

## SCHEMA :

```

DMS_LAB > lab5 > lab5.sql
Run on active connection | Select block
1 CREATE TABLE EMP (
2 Fname VARCHAR(20),
3 Minit CHAR(1),
4 Lname VARCHAR(20),
5 Ssn CHAR(9),
6 Bdate DATE,
7 Address VARCHAR(30),
8 Sex CHAR(1),
9 Salary NUMBER(5),
10 Super_Ssn CHAR(9),
11 Dno NUMBER(1),
12 PRIMARY KEY (Ssn),
13 FOREIGN KEY (Super_Ssn) REFERENCES EMP (Ssn)
14 );
15
16 INSERT INTO EMP VALUES ('James', 'E', 'Borg', '888665555', DA
17 INSERT INTO EMP VALUES ('Jennifer', 'S', 'Wallace', '98765432
18 INSERT INTO EMP VALUES ('Franklin', 'T', 'Wong', '333445555',
19 INSERT INTO EMP VALUES ('John', 'B', 'Smith', '123456789', DA
20 INSERT INTO EMP VALUES ('Alicia', 'J', 'Zelaya', '999887777',
21 INSERT INTO EMP VALUES ('Ramesh', 'K', 'Narayan', '666884444'
22 INSERT INTO EMP VALUES ('Joyce', 'A', 'English', '453453453',
23 INSERT INTO EMP VALUES ('Ahmad', 'V', 'Jabbar', '987987987',
24 INSERT INTO EMP VALUES ('Melissa', 'M', 'Jones', '808080808',
25 INSERT INTO EMP VALUES ('Tushar', 'T', 'Maroo', '333495555',
26
27 CREATE TABLE DEPARTMENT_EMP(
28 Dname VARCHAR(20),
29

```

SQL> desc EMP;

Name	Null?	Type
FNAME		VARCHAR2(20)
MINIT		CHAR(1)
LNAME		VARCHAR2(20)
SSN	NOT NULL	CHAR(9)
BDATE		DATE
ADDRESS		VARCHAR2(30)
SEX		CHAR(1)
SALARY		NUMBER(5)
SUPER_SSN		CHAR(9)
DNO		NUMBER(1)

SQL> select \* from EMP;

FNAME	M	LNAME	SSN	BDATE
James	E	Borg	888665555	10-NOV-37
450 Stone, Houston, TX	M		55000	1
Jennifer	S	Wallace	987654321	20-JUN-41
291 Berry, Bellaire, Tx	F		37000	888665555
Franklin	T	Wong	333445555	08-DEC-55
638 Voss, Houston, TX	M		40000	888665555

```

26
27 CREATE TABLE DEPARTMENT_EMP(
28 Dname VARCHAR(20),
29 Dnumber NUMBER(1),
30 Mgr_ssn CHAR(9),
31 Mgr_start_date DATE,
32 PRIMARY KEY (Dnumber),
33 FOREIGN KEY (Mgr_ssn) REFERENCES EMP (Ssn)
34 );
35
36 INSERT INTO DEPARTMENT_EMP VALUES ('Research', 5, '333445555'
37 INSERT INTO DEPARTMENT_EMP VALUES ('Administration', 4, '9876
38 INSERT INTO DEPARTMENT_EMP VALUES ('Headquarters', 1, '888665
39
40 -- this alter is needed to allow PROJECT and DEPARTMENT to re
41
42 ALTER TABLE EMP ADD FOREIGN KEY (Dno) REFERENCES DEPARTMENT_EI
43
44 CREATE TABLE DEPT_LOC (
45 Dnumber NUMBER(1),
46 Dlocation VARCHAR(20),
47 PRIMARY KEY (Dnumber, Dlocation),
48 FOREIGN KEY (Dnumber) REFERENCES DEPARTMENT_EMP (Dnumber)
49 );
50
51 INSERT INTO DEPT_LOC VALUES (1, 'Houston');
52 INSERT INTO DEPT_LOC VALUES (4, 'Stafford');
53 INSERT INTO DEPT_LOC VALUES (5, 'Bellaire');
54 INSERT INTO DEPT_LOC VALUES (5, 'Sugarland');
55

