# DBMS Lab - Session-4

**106122076 CSE-B**
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**1. With continuation to Session 03 exercise, execute all the example queries provided in Subsection 7.1.1 to 7.4.2 (excluding keywords 'TRIGGER', 'VIEW', 'EXCEPT' and 'CONTAINS').**

1)SELECT Fname,Lname FROM EMPLOYEE WHERE Super_ssn IS NULL;

```
+-------+-------+
| Fname | Lname |
+-------+-------+
| James | Borg  |
+-------+-------+
```

2)SELECT DISTINCT Pnumber
FROM PROJECT
WHERE Pnumber IN
( SELECT Pnumber
FROM PROJECT, DEPARTMENT, EMPLOYEE
WHERE Dnum = Dnumber AND Mgr_ssn = Ssn AND Lname = 'Smith' );

Empty set (0.00 sec)

3)SELECT Lname, Fname
FROM EMPLOYEE
WHERE Salary > ALL
( SELECT Salary
FROM EMPLOYEE
WHERE Dno = 5 );

```
+---------+----------+
| Lname   | Fname    |
+---------+----------+
| Borg    | James    |
| Wallace | Jennifer |
+---------+----------+
```

4)SELECT E.Fname, E.Lname
FROM EMPLOYEE AS E
WHERE E.Ssn IN
( SELECT D.Essn
FROM DEPENDENT AS D

```
   WHERE E.Fname = D.Dependent_name AND E.Sex = D.Sex );
```

```
   Empty set (0.00 sec)
```

```
5)SELECT E.Fname, E.Lname
FROM EMPLOYEE AS E
WHERE EXISTS ( SELECT *
FROM DEPENDENT AS D
WHERE E.Ssn = D.Essn AND E.Sex = D.Sex AND E.Fname = D.Dependent_name);
```

```
   Empty set (0.00 sec)
```

```
6)SELECT Fname, Lname
FROM EMPLOYEE
WHERE
EXISTS ( SELECT *
FROM DEPENDENT
WHERE Ssn = Essn )
AND
EXISTS ( SELECT *
FROM DEPARTMENT
WHERE Ssn = Mgr_ssn );
```

```
   +----------+---------+
   | Fname    | Lname   |
   +----------+---------+
   | Franklin | Wlong   |
   | Jennifer | Wallace |
   +----------+---------+
```

```
7) SELECT Lname, Fname
FROM EMPLOYEE
WHERE
NOT EXISTS ( SELECT *
FROM WORKS_ON B
WHERE ( B.Pno IN
( SELECT Pnumber
FROM PROJECT
WHERE Dnum = 5 )
AND
NOT EXISTS ( SELECT *
FROM WORKS_ON C
WHERE C.Essn = Ssn
AND C.Pno = B.Pno )));
```

Empty set (0.00 sec)

8) SELECT DISTINCT Essn
FROM WORKS_ON
WHERE Pno IN (1, 2, 3);

```
+-----------+
| Essn      |
+-----------+
| 123456789 |
| 453453453 |
| 333445555 |
| 666884444 |
+-----------+
```

9)SELECT Fname, Lname, Address
FROM (EMPLOYEE JOIN DEPARTMENT ON Dno = Dnumber)
WHERE Dname = ‘Research’;

```
+----------+---------+--------------------------+
| Fname    | Lname   | Address                  |
+----------+---------+--------------------------+
| Jhon     | Smith   | 731 Fondren, Houston,
TX |
| Franklin | Wlong   | 638 Voss, Houston,
TX    |
| Joyce    | English | 5631 Rice, Houston,
TX   |
| Ramesh   | Narayan | 975 Fire Oak,
Humble, TX |
+----------+---------+--------------------------+
```

