

CREATE TABLE EMPLOYEE

```
( Fname          VARCHAR(10)      NOT NULL,
  Minit          CHAR,
  Lname          VARCHAR(20)      NOT NULL,
  Ssn            CHAR(9)          NOT NULL,
  Bdate          DATE,
  Address        VARCHAR(30),
  Sex            CHAR(1),
  Salary         DECIMAL(5),
  Super_ssn      CHAR(9),
  Dno            INT              NOT NULL,
  PRIMARY KEY (Ssn) );
```

CREATE TABLE DEPARTMENT

```
( Dname          VARCHAR(15)      NOT NULL,
  Dnumber        INT              NOT NULL,
  Mgr_ssn        CHAR(9)          NOT NULL,
  Mgr_start_date DATE,
  PRIMARY KEY (Dnumber),
  UNIQUE        (Dname),
  FOREIGN KEY (Mgr_ssn) REFERENCES EMPLOYEE(Ssn) );
```

CREATE TABLE DEPT_LOCATIONS

```
( Dnumber        INT              NOT NULL,
  Dlocation       VARCHAR(15)     NOT NULL,
  PRIMARY KEY (Dnumber, Dlocation),
  FOREIGN KEY (Dnumber) REFERENCES DEPARTMENT(Dnumber) );
```

Create table PROJECT

```
( pname          varchar(25) not null unique,
  pnumber        int not null primary key,
  plocation       varchar(15),
  dnum           int not null,
  foreign key(dnum) references DEPARTMENT(Dnumber));
```

CREATE TABLE WORKS_ON

```
( Essn           CHAR(9)          NOT NULL,
  Pno            INT              NOT NULL,
  Hours          DECIMAL(3,1)     NOT NULL,
  PRIMARY KEY (Essn, Pno),
  FOREIGN KEY (Essn) REFERENCES EMPLOYEE(Ssn),
  FOREIGN KEY (Pno) REFERENCES PROJECT(Pnumber) );
```

CREATE TABLE DEPENDENT

```
( Essn           CHAR(9)          NOT NULL,
  Dependent_name VARCHAR(15)      NOT NULL,
  Sex            CHAR,
```

```

Bdate          DATE,
Relationship    VARCHAR(8),
PRIMARY KEY (Essn, Dependent_name),
FOREIGN KEY (Essn) REFERENCES EMPLOYEE(Ssn) );

```

```

INSERT INTO EMPLOYEE
VALUES ('Franklin','T','Wong',333445555,'1965-12-08','638 Voss,
Houston TX','M',40000,888665555,5),
      ('Alicia','J','Zelaya',999887777,'1968-01-19','3321
Castle, Spring TX','F',25000,987654321,4),
      ('Jennifer','S','Wallace',987654321,'1941-06-20','291
Berry, Bellaire TX','F',43000,888665555,4),
      ('Ramesh','K','Narayan',666884444,'1962-09-15','975 Fire
Oak, Humble TX','M',38000,333445555,5),
      ('Joyce','A','English',453453453,'1972-07-31','5631 Rice,
Houston TX','F',25000,333445555,5),
      ('Ahmad','V','Jabbar',987987987,'1969-03-29','980 Dallas,
Houston TX','M',25000,987654321,4),
      ('James','E','Borg',888665555,'1937-11-10','450 Stone,
Houston TX','M',55000,,1);

```

```

INSERT INTO DEPARTMENT
VALUES ('Research',5,333445555,'1988-05-22'),
      ('Administration',4,987654321,'1995-01-01'),
      ('Headquarters',1,888665555,'1981-06-19');

```

```

INSERT INTO PROJECT
VALUES ('ProductX',1,'Bellaire',5),
      ('ProductY',2,'Sugarland',5),
      ('ProductZ',3,'Houston',5),
      ('Computerization',10,'Stafford',4),
      ('Reorganization',20,'Houston',1),
      ('Newbenefits',30,'Stafford',4);

```

```

INSERT INTO WORKS_ON
VALUES (123456789,1,32.5),
      (123456789,2,7.5),
      (666884444,3,40.0),
      (453453453,1,20.0),
      (453453453,2,20.0),
      (333445555,2,10.0),
      (333445555,3,10.0),
      (333445555,10,10.0),
      (333445555,20,10.0),
      (999887777,30,30.0);

```

```

INSERT INTO DEPENDENT
VALUES (333445555,'Alice','F','1986-04-04','Daughter'),
      (333445555,'Theodore','M','1983-10-25','Son'),

```

```
(333445555, 'Joy', 'F', '1958-05-03', 'Spouse'),
(987654321, 'Abner', 'M', '1942-02-28', 'Spouse'),
(123456789, 'Michael', 'M', '1988-01-04', 'Son'),
(123456789, 'Alice', 'F', '1988-12-30', 'Daughter'),
(123456789, 'Elizabeth', 'F', '1967-05-05', 'Spouse');
```

```
INSERT INTO DEPT_LOCATIONS
VALUES (1, 'Houston'),
       (4, 'Stafford'),
       (5, 'Bellaire'),
       (5, 'Sugarland'),
       (5, 'Houston');
```

```
select * from EMPLOYEE;
```

```
+-----+-----+-----+-----+-----+-----+
| Fname   | Minit | Lname   | Ssn      | Bdate    | Address |
| Sex    | Salary | Super_ssn | Dno |
+-----+-----+-----+-----+-----+-----+
| John    | B      | Smith   | 123456789 | 1965-01-09 | 731 Houston, TX |
| M      | 30000 |          | 5 |
| Franklin | T      | Wong    | 333445555 | 1965-12-08 | 638 Voss, |
Houston TX | M      | 40000 | 888665555 | 5 |
| Joyce   | A      | English | 453453453 | 1972-07-31 | 5631 Rice, |
Houston TX | F      | 25000 | 333445555 | 5 |
| Ramesh  | K      | Narayan | 666884444 | 1962-09-15 | 975 Fire Oak, |
Humble TX | M      | 38000 | 333445555 | 5 |
| James   | E      | Borg    | 888665555 | 1937-11-10 | 450 Stone, |
Houston TX | M      | 55000 | NULL      | 1 |
| Jennifer | S      | Wallace | 987654321 | 1941-06-20 | 291 Berry, |
Bellaire TX | F      | 43000 | 888665555 | 4 |
| Ahmad   | V      | Jabbar  | 987987987 | 1969-03-29 | 980 Dallas, |
Houston TX | M      | 25000 | 987654321 | 4 |
| Alicia  | J      | Zelaya  | 999887777 | 1968-01-19 | 3321 Castle, |
Spring TX | F      | 25000 | 987654321 | 4 |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)
```

```
select * from DEPARTMENT;
```

```
+-----+-----+-----+-----+
| Dname          | Dnumber | Mgr_ssn | Mgr_start_date |
+-----+-----+-----+-----+
| Headquarters   | 1       | 888665555 | 1981-06-19 |
| Administration | 4       | 987654321 | 1995-01-01 |
| Research       | 5       | 333445555 | 1988-05-22 |
+-----+-----+-----+-----+
3 rows in set (0.00 sec)
```

```
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 in set (0.00 sec)

```
select * from DEPENDENT;
```

Essn	Dependent_name	Sex	Bdate	Relationship
123456789	Alice	F	1988-12-30	Daughter
123456789	Elizabeth	F	1967-05-05	Spouse
123456789	John	M	1973-04-04	Brother
123456789	Michael	M	1988-01-04	Son
333445555	Alice	F	1986-04-04	Daughter
333445555	Joy	F	1958-05-03	Spouse
333445555	Theodore	M	1983-10-25	Son
987654321	Abner	M	1942-02-28	Spouse

8 rows in set (0.00 sec)

```
select * from WORKS_ON;
```

Essn	Pno	Hours
123456789	1	32.5
123456789	2	7.5
333445555	2	10.0
333445555	3	10.0
333445555	10	10.0
333445555	20	10.0
453453453	1	20.0
453453453	2	20.0
666884444	3	40.0
999887777	30	30.0

10 rows in set (0.00 sec)

```
select * from DEPT_LOCATIONS;
```

```
+-----+-----+
| Dnumber | Dlocation |
+-----+-----+
|         1 | Houston   |
|         4 | Stafford  |
|         5 | Bellaire  |
|         5 | Houston   |
|         5 | Sugarland |
+-----+-----+
5 rows in set (0.00 sec)
```

3a. Retrieve the name and address of all employees who work for the 'Research' department.