```

SQL> desc DEPARTMENT\_EMP;

Name	Null?	Type
DNAME		VARCHAR2(20)
DNUMBER	NOT NULL	NUMBER(1)
MGR_SSN		CHAR(9)
MGR_START_DATE		DATE

SQL> select \* from DEPARTMENT\_EMP;

DNAME	DNUMBER	MGR_SSN	MGR_START_DATE
Research	5	333445555	22-MAY-88
Administration	4	987654321	01-JAN-95
Headquarters	1	888665555	19-JUN-81

SQL> desc DEPT\_LOC;

Name	Null?	Type
DNUMBER	NOT NULL	NUMBER(1)
DLOCATION	NOT NULL	VARCHAR2(20)

SQL> select \* from DEPT\_LOC;

DNUMBER	DLOCATION
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Austin

SQL> desc PROJECT;

Name	Null?	Type
PNAME		VARCHAR2(20)
PNUMBER	NOT NULL	NUMBER(2)
PLOCATION		VARCHAR2(20)
DNUM		NUMBER(1)

Visual Studio Code

pgm1.c ./lab2 lab4.sql lab5.sql DFSBruteForce.c pgm2.c

DB5\_LAB > lab5 > lab5.sql

```

44 CREATE TABLE DEPT_LOC (
45 Dnumber NUMBER(1),
46 Dlocation VARCHAR(20),
47 PRIMARY KEY (Dnumber, Dlocation),
48 FOREIGN KEY (Dnumber) REFERENCES DEPARTMENT_EMP (Dnumber)
49 );
50
51 INSERT INTO DEPT_LOC VALUES (1, 'Houston');
52 INSERT INTO DEPT_LOC VALUES (4, 'Stafford');
53 INSERT INTO DEPT_LOC VALUES (5, 'Bellaire');
54 INSERT INTO DEPT_LOC VALUES (5, 'Sugarland');
55 INSERT INTO DEPT_LOC VALUES (5, 'Austin');
56
57 CREATE TABLE PROJECT (
58 Pname VARCHAR(20),
59 Pnumber NUMBER(2),
60 Plocation VARCHAR(20),
61 Dnum NUMBER(1),
62 PRIMARY KEY (Pnumber),
63 FOREIGN KEY (Dnum) REFERENCES DEPARTMENT_EMP (Dnumber)
64 );
65
66 INSERT INTO PROJECT VALUES ('ProductX', 1, 'Bellaire', 5);
67 INSERT INTO PROJECT VALUES ('ProductY', 2, 'Sugarland', 5);
68 INSERT INTO PROJECT VALUES ('ProductZ', 3, 'Houston', 5);
69 INSERT INTO PROJECT VALUES ('Computerization', 10, 'Stafford');
70 INSERT INTO PROJECT VALUES ('Reorganization', 20, 'Houston');
71 INSERT INTO PROJECT VALUES ('Newbenefits', 30, 'Stafford', 4);

```

SQL> desc DEPT\_LOC;

Name	Null?	Type
DNUMBER	NOT NULL	NUMBER(1)
DLOCATION	NOT NULL	VARCHAR2(20)

SQL> select \* from DEPT\_LOC;

DNUMBER	DLOCATION
1	Houston
4	Stafford
5	Bellaire
5	Sugarland
5	Austin

SQL> desc PROJECT;

Name	Null?	Type
PNAME		VARCHAR2(20)
PNUMBER	NOT NULL	NUMBER(2)
PLOCATION		VARCHAR2(20)
DNUM		NUMBER(1)

SQL> select \* from PROJECT;

PNAME	PNUMBER	PLOCATION	DNUM
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

6 rows selected.