10)SELECT E.Lname AS Employee_name,S.Lname AS Supervisor_name
FROM (EMPLOYEE AS E LEFT OUTER JOIN EMPLOYEE AS S ON E.Super_ssn = S.Ssn);

```
+---------------+----------------+
| Employee_name | Supervisor_name |
+---------------+----------------+
| Smith         | Wlong          |
| Wlong         | Borg           |
| English       | Wlong          |
```

```
| Narayan       | Wlong           |
| Borg          | NULL            |
| Wallace       | Borg            |
| Jabbar        | Wallace         |
| Zelaya        | Wallace         |
+---------------+-----------------+
```

11)SELECT SUM(Salary),MAX(Salary),MIN(Salary),AVG(Salary)
FROM EMPLOYEE;

```
+-------------+-------------+-------------+--------------+
| SUM(Salary) | MAX(Salary) | MIN(Salary) | AVG(Salary)  |
+-------------+-------------+-------------+--------------+
|   281000.00 |    55000.00 |    25000.00 | 35125.000000 |
+-------------+-------------+-------------+--------------+
```

12)SELECT COUNT (*)
FROM EMPLOYEE, DEPARTMENT
WHERE DNO = DNUMBER AND DNAME = ‘Research’;

```
+----------+
| COUNT(*) |
+----------+
|        4 |
+----------+
```

13)SELECT Pnumber,Pname,COUNT(*)
FROM PROJECT,WORKS_ON
WHERE Pnumber = Pno
GROUP BY Pnumber,Pname;

```
+---------+-----------------+----------+
| Pnumber | Pname           | COUNT(*) |
+---------+-----------------+----------+
|      10 | Computerization |        3 |
|      30 | Newbenefits     |        3 |
|       1 | ProductX        |        2 |
|       2 | ProductY        |        3 |
|       3 | ProductZ        |        2 |
|      20 | Reorganization  |        3 |
+---------+-----------------+----------+
```

**2. Execute the following Queries over the Company Schema you have already created.**

a. For each department whose average employee salary is more than 30,000, retrieve the department name and the number of employees working for that department.

```
SELECT D.Dname, COUNT(E.Ssn) AS NumberOfEmployees
FROM DEPARTMENT D
JOIN EMPLOYEE E ON D.Dnumber = E.Dno
GROUP BY D.Dname
HAVING AVG(E.Salary) > 30000;
```

| Dname | NumberOfEmployees |
|---|---|
| Research | 4 |
| Headquarters | 1 |
| Administration | 3 |

b.

i. Retrieve the number of female employees in each department making more than 30,000.

```
SELECT D.Dname, COUNT(E.Ssn) AS NumberOfFemaleEmployees
FROM DEPARTMENT D
JOIN EMPLOYEE E ON D.Dnumber = E.Dno
WHERE E.Salary > 30000 AND E.Sex = 'F'
GROUP BY D.Dname;
```

| Dname | NumberOfFemaleEmployees |
|---|---|
| Administration | 1 |

ii. For each department whose average employee salary is more than 30,000, retrieve the department name and number of male employees working for that department.

```
SELECT D.Dname, COUNT(E.Ssn) AS NumberOfMaleEmployees
FROM DEPARTMENT D
JOIN EMPLOYEE E ON D.Dnumber = E.Dno
WHERE E.Sex = 'M'
GROUP BY D.Dname
HAVING AVG(E.Salary) > 30000;
```

| Dname | NumberOfMaleEmployees |
|---|---|
| Research | 3 |
| Headquarters | 1 |

c. Retrieve the names of all employees who work in the department that has the employee with the highest salary among all employees.

```
SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
WHERE E.Dno = (
   SELECT E1.Dno
```

```
    FROM EMPLOYEE E1
    ORDER BY E1.Salary DESC
    LIMIT 1
);
```

| | Fname | Minit | Lname |
|---|---|---|---|
| ▶ | James | E | Borg |

d. Retrieve the names of employees who make at least 10,000 more than the employee who is paid the least in the company.

```
SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
WHERE E.Salary >= (
    SELECT MIN(Salary) + 10000
    FROM EMPLOYEE
);
```

