

LAB – 4 (ANSWER SCRIPT)

QUESTION:-

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').

I. `SELECT Fname, Lname FROM Employee WHERE Super_ssn IS NULL;`

```
+-----+-----+
| Fname | Lname |
+-----+-----+
| James | Borg  |
+-----+-----+
1 row in set (0.00 sec)
```

II. `SELECT DISTINCT Pnumber FROM PROJECT WHERE Pnumber IN (SELECT Pnumber FROM PROJECT, DEPARTMENT, Employee WHERE Dnum = Dnumber AND Mgr_ssn = Ssn AND Lname = 'Smith') OR Pnumber IN (SELECT Pno FROM WORKS_ON, Employee WHERE Essn = Ssn AND Lname = 'Smith');`

```
+-----+
| Pnumber |
+-----+
|      20 |
|      30 |
|       1 |
|       2 |
+-----+
4 rows in set (0.01 sec)
```

III. `SELECT DISTINCT Essn FROM WORKS_ON WHERE (Pno, Hours) IN (SELECT Pno, Hours FROM WORKS_ON WHERE Essn = '123456789');`

```
+-----+
| Essn   |
+-----+
| 123456789 |
+-----+
1 row in set (0.00 sec)
```

IV. `SELECT Lname, Fname FROM Employee WHERE Salary > ALL (SELECT Salary FROM Employee WHERE Dno = 5);`

```
+-----+-----+
| Lname | Fname   |
+-----+-----+
| Borg  | James   |
| Smith | Jennifer |
+-----+-----+
2 rows in set (0.00 sec)
```

V. `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)
```

VI. `SELECT E.Fname, E.Lname FROM Employee AS E, DEPENDENT AS D WHERE E.Ssn = D.Essn AND E.Sex = D.Sex AND E.Fname = D.Dependent_name;`

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

VII. `SELECT Fname, Lname FROM Employee WHERE NOT EXISTS (SELECT * FROM DEPENDENT WHERE Ssn = Essn);`

```
+-----+-----+
| Fname | Lname |
+-----+-----+
| Joyce | English |
| Ramesh | Narayan |
| James | Borg |
| Ahmad | Jabbar |
| Alicia | Zelaya |
+-----+-----+
5 rows in set (0.00 sec)
```

VIII. `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 | Wong |
+-----+-----+
1 row in set (0.00 sec)
```

IX. `SELECT DISTINCT Essn FROM WORKS_ON WHERE Pno IN (1, 2, 3);`

```
+-----+
| Essn |
+-----+
| 123456789 |
| 453453453 |
| 333445555 |
| 666884444 |
+-----+
4 rows in set (0.00 sec)
```

X. `SELECT E.Lname AS Employee_name, S.Lname AS Supervisor_name FROM Employee AS E, Employee AS S WHERE`

`E.Super_ssn = S.Ssn;`

```
+-----+-----+
| Employee_name | Supervisor_name |
+-----+-----+
| Smith | Wong |
| Wong | Borg |
| English | Wong |
| Narayan | Wong |
| Borg | NULL |
| Smith | Borg |
| Jabbar | Smith |
| Zelaya | Smith |
+-----+-----+
8 rows in set (0.00 sec)
```

XI. `SELECT Fname, Lname, Address FROM (Employee JOIN DEPARTMENT ON Dno = Dnumber) WHERE Dname = 'Research';`

Fname	Lname	Address
John	Smith	731 Fondren, Houston, TX
Franklin	Wong	38 Voss, Houston, TX
Joyce	English	5631 Rice, Houston, TX
Ramesh	Narayan	975 Fire Oak, Houston, TX

4 rows in set (0.00 sec)

XII. `SELECT Fname, Lname, Address FROM (Employee NATURAL JOIN (DEPARTMENT AS DEPT (Dname, Dno, Mssn, Msdate))) WHERE Dname = 'Research';`

Fname	Lname	Address
John	Smith	731 Fondren, Houston, TX
Franklin	Wong	38 Voss, Houston, TX
Joyce	English	5631 Rice, Houston, TX
Ramesh	Narayan	975 Fire Oak, Houston, TX
James	Borg	450 Stone, Houston, TX
Jennifer	Smith	291 Berry Houston, TX
Ahmad	Jabbar	980 Dallas, Houston, TX
Alicia	Zelaya	3321 Castle, Spring, TX

8 rows in set (0.00 sec)

XIII. `SELECT Pnumber, Dnum, Lname, Address, Bdate FROM ((PROJECT JOIN DEPARTMENT ON Dnum = Dnumber) JOIN Employee ON Mgr_ssn = Ssn) WHERE Plocation = 'Stafford';`

Pnumber	Dnum	Lname	Address	Bdate
10	4	Wong	38 Voss, Houston, TX	1955-12-08
30	4	Wong	38 Voss, Houston, TX	1955-12-08

2 rows in set (0.00 sec)

XIV. `SELECT E.Lname, S.Lname FROM Employee E, Employee S WHERE E.Super_ssn = S.Ssn;`

Lname	Lname
Smith	Wong
Wong	Borg
English	Wong
Narayan	Wong
Smith	Borg
Jabbar	Smith
Zelaya	Smith

7 rows in set (0.00 sec)

XV. `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 |
+-----+-----+-----+-----+
1 row in set (0.00 sec)
```

XVI. `SELECT SUM (Salary), MAX (Salary), MIN (Salary), AVG (Salary)
FROM (Employee JOIN DEPARTMENT ON Dno = Dnumber) WHERE Dname =
'Research';`

```
+-----+-----+-----+-----+
| SUM(Salary) | MAX(Salary) | MIN(Salary) | AVG(Salary) |
+-----+-----+-----+-----+
| 133000.00 | 40000.00 | 25000.00 | 33250.000000 |
+-----+-----+-----+-----+
1 row in set (0.00 sec)
```

XVII. `SELECT COUNT (*) FROM Employee, DEPARTMENT WHERE DNO = DNUMBER
AND DNAME = 'Research';`

```
+-----+
| COUNT(*) |
+-----+
| 4 |
+-----+
1 row in set (0.00 sec)
```

XVIII. `SELECT Lname, Fname FROM Employee WHERE (SELECT COUNT(*) FROM
DEPENDENT WHERE Ssn = Essn) >= 2;`

```
+-----+-----+
| Lname | Fname |
+-----+-----+
| Smith | John |
| Wong | Franklin |
+-----+-----+
2 rows in set (0.01 sec)
```

XIX. `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         | Wong            |
| Wong         | Borg            |
| English       | Wong            |
| Narayan       | Wong            |
| Borg          | NULL            |
| Smith         | Borg            |
| Jabbar        | Smith           |
| Zelaya        | Smith           |
+-----+-----+
3 rows in set (0.00 sec)

```

XX. `SELECT Dno, COUNT(*), AVG (Salary) FROM Employee`

`GROUP BY Dno;`

```

+-----+-----+-----+
| Dno | COUNT(*) | AVG (Salary) |
+-----+-----+-----+
| 5   | 4        | 33250.000000 |
| 1   | 1        | 55000.000000 |
| 4   | 3        | 31000.000000 |
+-----+-----+-----+
3 rows in set (0.00 sec)

```

XXI. `SELECT Pnumber, Pname, COUNT(*) FROM PROJECT, WORKS_ON WHERE Pnumber = Pno GROUP BY Pnumber, Pname HAVING COUNT (*) > 2;`

```

+-----+-----+-----+
| Pnumber | Pname           | COUNT(*) |
+-----+-----+-----+
| 10      | Computerization | 3        |
| 30      | Newbenefits     | 3        |
| 2       | ProductY        | 3        |
| 20      | Reorganization  | 3        |
+-----+-----+-----+
4 rows in set (0.00 sec)

```

XXII. `SELECT Dno, COUNT(*) FROM Employee WHERE Salary>40000 GROUP BY Dno HAVING COUNT (*) > 5;`

```

Empty set (0.00 sec)