SQL> desc WORKS\_ON;

Name	Null?	Type
ESSN		CHAR(9)
PNO	NOT NULL	NUMBER(2)
HOURS	NOT NULL	NUMBER(3,1)

Ln 122, Col 1 (82 selected) Spaces: 4 UTF-8 LF sql

Visual Studio Code

pgm1.c ./lab2 lab4.sql lab5.sql DFSBruteForce.c pgm2.c

DB5\_LAB > lab5 > lab5.sql

```

57 CREATE TABLE PROJECT (
58 Pname VARCHAR(20),
59 Pnumber NUMBER(2),
60 Plocation VARCHAR(20),
61 Dnum NUMBER(1),
62 PRIMARY KEY (Pnumber),
63 FOREIGN KEY (Dnum) REFERENCES DEPARTMENT_EMP (Dnumber)
64 );
65
66 INSERT INTO PROJECT VALUES ('ProductX', 1, 'Bellaire', 5);
67 INSERT INTO PROJECT VALUES ('ProductY', 2, 'Sugarland', 5);
68 INSERT INTO PROJECT VALUES ('ProductZ', 3, 'Houston', 5);
69 INSERT INTO PROJECT VALUES ('Computerization', 10, 'Stafford');
70 INSERT INTO PROJECT VALUES ('Reorganization', 20, 'Houston');
71 INSERT INTO PROJECT VALUES ('Newbenefits', 30, 'Stafford', 4);
72
73 CREATE TABLE WORKS_ON (
74 Essn CHAR(9),
75 Pno NUMBER(2),
76 Hours NUMBER(3,1),
77 PRIMARY KEY (Essn, Pno),
78 FOREIGN KEY (Essn) REFERENCES EMP (Ssn),
79 FOREIGN KEY (Pno) REFERENCES PROJECT(Pnumber)
80 );
81
82 INSERT INTO WORKS_ON VALUES ('123456789', 1, 32.0);
83 INSERT INTO WORKS_ON VALUES ('123456789', 2, 8.0);
84 INSERT INTO WORKS_ON VALUES ('453453453', 1, 20.0);

```

SQL> desc PROJECT;

Name	Null?	Type
PNAME		VARCHAR2(20)
PNUMBER	NOT NULL	NUMBER(2)
PLOCATION		VARCHAR2(20)
DNUM		NUMBER(1)

SQL> select \* from PROJECT;

PNAME	PNUMBER	PLOCATION	DNUM
ProductX	1	Bellaire	5
ProductY	2	Sugarland	5
ProductZ	3	Houston	5
Computerization	10	Stafford	4
Reorganization	20	Houston	1
Newbenefits	30	Stafford	4

6 rows selected.

SQL> desc WORKS\_ON;

Name	Null?	Type
ESSN		CHAR(9)
PNO	NOT NULL	NUMBER(2)
HOURS	NOT NULL	NUMBER(3,1)

SQL> select \* from WORKS\_ON;