| | Fname | Minit | Lname |
|---|---|---|---|
| ▶ | Franklin | T | Wlong |
| | Ramesh | K | Narayan |
| | James | E | Borg |
| | Jennifer | S | Wallace |

e. Retrieve the names of all employees in department 5 who work more than 10 hours per week on the Product X's project.

```
SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
JOIN WORKS_ON W ON E.Ssn = W.Essn
JOIN PROJECT P ON W.Pno = P.Pnumber
WHERE E.Dno = 5 AND P.Pname = 'Product X' AND W.Hours > 10;
```

| | Fname | Minit | Lname |
|---|---|---|---|

f. List the names of all employees who have a dependent with the same first name as themselves.

```
SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
JOIN DEPENDENT D ON E.Ssn = D.Essn
WHERE E.Fname = D.Dependent_name;
```

| | Fname | Minit | Lname |
|---|---|---|---|

g. Find the names of all employees who are directly supervised by 'Tejaswi Kumar'.

```
SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
JOIN EMPLOYEE S ON E.Super_ssn = S.Ssn
WHERE S.Fname = 'Tejaswi' AND S.Lname = 'Kumar';
```

| | Fname | Minit | Lname |
|---|---|---|---|

h. Find the names of employees who work on all the projects controlled by department number 5.

```
SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
WHERE NOT EXISTS (
   SELECT P.Pnumber
   FROM PROJECT P
   WHERE P.Dnum = 5
   AND NOT EXISTS (
      SELECT W.Essn
      FROM WORKS_ON W
      WHERE W.Pno = P.Pnumber
      AND W.Essn = E.Ssn
   )
);
```

| | Fname | Minit | Lname |
|---|---|---|---|

i. For each project, list the project name and the total hours per week (by all employees) spent on that project.

```
SELECT P.Pname, SUM(W.Hours) AS TotalHours
FROM PROJECT P
JOIN WORKS_ON W ON P.Pnumber = W.Pno
GROUP BY P.Pname;
```

| | Pname | TotalHours |
|---|---|---|
| ▶ | Computerization | 55.0 |
| | Newbenefits | 55.0 |
| | ProductX | 52.5 |
| | ProductY | 37.5 |
| | ProductZ | 50.0 |
| | Reorganization | 40.0 |

j. Retrieve the names of all employees who work on every project.

```
SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
WHERE NOT EXISTS (
   SELECT P.Pnumber
   FROM PROJECT P
   WHERE NOT EXISTS (
      SELECT W.Essn
      FROM WORKS_ON W
      WHERE W.Pno = P.Pnumber
      AND W.Essn = E.Ssn
   )
);
```

| | Fname | Minit | Lname |
|---|---|---|---|

k. Retrieve the names of all employees who do not work on any project.

```
SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
WHERE NOT EXISTS (
   SELECT W.Essn
   FROM WORKS_ON W
   WHERE W.Essn = E.Ssn
);
```

| | Fname | Minit | Lname |
|---|---|---|---|

l. Retrieve the average salary of all female employees.

```
SELECT AVG(E.Salary) AS AverageFemaleSalary
FROM EMPLOYEE E
WHERE E.Sex = 'F';
```

| | AverageFemaleSalary |
|---|---|
| ▶ | 31000.000000 |

m. Find the names and addresses of all employees who work on at least one project located in Madurai but whose department has no location in Madurai.

```
SELECT DISTINCT E.Fname, E.Minit, E.Lname, E.Address
FROM EMPLOYEE E
JOIN WORKS_ON W ON E.Ssn = W.Essn
JOIN PROJECT P ON W.Pno = P.Pnumber
WHERE P.Plocation = 'Madurai'
AND NOT EXISTS (
   SELECT DL.Dlocation
   FROM DEPT_LOCATIONS DL
   WHERE DL.Dnumber = E.Dno
   AND DL.Dlocation = 'Madurai'
);
```

