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Homework 2

Database I

3.8 Consider the bank database of Figure 3.19, where the primary keys are underlined. Construct the following SQL queries for this relational database.

a) Find all customers of the bank who have an account but not a loan.

```
(select customer_name
from depositor)
except
(select customer_name
from borrower)
```

b) