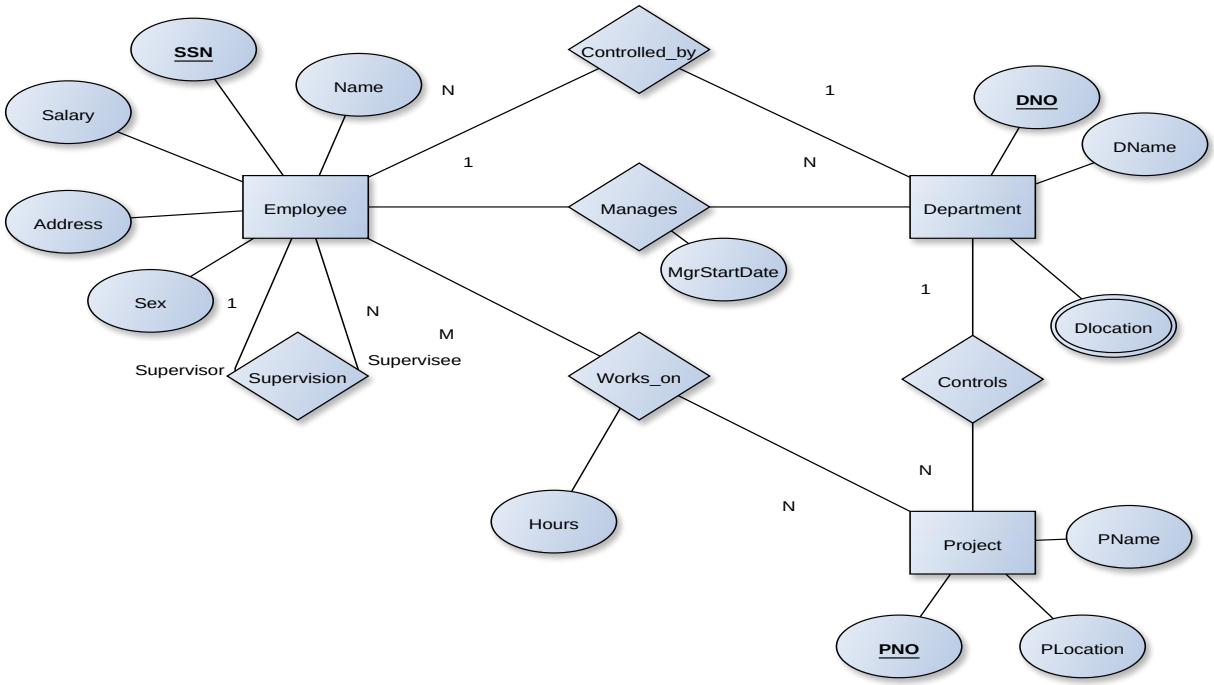
E. Consider the schema for Company Database:

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).**
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.**

