

A. Consider the schema for Company Database:

EMPLOYEE (SSN, Name, Address, Sex, Salary, SuperSSN, DNo)

DEPARTMENT (DNo, DName, MgrSSN, MgrStartDate)

DLOCATION (DNo, DLoc)

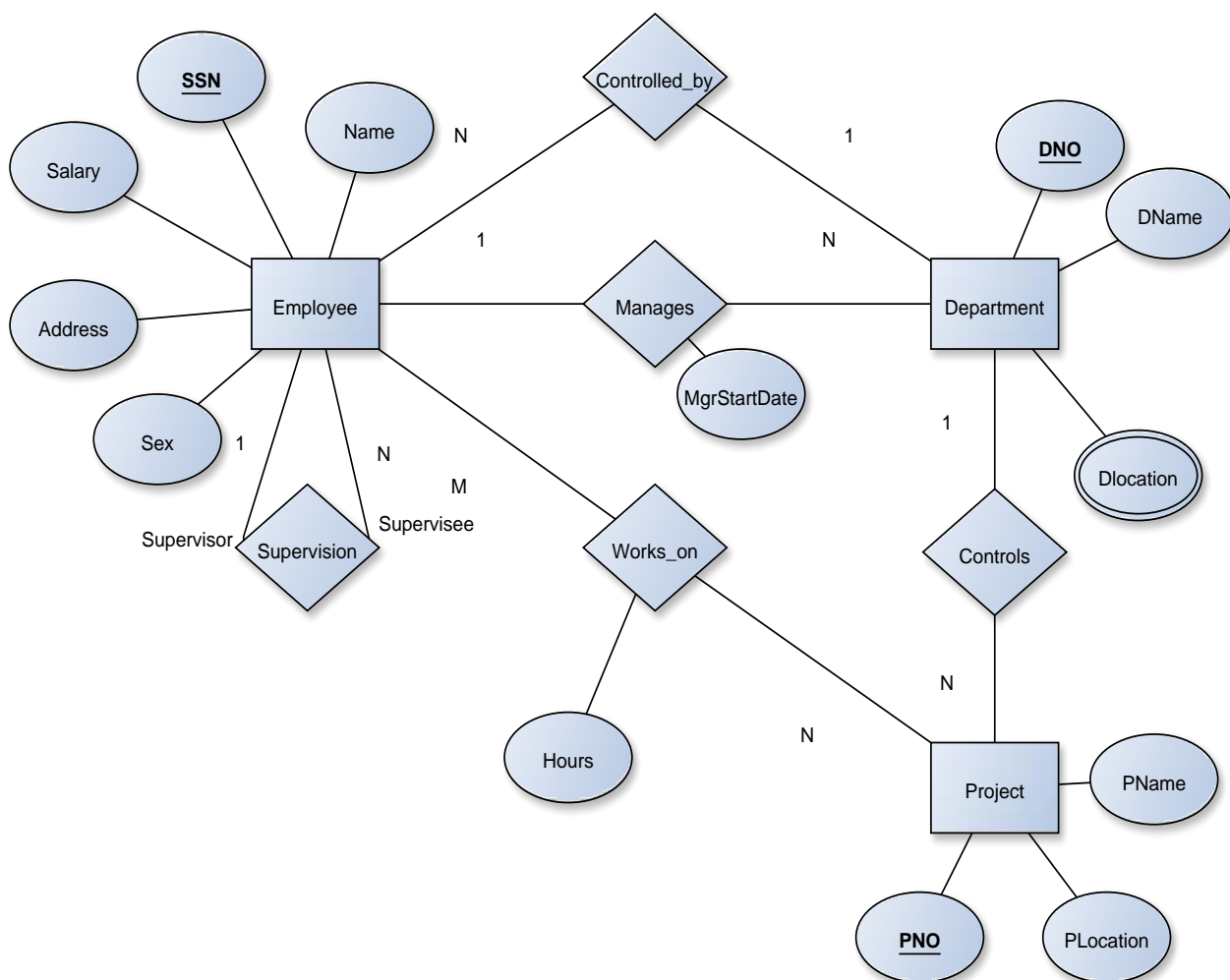
PROJECT (PNo, PName, PLocation, DNo)

WORKS_ON (SSN, PNo, Hours)

Write SQL queries to

1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.
2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.
3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department
4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator). For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs. 6,00,000.

