechID) FROM Faculties);
```

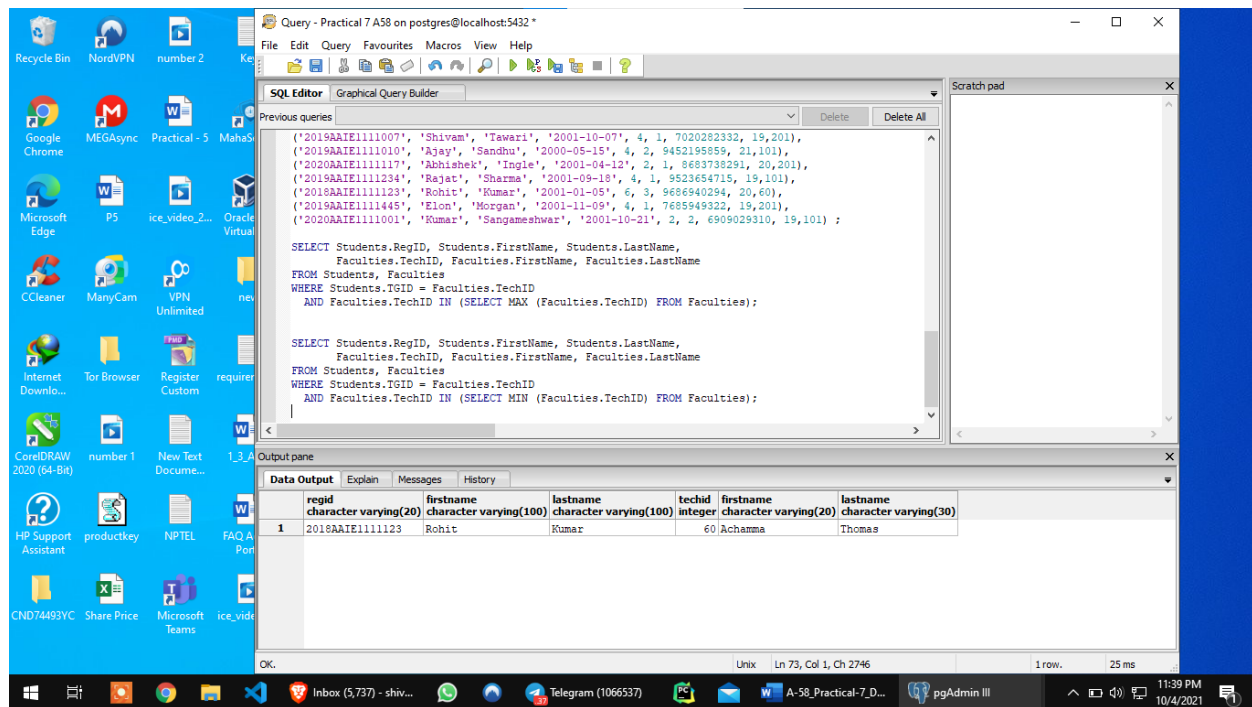
The Output pane shows the results of the SELECT query:

	regid character varying(20)	firstname character varying(100)	lastname character varying(100)	techid integer	firstname character varying(20)	lastname character varying(30)
1	2019AAIE1111007	Shivam	Tawari	201	Gopal	Sakarkar
2	2020AAIE1111117	Abhishek	Ingle	201	Gopal	Sakarkar
3	2019AAIE1111445	Elon	Morgan	201	Gopal	Sakarkar

SQL Script 2:

```
SELECT Students.RegID, Students.FirstName, Students.LastName,
       Faculties.TechID, Faculties.FirstName, Faculties.LastName
FROM Students, Faculties
WHERE Students.TGID = Faculties.TechID
AND Faculties.TechID IN (SELECT MIN (Faculties.TechID) FROM Faculties);
```

Output 2:



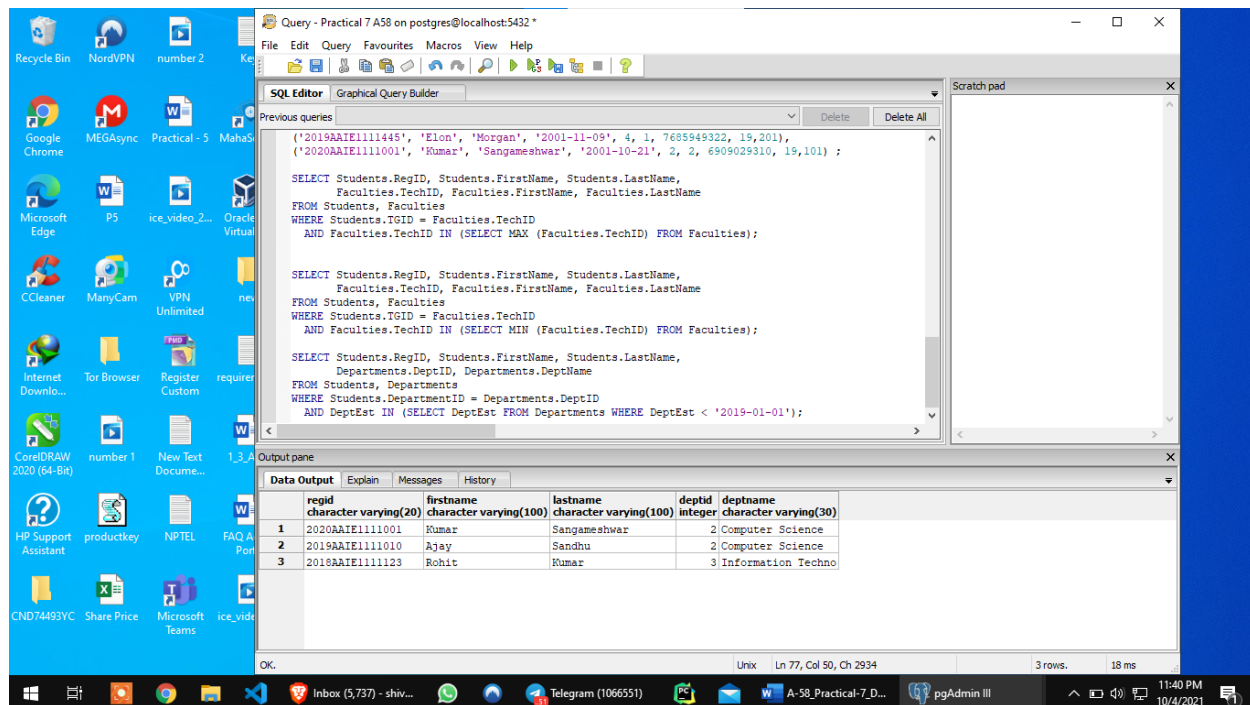
SQL Script 3:

```

SELECT Students.RegID, Students.FirstName, Students.LastName,
       Departments.DeptID, Departments.DeptName
FROM Students, Departments
WHERE Students.DepartmentID = Departments.DeptID
      AND DeptEst IN (SELECT DeptEst FROM Departments WHERE DeptEst < '2019-01-01');

```

Output 3:



SQL Script 4:

```

SELECT Faculties.TechID, Faculties.FirstName, Faculties.LastName,
       Departments.DeptID, Departments.DeptName
FROM Faculties, Departments
WHERE Faculties.DeptID = Departments.DeptID
      AND Faculties.TechID IN (SELECT TGID FROM Students WHERE Age = 18);

```

Output 4:

The screenshot displays the pgAdmin III SQL Editor interface. The SQL Editor window contains the following query:

```
AND Faculties.TechID IN (SELECT MAX (Faculties.TechID) FROM Faculties);

SELECT Students.RegID, Students.FirstName, Students.LastName,
       Faculties.TechID, Faculties.FirstName, Faculties.LastName
FROM Students, Faculties
WHERE Students.TGID = Faculties.TechID
      AND Faculties.TechID IN (SELECT MIN (Faculties.TechID) FROM Faculties);

SELECT Students.RegID, Students.FirstName, Students.LastName,
       Departments.DeptID, Departments.DeptName
FROM Students, Departments
WHERE Students.DepartmentID = Departments.DeptID
      AND DeptEst IN (SELECT DeptEst FROM Departments WHERE DeptEst < '2019-01-01');

SELECT Faculties.TechID, Faculties.FirstName, Faculties.LastName,
       Departments.DeptID, Departments.DeptName
FROM Faculties, Departments
WHERE Faculties.DeptID = Departments.DeptID
      AND Faculties.TechID IN (SELECT TGID FROM Students WHERE Age = 18);
```

The Output pane shows the results of the query, which consists of two rows:

techid	firstname	lastname	deptid	deptname
201	Gopal	Sakarker	4	Data Science
101	Durgesh	Sharma	1	Artificial Intelligence

The status bar at the bottom indicates "0 rows" and "16 ms" execution time.

Conclusion: Hence, we have retrieved data from SQL Subquery on multiple tables and use of Subquery Operation on various tables has been performed.