ESSN	PNO	HOURS
123456789	1	32
123456789	2	8
453453453	1	20
453453453	2	20
333445555	1	10
333445555	2	10
333445555	3	5

Ln 122, Col 1 (82 selected) Spaces: 4 UTF-8 LF sql

```

Visual Studio Code
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DB5_LAB > lab5 > lab5.sql

72
73 CREATE TABLE WORKS_ON (
74 Essn CHAR(9),
75 Pno NUMBER(2),
76 Hours NUMBER(3,1),
77 PRIMARY KEY (Essn, Pno),
78 FOREIGN KEY (Essn) REFERENCES EMP (Ssn),
79 FOREIGN KEY (Pno) REFERENCES PROJECT(Pnumber)
80 );
81
82 INSERT INTO WORKS_ON VALUES ('123456789', 1, 32.0);
83 INSERT INTO WORKS_ON VALUES ('123456789', 2, 8.0);
84 INSERT INTO WORKS_ON VALUES ('453453453', 1, 20.0);
85 INSERT INTO WORKS_ON VALUES ('453453453', 2, 20.0);
86 INSERT INTO WORKS_ON VALUES ('333445555', 1, 10.0);
87 INSERT INTO WORKS_ON VALUES ('333445555', 2, 10.0);
88 INSERT INTO WORKS_ON VALUES ('333445555', 3, 5.0);
89 INSERT INTO WORKS_ON VALUES ('333445555', 10, 10.0);
90 INSERT INTO WORKS_ON VALUES ('333445555', 20, 10.0);
91 INSERT INTO WORKS_ON VALUES ('333445555', 30, 5.0);
92 INSERT INTO WORKS_ON VALUES ('999887777', 30, 30.0);
93 INSERT INTO WORKS_ON VALUES ('999887777', 10, 10.0);
94 INSERT INTO WORKS_ON VALUES ('987987987', 10, 35.0);
95 INSERT INTO WORKS_ON VALUES ('987987987', 30, 5.0);
96 INSERT INTO WORKS_ON VALUES ('987654321', 30, 20.0);
97 INSERT INTO WORKS_ON VALUES ('987654321', 20, 15.0);
98 INSERT INTO WORKS_ON VALUES ('888665555', 20, 10.0);
99

SQL> desc WORKS_ON;
-----
Name Null? Type
-----
ESSN NOT NULL CHAR(9)
PNO NOT NULL NUMBER(2)
HOURS NUMBER(3,1)

SQL> select * from WORKS_ON;

ESSN PNO HOURS
-----
123456789 1 32
123456789 2 8
453453453 1 20
453453453 2 20
333445555 1 10
333445555 2 10
333445555 3 5
333445555 10 10
333445555 20 10
333445555 30 5
999887777 30 30
999887777 10 10
987987987 10 35
987987987 30 5
987654321 30 20
987654321 20 15
888665555 20 10

17 rows selected.

SQL> desc DEPENDENT;
ERROR:
ORA-04043: object DEPENDENT does not exist

SQL> desc DEPENDENT;
-----
Name Null? Type
-----
ESSN NOT NULL CHAR(9)
DEPENDENT_NAME NOT NULL VARCHAR2(20)
SEX NOT NULL CHAR(1)
BDATE DATE
RELATIONSHIP VARCHAR2(10)

SQL> select * from DEPENDENT;

ESSN DEPENDENT_NAME S BDATE RELATIONSH
-----
333445555 Alice F 05-APR-86 Daughter
333445555 Theodore M 25-OCT-83 Son
333445555 Joy F 03-MAY-58 Spouse
987654321 Abner M 04-JAN-88 Son
987654321 Jennifer F 04-JAN-88 Daughter
123456789 John M 28-FEB-88 Son
123456789 Elizabeth F 30-DEC-88 Daughter
123456789 Elizabeth F 05-MAY-67 Spouse
453453453 Joyce F 05-APR-90 Daughter

9 rows selected.

SQL>

```

```

Visual Studio Code
pgm1.c ./lab2 lab4.sql lab5.sql DFSBruteForce.c pgm2.c
DB5_LAB > lab5 > lab5.sql

100 CREATE TABLE DEPENDENT(
101 Essn CHAR(9),
102 Dependent_name VARCHAR(20),
103 Sex CHAR(1),
104 Bdate DATE,
105 Relationship VARCHAR(10),
106 PRIMARY KEY (Essn, Dependent_name),
107 FOREIGN KEY (Essn) REFERENCES EMP (Ssn)
108 );
109
110 INSERT INTO DEPENDENT VALUES ('333445555', 'Alice', 'F', DATE
111 INSERT INTO DEPENDENT VALUES ('333445555', 'Theodore', 'M', DATE
112 INSERT INTO DEPENDENT VALUES ('333445555', 'Joy', 'F', DATE
113 INSERT INTO DEPENDENT VALUES ('987654321', 'Abner', 'M', DATE
114 INSERT INTO DEPENDENT VALUES ('987654321', 'Jennifer', 'F', DATE
115 INSERT INTO DEPENDENT VALUES ('123456789', 'John', 'M', DATE
116 INSERT INTO DEPENDENT VALUES ('123456789', 'Alice', 'F', DATE
117 INSERT INTO DEPENDENT VALUES ('123456789', 'Elizabeth', 'F', DATE
118 INSERT INTO DEPENDENT VALUES ('453453453', 'Joyce', 'F', DATE
119
120
121 select bdate,address from EMP where fname='John' and minit='B
122 select fname,minit,lname,address from (employee natural join
123
124
125 select p.pnumber,d.dnumber,e.lname,e.address,e.bdate from (d
126
127 -- 3
128 select distinct salary from employee;

SQL>