Entity-Relationship Diagram



Schema Diagram

Employee



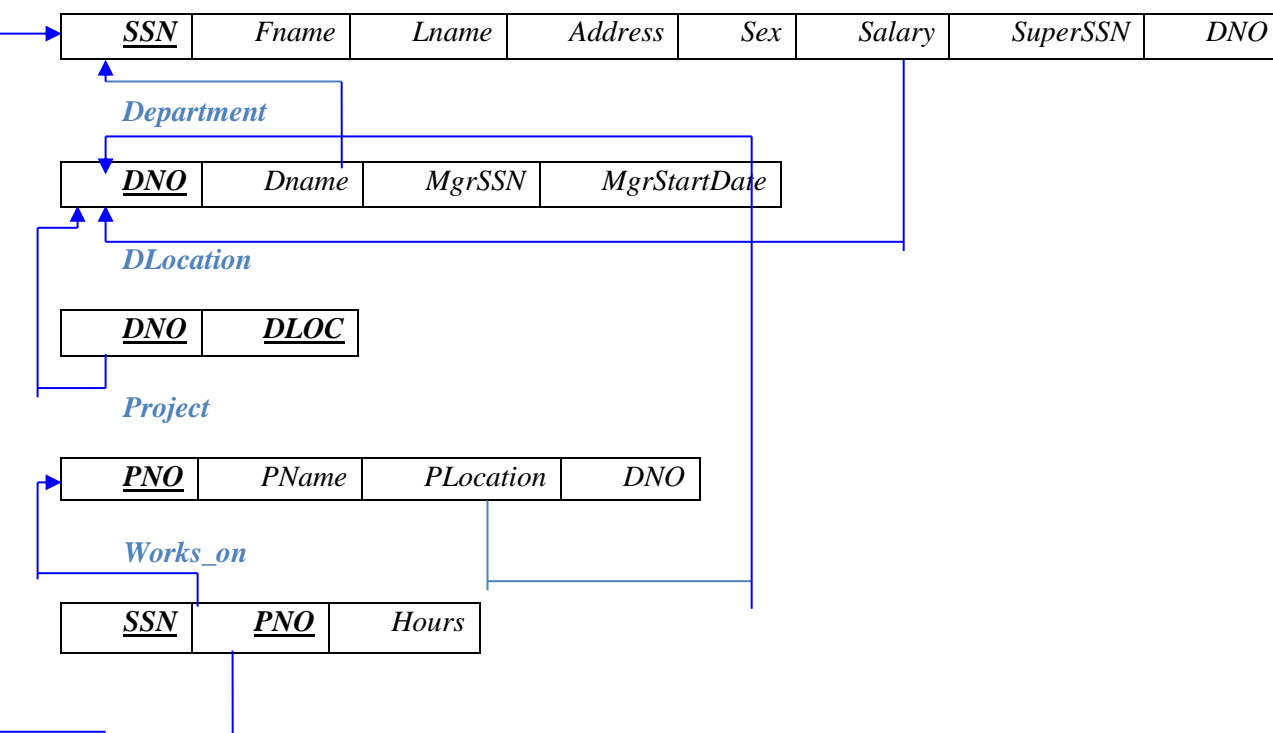


Table Creation

```
CREATE TABLE DEPARTMENT
(DNO VARCHAR (20) PRIMARY KEY,
DNAME VARCHAR (20),
MGRSTARTDATE DATE);
```

```
CREATE TABLE EMPLOYEE
(SSN VARCHAR (20) PRIMARY KEY,
FNAME VARCHAR (20),
LNAME VARCHAR (20),
ADDRESS VARCHAR (20),
SEX CHAR (1),
SALARY INTEGER,
DNO REFERENCES DEPARTMENT (DNO));
```