| | Fname | Minit | Lname | Address |
|---|---|---|---|---|

n. List the last names of all department managers who have no dependents.

```
SELECT E.Lname
FROM EMPLOYEE E
JOIN DEPARTMENT D ON E.Ssn = D.Mgr_ssn
WHERE NOT EXISTS (
   SELECT Dp.Essn
   FROM DEPENDENT Dp
   WHERE Dp.Essn = E.Ssn
);
```

| | Lname |
|---|---|
| ▶ | Borg |

o. Display employee names (e'') who are supervised by an e' who is immediately supervised by an employee with lname "XYZ".

```
SELECT E2.Fname, E2.Minit, E2.Lname
FROM EMPLOYEE E2
JOIN EMPLOYEE E1 ON E2.Super_ssn = E1.Ssn
JOIN EMPLOYEE E0 ON E1.Super_ssn = E0.Ssn
WHERE E0.Lname = 'XYZ';
```

| | Fname | Minit | Lname |
|---|---|---|---|

p. Display names of all employees who work on some project controlled by department number 10.

```
SELECT DISTINCT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
JOIN WORKS_ON W ON E.Ssn = W.Essn
JOIN PROJECT P ON W.Pno = P.Pnumber
WHERE P.Dnum = 10;
```

| | Fname | Minit | Lname |
|---|---|---|---|

q. Print all the ssn and the first name of supervisors who supervise at least 2 projects in ascending order of the number of employee he/she supervise under him/her.

```
SELECT E.Super_ssn, S.Fname, COUNT(DISTINCT P.Pnumber) AS ProjectCount
FROM EMPLOYEE E
JOIN WORKS_ON W ON E.Ssn = W.Essn
JOIN PROJECT P ON W.Pno = P.Pnumber
JOIN EMPLOYEE S ON E.Super_ssn = S.Ssn
GROUP BY E.Super_ssn, S.Fname
HAVING COUNT(DISTINCT P.Pnumber) >= 2
ORDER BY ProjectCount ASC;
```

| | Super_ssn | Fname | ProjectCount |
|---|---|---|---|
| ▶ | 987654321 | Jennifer | 2 |
| | 333445555 | Franklin | 3 |
| | 888665555 | James | 5 |

r. Display all male employee names who also have dependents along with their dependent names.

```
SELECT E.Fname, E.Minit, E.Lname, D.Dependent_name
FROM EMPLOYEE E
JOIN DEPENDENT D ON E.Ssn = D.Essn
WHERE E.Sex = 'M';
```

| | Fname | Minit | Lname | Dependent_name |
|---|---|---|---|---|
| ▶ | Jhon | B | Smith | Alice |
| | Jhon | B | Smith | Elizabeth |
| | Jhon | B | Smith | Michae |
| | Franklin | T | Wlong | Alice |
| | Franklin | T | Wlong | Joy |
| | Franklin | T | Wlong | Theodore |

s. Display those employees whose salary exceeds the department managers salary that the employee(s) work for.

```
SELECT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
JOIN DEPARTMENT D ON E.Dno = D.Dnumber
JOIN EMPLOYEE M ON D.Mgr_ssn = M.Ssn
WHERE E.Salary > M.Salary;
```

| | Fname | Minit | Lname |
|---|---|---|---|

t. Display employee names who either work in CS department or supervise an employee working for CS department.

```
SELECT DISTINCT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
JOIN DEPARTMENT D ON E.Dno = D.Dnumber
WHERE D.Dname = 'CS'
UNION
SELECT DISTINCT E.Fname, E.Minit, E.Lname
FROM EMPLOYEE E
JOIN EMPLOYEE S ON E.Ssn = S.Super_ssn
JOIN DEPARTMENT D ON S.Dno = D.Dnumber
WHERE D.Dname = 'CS';
```

| | Fname | Minit | Lname |
|---|---|---|---|