```

## QUERIES :

1.

```
select bdate,address from EMP where fname='John' and init='B' and  
lname='Smith';  
select fname,init,lname,address from (employee natural join  
department_emp) where dname='Research';
```

2.

```
select p.pnumber,d.dnumber,e.lname,e.address,e.bdate  
from (department_emp d  
inner join project p on  
(d.dnumber=p.dnum) inner join  
EMP e on (d.mgr_ssn=e.ssn));
```

3.

```
select distinct salary from EMP;
```

4.

```
select e.fname,e.lname,s.fname,s.lname  
from  
(EMP e inner join EMP s on (e.super_ssn=s.ssn));
```

5.

```
select pnumber from project where  
pnumber in (select pno from  
(EMP e inner join works_on w on (e.ssn=w.ssn))  
where e.lname='Smith') or pnumber in  
(select p.pnumber from (department_emp d inner join  
project p on (d.dnumber=p.dnum) inner join  
EMP e on (d.mgr_ssn=e.ssn))  
where e.lname='Smith');
```

6.

```
select * from EMP where address='Houston, Texas';
```

7.

```
select e.fname,e.salary*1.10 from  
(EMP e inner join works_on w on  
(e.ssn=w.ssn) inner join project p on  
(p.pnumber=w.pno)) where p.pname='ProductX';
```

8.

```
select fname, lname from EMP
where dno=5 and salary between 30000 and 40000;
```

9.

```
select e.fname, e.lname, p.pname, e.dno from
(EMP e inner join works_on w on (e.ssn=w.essn)
inner join project p on (p.pnumber=w.pno))
order by e.dno, e.fname, e.lname;
```

10.

```
select fname, lname from EMP where
super_ssn is null;
```

11.

```
select e.fname, e.lname from
(EMP e inner join dependent d on (e.ssn=d.essn))
where e.fname=d.dependent_name and e.sex=d.sex;
```

12.

```
select fname, lname from EMP where
ssn not in
(select essn from dependent);
```

13

```
select fname, lname from EMP where
ssn in
(select mgr_ssn from department_emp)
and ssn in
(select essn from dependent);
```

14

```
select ssn from
(EMP e inner join works_on w on (e.ssn=w.essn))
where pno<=3;
```

15.

```
select min(salary), max(salary), avg(salary), sum(salary) from EMP;
```

16.

```
select min(salary),max(salary),avg(salary),  
sum(salary) from  
(EMP natural join department_emp) where dname='Research';
```

17.

```
select pnumber,pname,count(w.essn) from  
(project p inner join works_on w on (w.pno=p.pnumber))  
group by p.pnumber,p.pname;
```

18.

```
with pr_cnt(pnum,pname,cnt) as  
(select pnumber,pname,count(w.essn) from  
(project p inner join works_on w on (w.pno=p.pnumber))  
group by p.pnumber,p.pname)  
select * from pr_cnt where cnt>2;
```

19.

```
with req_dno(dno) as(select dno from EMP group by  
dno having count(ssn)>=5) ,  
req_tab as (select * from  
(EMP e natural join req_dno rd) where salary>40000)  
select dno,count(ssn) from req_tab group by dno;
```