NOTE: Once DEPARTMENT and EMPLOYEE tables are created we must alter department table to add foreign constraint MGRSSN using sql command

```
ALTER TABLE EMPLOYEE ADD SUPERSSN REFERENCES EMPLOYEE (SSN);
```

```
ALTER TABLE DEPARTMENT
ADD MGRSSN REFERENCES EMPLOYEE (SSN);
```

```
CREATE TABLE DLOCATION
(DLOC VARCHAR (20),
DNO REFERENCES DEPARTMENT (DNO),
PRIMARY KEY (DNO, DLOC));
```

```
CREATE TABLE PROJECT
(PNO INTEGER PRIMARY KEY,
PNAME VARCHAR (20),
PLOCATION VARCHAR (20),
DNO REFERENCES DEPARTMENT (DNO));
```

```
CREATE TABLE WORKS_ON
(HOURS INTEGER (2),
SSN REFERENCES EMPLOYEE (SSN),
PNO REFERENCES PROJECT(PNO),
PRIMARY KEY (SSN, PNO));
```

Table Descriptions

SQL> DESC EMPLOYEE;

Name

SSN
FNAME
LNAME
ADDRESS
SEX
SALARY
SUPERSSN
DNO

SQL> DESC DEPARTMENT;

Name

DNO
DNAME
MGRSTARTDATE
MGRSSN

SQL> DESC DLOCATION;

Name

DLOC
DNO

SQL> DESC PROJECT;

Name

PNO
PNAME
PLOCATION
DNO

SQL> DESC WORKS_ON;

Name

HOURS
SSN
PNO

Insertion of values to tables

```
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSECE01','JOHN','SCOTT','BANGALORE','M', 450000);
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSCSE01','JAMES','SMITH','BANGALORE','M', 500000);
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSCSE02','HEARN','BAKER','BANGALORE','M', 700000);
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSCSE03','EDWARD','SCOTT','MYSORE','M', 500000);
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSCSE04','PAVAN','HEGDE','MANGALORE','M', 650000);
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSCSE05','GIRISH','MALYA','MYSORE','M', 450000);
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSCSE06','NEHA','SN','BANGALORE','F', 800000);
```

```
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSACC01','AHANA','K','MANGALORE','F', 350000);
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSACC02','SANTHOSH','KUMAR','MANGALORE','M', 300000);
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSISE01','VEENA','M','MYSORE','M', 600000);
INSERT INTO EMPLOYEE (SSN, FNAME, LNAME, ADDRESS, SEX, SALARY) VALUES
('RNSIT01','NAGESH','HR','BANGALORE','M', 500000);
```

```
INSERT INTO DEPARTMENT VALUES ('1','ACCOUNTS','01-JAN-01','RNSACC02');
INSERT INTO DEPARTMENT VALUES ('2','IT','01-AUG-16','RNSIT01');
INSERT INTO DEPARTMENT VALUES ('3','ECE','01-JUN-08','RNSECE01');
INSERT INTO DEPARTMENT VALUES ('4','ISE','01-AUG-15','RNSISE01');
INSERT INTO DEPARTMENT VALUES ('5','CSE','01-JUN-02','RNSCSE05');
```

Note: update entries of employee table to fill missing fields SUPERSSN and DNO

```
UPDATE EMPLOYEE SET
SUPERSSN=NULL, DNO='3'
WHERE SSN='RNSECE01';
```

```
UPDATE EMPLOYEE SET
SUPERSSN='RNSCSE02', DNO='5'
WHERE SSN='RNSCSE01';
```

```
UPDATE EMPLOYEE SET
SUPERSSN='RNSCSE03', DNO='5'
WHERE SSN='RNSCSE02';
```

```
UPDATE EMPLOYEE SET
SUPERSSN='RNSCSE04', DNO='5'
WHERE SSN='RNSCSE03';
```

```
UPDATE EMPLOYEE SET
DNO='5', SUPERSSN='RNSCSE05'
WHERE SSN='RNSCSE04';
```

```
UPDATE EMPLOYEE SET
DNO='5', SUPERSSN='RNSCSE06'
WHERE SSN='RNSCSE05';
```

```
UPDATE EMPLOYEE SET
DNO='5', SUPERSSN=NULL
WHERE SSN='RNSCSE06';
```

```
UPDATE EMPLOYEE SET
DNO='1', SUPERSSN='RNSACC02'
WHERE SSN='RNSACC01';
```

```
UPDATE EMPLOYEE SET
DNO='1', SUPERSSN=NULL
WHERE SSN='RNSACC02';
```

```
UPDATE EMPLOYEE SET
DNO='4', SUPERSSN=NULL
WHERE SSN='RNSISE01';
```

```
UPDATE EMPLOYEE SET
DNO='2', SUPERSSN=NULL
```