```
select Fname, Minit, Lname, Address
  from EMPLOYEE e, DEPARTMENT d where
  e.Dno=d.Dnumber
  and
  d.Dname="Research";
```

```
+-----+-----+-----+-----+
| Fname   | Minit | Lname   | Address                |
+-----+-----+-----+-----+
| John    | B     | Smith   | 731 Houston,TX         |
| Franklin| T     | Wong    | 638 Voss, Houston TX   |
| Joyce   | A     | English | 5631 Rice, Houston TX  |
| Ramesh  | K     | Narayan | 975 Fire Oak, Humble TX|
+-----+-----+-----+-----+
```

3b. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.

```
select e.Lname, e.Bdate, e.Address, p.pnumber, p.dnum
  from EMPLOYEE e, PROJECT p, DEPARTMENT d
  where p.plocation="Stafford" and p.dnum=d.Dnumber
  and d.Mgr_ssn=e.Ssn;
```

```
+-----+-----+-----+-----+-----+
| Lname   | Bdate       | Address                | pnumber | dnum |
+-----+-----+-----+-----+-----+
| Wallace | 1941-06-20 | 291 Berry, Bellaire TX |      10 |     4 |
| Wallace | 1941-06-20 | 291 Berry, Bellaire TX |      30 |     4 |
+-----+-----+-----+-----+-----+
```

3c. For each employee, retrieve the employee's first and last name and the first and last name

of his or her immediate supervisor.

```
select e1.Fname, e1.Lname, e2.Fname as manager_Fname, e2.Lname as
manager_Lname
from EMPLOYEE as e1, EMPLOYEE as e2
where e2.Ssn=e1.Super_ssn;
```

```
+-----+-----+-----+-----+
| Fname   | Lname   | manager_Fname | manager_Lname |
+-----+-----+-----+-----+
| Franklin | Wong    | James         | Borg           |
| Joyce    | English | Franklin      | Wong           |
| Ramesh   | Narayan | Franklin      | Wong           |
| Jennifer | Wallace | James         | Borg           |
| Ahmad    | Jabbar  | Jennifer      | Wallace        |
| Alicia   | Zelaya  | Jennifer      | Wallace        |
+-----+-----+-----+-----+
6 rows in set (0.00 sec)
```

3d. Make a list of all project numbers for projects that involve an employee whose last name is

‘Smith’, either as a worker or as a manager of the department that controls the project.

```
(select distinct pnumber
From PROJECT,DEPARTMENT,EMPLOYEE
where Dnum=Dnumber AND Mgr_ssn=Ssn AND Lname="Smith")
UNION
(Select distinct pnumber
From PROJECT,WORKS_ON,EMPLOYEE
where pnumber=Pno AND Essn=Ssn AND Lname="Smith");
```

```
+-----+
| pnumber |
+-----+
|         1 |
|         2 |
+-----+
2 rows in set (0.00 sec)
```

3e. Retrieve all employees whose address is in Houston, Texas.

```
select Fname, Minit, Lname
from EMPLOYEE
where Address like "%Houston%TX%";
```

```
+-----+-----+-----+-----+
```

Fname	Minit	Lname
John	B	Smith
Franklin	T	Wong
Joyce	A	English
James	E	Borg
Ahmad	V	Jabbar

5 rows in set (0.00 sec)

3f. Retrieve all employees in department 5 whose salary is between \$30,000 and \$40,000.

```
select *
from EMPLOYEE e, DEPARTMENT d
where e.Dno=d.Dnumber and d.Dnumber=5
and e.Salary between 30000 and 40000;
```

Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno	Dname	Dnumber	Mgr_ssn	Mgr_start_date
John	B	Smith	123456789	1965-01-09	731 Houston, TX	M	30000		5	Research	5		1988-05-22
Franklin	T	Wong	333445555	1965-12-08	638 Voss, Houston TX	M	40000	888665555	5	Research	5		1988-05-22
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble TX	M	38000	333445555	5	Research	5		1988-05-22

3 rows in set (0.00 sec)

4a. Retrieve the names of all employees who do not have supervisors.

```
select Fname, Minit, Lname
from EMPLOYEE e
```

```

where
not exists(select * from EMPLOYEE as s where e.Super_ssn=s.Ssn);

```

```

+-----+-----+-----+
| Fname | Minit | Lname |
+-----+-----+-----+
| John  | B     | Smith |
| James | E     | Borg  |
+-----+-----+-----+
2 rows in set (0.00 sec)

```

4b. Retrieve the name of each employee who has a dependent with the same first name and is the same gender as the employee

```

select Fname, Minit, Lname
from EMPLOYEE e, DEPENDENT d where
e.Fname=d.Dependent_name
and
e.Sex=d.Sex;

```

```

+-----+-----+-----+
| Fname | Minit | Lname |
+-----+-----+-----+
| John  | B     | Smith |
+-----+-----+-----+
1 row in set (0.00 sec)

```

4c. Retrieve the names of employees who have no dependents.

```

select Fname, Minit, Lname
from EMPLOYEE where
not exists(select * from DEPENDENT where Ssn=Essn);

```

```

+-----+-----+-----+
| Fname | Minit | Lname |
+-----+-----+-----+
| Joyce  | A     | English |
| Ramesh | K     | Narayan |
| James  | E     | Borg    |
| Ahmad  | V     | Jabbar  |
| Alicia | J     | Zelaya  |
+-----+-----+-----+
5 rows in set (0.00 sec)

```


4d. List the names of managers who have at least one dependent.

```
select Fname, Minit, Lname
from EMPLOYEE where
exists(select * from DEPARTMENT where Ssn=Mgr_ssn and Dno=Dnumber)
and
exists(select * from DEPENDENT where Ssn=Essn);
```

```
+-----+-----+-----+
| Fname   | Minit | Lname   |
+-----+-----+-----+
| Franklin | T     | Wong    |
| Jennifer | S     | Wallace |
+-----+-----+-----+
2 rows in set (0.00 sec)
```

4e. Retrieve the Social Security numbers of all employees who work on project numbers 1, 2, or 3.

```
select distinct Essn from WORKS_ON where Pno in (1,2,3);
```

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

4f. Find the sum of the salaries of all employees of the 'Research' department, as well as the maximum salary, the minimum salary, and the average salary in this department.

```
select sum(Salary), max(Salary), min(Salary), avg(salary)
from EMPLOYEE, DEPARTMENT
where Dno=Dnumber and Dname="Research";
```

```
+-----+-----+-----+-----+
| sum(Salary) | max(Salary) | min(Salary) | avg(salary) |
+-----+-----+-----+-----+
|      133000 |       40000 |       25000 | 33250.0000 |
+-----+-----+-----+-----+
```

1 row in set (0.00 sec)

4g. For each department, retrieve the department number, the number of employees in the department, and their average salary.

```
select Dno, count(*), avg(Salary)
from EMPLOYEE
group by Dno;
```

```
+-----+-----+-----+
| Dno | count(*) | avg(Salary) |
+-----+-----+-----+
| 1 | 1 | 55000.0000 |
| 4 | 3 | 31000.0000 |
| 5 | 4 | 33250.0000 |
+-----+-----+-----+
3 rows in set (0.00 sec)
```


BANK DATABASE:

```
create table branch(  
    branch_name varchar(25),  
    branch_city varchar(25),  
    assets int,  
    primary key(branch_name));  
  
create table account(  
    accno int,  
    branch_name varchar(25),  
    balance int,  
    primary key(accno));  
  
create table customer(  
    customer_name varchar(25),  
    customer_street varchar(25),  
    customer_city varchar(25),  
    primary key(customer_name));  
  
create table depositor(  
    customer_name varchar(25),  
    accno int,  
    primary key(customer_name, accno),  
    foreign key(customer_name) references customer(customer_name),  
    foreign key(accno) references account(accno) on delete cascade);  
  
create table loan(  
    loan_number int,  
    branch_name varchar(25),  
    amount int,  
    primary key(loan_number),  
    foreign key(branch_name) references branch(branch_name));  
  
insert into branch values('jaynagar','bangalore',15000000),  
    ('basavanagudi','bangalore',25000000),  
    ('noida','delhi',50000000),  
    ('marine drive','mumbai',40000000),  
    ('green park','delhi',30000000);  
  
insert into account values(123,'jaynagar',25000);  
insert into account values(156,'jaynagar',30000);  
insert into account values(456,'basavanagudi',15000);  
insert into account values(789,'noida',25000);  
insert into account values(478,'marine drive',48000);  
insert into account values(778,'green park',60000);  
insert into account values(189,'basavanagudi',50000);  
  
insert into customer values('ramu','jaynagar','bangalore');  
insert into customer values('kumar','basavanagudi','bangalore');
```

```
insert into customer values('john','noida','delhi');
insert into customer values('mike','marine drive','mumbai');
insert into customer values('sachin','green park','delhi');
```

```
insert into depositor values('ramu',123);
insert into depositor values('ramu',156);
insert into depositor values('ramu',189);
insert into depositor values('kumar',456);
insert into depositor values('john',789);
insert into depositor values('mike','478');
insert into depositor values('sachin','778');
```

```
insert into loan values(1111,'jaynagar',250000);
insert into loan values(2222,'basavanagudi',350000);
insert into loan values(3333,'noida',150000);
insert into loan values(4444,'marine drive',1500000);
insert into loan values(5555,'green park',7500000);
```

```
mysql> select * from branch;
```

branch_name	branch_city	assets
basavanagudi	bangalore	25000000
green park	delhi	30000000
jaynagar	bangalore	15000000
marine drive	mumbai	40000000
noida	delhi	50000000

```
5 rows in set (0.00 sec)
```

```
mysql> select * from account;
```

accno	branch_name	balance
123	jaynagar	25000
156	jaynagar	30000
189	basavanagudi	50000
456	basavanagudi	15000
478	marine drive	48000
778	green park	60000
789	noida	25000

```
7 rows in set (0.00 sec)
```

```
mysql> select * from depositor;
```

customer_name	accno
ramu	123

ramu	156
ramu	189
kumar	456
mike	478
sachin	778
john	789

7 rows in set (0.00 sec)

```
mysql> select * from customer;
```

customer_name	customer_street	customer_city
john	noida	delhi
kumar	basavanagudi	bangalore
mike	marine drive	mumbai
ramu	jaynagar	bangalore
sachin	green park	delhi

5 rows in set (0.00 sec)

```
mysql> select * from loan;
```

loan_number	branch_name	amount
1111	jaynagar	250000
2222	basavanagudi	350000
3333	noida	150000
4444	marine drive	1500000
5555	green park	7500000

5 rows in set (0.00 sec)

5a. Find all the customers who have atleast two accounts at the main branch

```
select distinct(customer_name), count(*)
from account a, depositor d
where a.accno=d.accno and
      d.accno in (select accno from account where branch_name='jaynagar')
group by d.customer_name having count(*)>=2;
```

```

+-----+-----+
| customer_name | count(*) |
+-----+-----+
| ramu          |          2 |
+-----+-----+
1 row in set (0.00 sec)

```

5b. Find all the customers who have an account at all the branches located in a specified city.

```

select d.customer_name from
account a, depositor d, branch b where
b.branch_name=a.branch_name
and
a.accno=d.accno
and
b.branch_city='bangalore'
group by customer_name having
count(distinct b.branch_name) = (select count(branch_name) from branch
where branch_city='bangalore');

```

or

5b. Find all the customers who have an account at all the branches located in a specified city

```

SELECT d.customer_name
FROM account a
JOIN depositor d ON a.accno = d.accno
JOIN branch b ON a.branch_name = b.branch_name
WHERE b.branch_city = 'bangalore'
GROUP BY d.customer_name
HAVING COUNT(DISTINCT b.branch_name) = (SELECT COUNT(branch_name) FROM
branch WHERE branch_city = 'bangalore');

```

```

+-----+
| customer_name |
+-----+
| ramu          |
+-----+
1 row in set (0.00 sec)

```

5c. Demonstrate how you delete all account tuples at every branch located in a specified city

```
delete from account
where branch_name
in (select branch_name from branch where branch_city='delhi' and accno
<> 0);
```

after executing the delete query output will "delete from account
Query OK, 2 rows affected (0.03 sec)"

Before deletion account table

```
select * from branch;
```

branch_name	branch_city	assets
basavanagudi	bangalore	25000000
green park	delhi	30000000
jaynagar	bangalore	15000000
marine drive	mumbai	40000000
noida	delhi	50000000

5 rows in set (0.00 sec)

```
select * from account;
```

accno	branch_name	balance
123	jaynagar	25000
156	jaynagar	30000
189	basavanagudi	50000
333	basavanagudi	25000
456	basavanagudi	15000
478	marine drive	48000
778	green park	60000
789	noida	25000

8 rows in set (0.00 sec)

After deletion account table

```
select * from account;
```

accno	branch_name	balance
123	jaynagar	25000
156	jaynagar	30000
189	basavanagudi	50000
333	basavanagudi	25000
456	basavanagudi	15000

	478		marine drive		48000	
+	-----	+	-----	+	-----	+

6 rows in set (0.00 sec)