Entity-Relationship Diagram



Schema Diagram

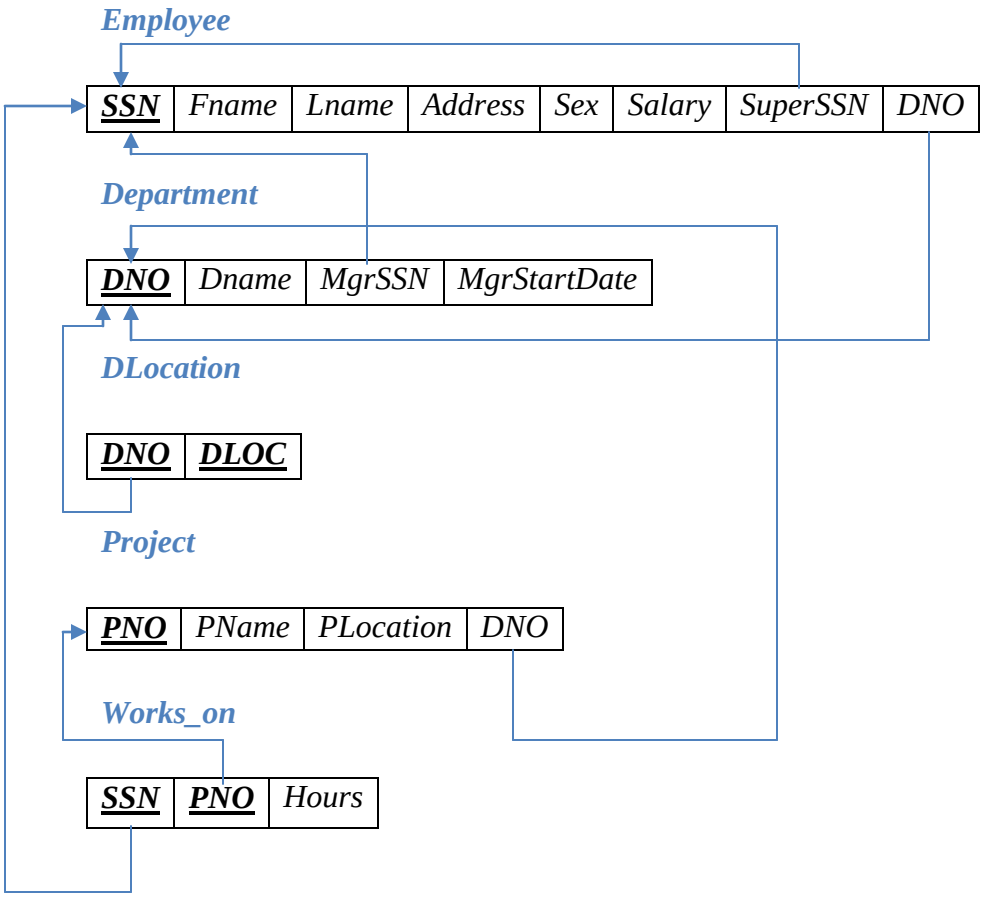


Table Creation

```
CREATE TABLE DEPARTMENT
(DNO INTEGER 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,
SUPERSSN VARCHAR(20),
DNO INTEGER,
```

FOREIGN KEY(SUPERSSN) REFERENCES EMPLOYEE (SSN) ON DELETE CASCADE
FOREIGN KEY(DNO) REFERENCES DEPARTMENT (DNO) ON DELETE CASCADE);
NOTE: Once DEPARTMENT and EMPLOYEE tables are created we must alter department table to add foreign constraint MGRSSN using sql command

ALTER TABLE DEPARTMENT
ADD MGRSSN VARCHAR(20) REFERENCES EMPLOYEE (SSN);

CREATE TABLE DLOCATION
(DLOC VARCHAR(20),
DNO INTEGER,
FOREIGN KEY(DNO) REFERENCES DEPARTMENT (DNO) ON DELETE CASCADE,
PRIMARY KEY (DNO, DLOC));

CREATE TABLE PROJECT
(PNO INTEGER PRIMARY KEY,
PNAME VARCHAR(20),
PLOCATION VARCHAR(20),
DNO INTEGER,
FOREIGN KEY(DNO) REFERENCES DEPARTMENT (DNO) ON DELETE CASCADE);

CREATE TABLE WORKS_ON
(HOURS INTEGER,
SSN VARCHAR(20),
PNO INTEGER,
FOREIGN KEY(PNO) REFERENCES PROJECT (PNO) ON DELETE CASCADE,
FOREIGN KEY(SSN) REFERENCES EMPLOYEE(SSN) ON DELETE CASCADE
PRIMARY KEY (SSN, PNO));

Table Descriptions

DESC EMPLOYEE;

```
SQL> DESC EMPLOYEE;
 Name
 -----------------------------------------------------------------
 SSN
 FNAME
 LNAME
 ADDRESS
 SEX
 SALARY
 SUPERSSN
 DNO
```

DESC DEPARTMENT;

```
SQL> DESC DEPARTMENT;
 Name
 -----------------------------------------------------
 DNO
 DNAME
 MGRSTARTDATE
 MGRSSN
```

DESC DLOCATION;

```
SQL> DESC DLOCATION;
 Name
 --------------------------
 DLOC
 DNO
```

DESC PROJECT;

```
SQL> DESC PROJECT;
 Name
 -------------------------
 PNO
 PNAME
 PLOCATION
 DNO
```

DESC WORKS_ON;

```
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','2001-01-01','RNSACC02');
INSERT INTO DEPARTMENT VALUES (2,'IT','2016-08-01','RNSIT01');
INSERT INTO DEPARTMENT VALUES (3,'ECE','2008-06-01','RNSECE01');
INSERT INTO DEPARTMENT VALUES (4,'ISE','2015-08-01','RNSISE01');
INSERT INTO DEPARTMENT VALUES (5,'CSE','2002-06-01','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
 SUPERSSN='RNSCSE05',DNO=5
WHERE SSN='RNSCSE04';


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

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

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

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

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

UPDATE EMPLOYEE SET
SUPERSSN=NULL, DNO=2
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

SELECT * FROM DEPARTMENT;

```
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 *  FROM WORKS_ON B
                   WHERE  B.PNO IN (SELECT PNO FROM PROJECT
                  WHERE DNO = 5)
                   AND
                   NOT EXISTS (SELECT *  FROM WORKS_ON C
                    WHERE C.SSN=E.SSN AND C.PNO = B.PNO));
```

```
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
```