WHERE SSN='RNSIT01';

INSERT INTO DLOCATION VALUES ('BANGALORE', '1');
 INSERT INTO DLOCATION VALUES ('BANGALORE', '2');
 INSERT INTO DLOCATION VALUES ('BANGALORE', '3');
 INSERT INTO DLOCATION VALUES ('MANGALORE', '4');
 INSERT INTO DLOCATION VALUES ('MANGALORE', '5');

INSERT INTO PROJECT VALUES (100,'IOT','BANGALORE','5');
 INSERT INTO PROJECT VALUES (101,'CLOUD','BANGALORE','5');
 INSERT INTO PROJECT VALUES (102,'BIGDATA','BANGALORE','5');
 INSERT INTO PROJECT VALUES (103,'SENSORS','BANGALORE','3');
 INSERT INTO PROJECT VALUES (104,'BANK MANAGEMENT','BANGALORE','1');
 INSERT INTO PROJECT VALUES (105,'SALARY MANAGEMENT','BANGALORE','1');
 INSERT INTO PROJECT VALUES (106,'OPENSTACK','BANGALORE','4');
 INSERT INTO PROJECT VALUES (107,'SMART CITY','BANGALORE','2');

INSERT INTO WORKS_ON VALUES (4, 'RNSCSE01', 100);
 INSERT INTO WORKS_ON VALUES (6, 'RNSCSE01', 101);
 INSERT INTO WORKS_ON VALUES (8, 'RNSCSE01', 102);
 INSERT INTO WORKS_ON VALUES (10, 'RNSCSE02', 100);
 INSERT INTO WORKS_ON VALUES (3, 'RNSCSE04', 100);
 INSERT INTO WORKS_ON VALUES (4, 'RNSCSE05', 101);
 INSERT INTO WORKS_ON VALUES (5, 'RNSCSE06', 102);
 INSERT INTO WORKS_ON VALUES (6, 'RNSCSE03', 102);
 INSERT INTO WORKS_ON VALUES (7, 'RNSECE01', 103);
 INSERT INTO WORKS_ON VALUES (5, 'RNSACC01', 104);
 INSERT INTO WORKS_ON VALUES (6, 'RNSACC02', 105);
 INSERT INTO WORKS_ON VALUES (4, 'RNSISE01', 106);
 INSERT INTO WORKS_ON VALUES (10, 'RNSIT01', 107);

SELECT * FROM EMPLOYEE;

SSN	FNAME	LNAME	ADDRESS	S	SALARY	SUPERSSN	DNO
RNSECE01	JOHN	SCOTT	BANGALORE	M	450000		3
RNSCSE01	JAMES	SMITH	BANGALORE	M	500000	RNSCSE02	5
RNSCSE02	HEARN	BAKER	BANGALORE	M	700000	RNSCSE03	5
RNSCSE03	EDWARD	SCOTT	MYSORE	M	500000	RNSCSE04	5
RNSCSE04	PAVAN	HEGDE	MANGALORE	M	650000	RNSCSE05	5
RNSCSE05	GIRISH	MALYA	MYSORE	M	450000	RNSCSE06	5
RNSCSE06	NEHA	SN	BANGALORE	F	800000		5
RNSACC01	AHANA	K	MANGALORE	F	350000	RNSACC02	1
RNSACC02	SANTHOSH	KUMAR	MANGALORE	M	300000		1
RNSISE01	VEENA	M	MYSORE	M	600000		4
RNSIT01	NAGESH	HR	BANGALORE	M	500000		2

SQL> SELECT * FROM DEPARTMENT;

DNO	DNAME	MGRSTARTD	MGRSSN
1	ACCOUNTS	01-JAN-01	RNSACC02
2	IT	01-AUG-16	RNSIT01
3	ECE	01-JUN-08	RNSECE01
4	ISE	01-AUG-15	RNSISE01
5	CSE	01-JUN-02	RNSCSE05

SELECT * FROM DLOCATION;

DLOC	DNO
BANGALORE	1
BANGALORE	2
BANGALORE	3
MANGALORE	4
MANGALORE	5

SELECT * FROM PROJECT;

PNO	PNAME	PLOCATION	DNO
100	IOT	BANGALORE	5
101	CLOUD	BANGALORE	5
102	BIGDATA	BANGALORE	5
103	SENSORS	BANGALORE	3
104	BANK MANAGEMENT	BANGALORE	1
105	SALARY MANAGEMENT	BANGALORE	1
106	OPENSTACK	BANGALORE	4
107	SMART CITY	BANGALORE	2

SELECT * FROM WORKS_ON;

HOURS	SSN	PNO
4	RNSCSE01	100
6	RNSCSE01	101
8	RNSCSE01	102
10	RNSCSE02	100
3	RNSCSE04	100
4	RNSCSE05	101
5	RNSCSE06	102
6	RNSCSE03	102
7	RNSECE01	103
5	RNSACC01	104
6	RNSACC02	105
4	RNSISE01	106
10	RNSIT01	107

Queries:

1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project.

```
(SELECT DISTINCT P.PNO
FROM PROJECT P, DEPARTMENT D, EMPLOYEE E
WHERE E.DNO=D.DNO
AND D.MGRSSN=E.SSN
AND E.LNAME='SCOTT')
UNION
(SELECT DISTINCT P1.PNO
FROM PROJECT P1, WORKS_ON W, EMPLOYEE E1
WHERE P1.PNO=W.PNO
AND E1.SSN=W.SSN
AND E1.LNAME='SCOTT');
```

PNO
100
101
102
103
104
105
106
107

2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise.

```

SELECT E.FNAME, E.LNAME, 1.1*E.SALARY AS INCR_SAL
FROM EMPLOYEE E, WORKS_ON W, PROJECT P
WHERE E.SSN=W.SSN
AND W.PNO=P.PNO
AND P.PNAME='IOT';

```

FNAME	LNAME	INCR_SAL
JAMES	SMITH	550000
HEARN	BAKER	770000
PAVAN	HEGDE	715000

3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department

```

SELECT SUM (E.SALARY), MAX (E.SALARY), MIN (E.SALARY), AVG (E.SALARY)
FROM EMPLOYEE E, DEPARTMENT D
WHERE E.DNO=D.DNO
AND D.DNAME='ACCOUNTS';

```

SUM(E.SALARY)	MAX(E.SALARY)	MIN(E.SALARY)	AVG(E.SALARY)
650000	350000	300000	325000

4. Retrieve the name of each employee who works on all the projects Controlled by department number 5 (use NOT EXISTS operator).

```

SELECT E.FNAME, E.LNAME
FROM EMPLOYEE E
WHERE NOT EXISTS((SELECT PNO
FROM PROJECT
WHERE DNO='5')
MINUS (SELECT PNO
FROM WORKS_ON
WHERE E.SSN=SSN));

```

FNAME	LNAME
JAMES	SMITH

5. For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs. 6, 00,000.

```

SELECT D.DNO, COUNT (*)
FROM DEPARTMENT D, EMPLOYEE E
WHERE D.DNO=E.DNO
AND E.SALARY>600000
AND D.DNO IN (SELECT E1.DNO
FROM EMPLOYEE E1
GROUP BY E1.DNO
HAVING COUNT (*)>5)
GROUP BY D.DNO;

```

DNO	COUNT (*)
5	3