```

XXIII. `SELECT Dno, COUNT (*) FROM Employee WHERE Salary>40000 AND Dno IN (SELECT Dno FROM Employee GROUP BY Dno HAVING COUNT(*)>2) GROUP BY Dno;`

```

+-----+-----+
| Dno | COUNT(*) |
+-----+-----+
| 4   | 1        |
+-----+-----+
1 row in set (0.00 sec)

```

```
XXIV. WITH RECURSIVE SUP_EMP (SupSsn, EmpSsn) AS (SELECT Super_Ssn,
Ssn FROM Employee UNION SELECT E.Ssn, S.SupSsn FROM Employee AS E,
SUP_EMP AS S WHERE E.Super_Ssn = S.EmpSsn) SELECT * FROM SUP_EMP;
```

SupSsn	EmpSsn
333445555	123456789
888665555	333445555
333445555	453453453
333445555	666884444
NULL	888665555
888665555	987654321
987654321	987987987
987654321	999887777
123456789	888665555
333445555	NULL
453453453	888665555
666884444	888665555
987654321	NULL
987987987	888665555
999887777	888665555
333445555	999887777
333445555	987987987
987654321	666884444
987654321	453453453
987654321	123456789

20 rows in set (0.00 sec)

Q2)

a.)
SELECT D.Dname, COUNT(E.Ssn) AS NumberOfEmployees
FROM EMPLOYEE E
JOIN DEPARTMENT D ON E.Dno = D.Dnumber

```
GROUP BY D.Dname
HAVING AVG(E.Salary) > 30000;
```

b.)

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

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

c.

```
SELECT E.Fname, E.Lname
FROM EMPLOYEE E
WHERE E.Dno = (SELECT Dno FROM EMPLOYEE ORDER BY Salary DESC LIMIT 1);
```

d.

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

e.

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

f.

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

g.

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

h.

```
SELECT E.Fname, 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
  )
);
```

i.

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

j.

```
SELECT E.Fname, 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
  )
);
```

k.

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

l.

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

m.


```
ELECT DISTINCT E.Fname, 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 E.Dno NOT IN (
    SELECT D.Dnumber
    FROM DEPT_LOCATIONS D
    WHERE D.Dlocation = 'Madurai'
);
```

n.

```
SELECT E.Lname
FROM EMPLOYEE E
JOIN DEPARTMENT D ON E.Ssn = D.Mgr_ssn
WHERE NOT EXISTS (
    SELECT 1
    FROM DEPENDENT DEP
    WHERE DEP.Essn = E.Ssn
);
```

o.

```
SELECT E1.Fname, E1.Lname
FROM EMPLOYEE E1
JOIN EMPLOYEE E2 ON E1.Super_ssn = E2.Ssn
JOIN EMPLOYEE E3 ON E2.Super_ssn = E3.Ssn
WHERE E3.Lname = 'XYZ';
```

p.

```
SELECT DISTINCT E.Fname, 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;
```

q.

```
SELECT E.Ssn, E.Fname
FROM EMPLOYEE E
WHERE E.Ssn IN (
    SELECT W.Essn
    FROM WORKS_ON W
    GROUP BY W.Essn
    HAVING COUNT(DISTINCT W.Pno) >= 2
)
ORDER BY (
    SELECT COUNT(*)
    FROM EMPLOYEE E2
    WHERE E2.Super_ssn = E.Ssn
```

);

r.

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

s.

```
SELECT E.Fname, 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;
```

t.

```
SELECT DISTINCT E.Fname, E.Lname  
FROM EMPLOYEE E  
WHERE E.Dno = (SELECT D.Dnumber FROM DEPARTMENT D WHERE D.Dname = 'CS')  
OR E.Ssn IN (SELECT E1.Super_ssn FROM EMPLOYEE E1 JOIN DEPARTMENT  
D1 ON E1.Dno = D1.Dnumber WHERE D1.Dname = 'CS');
```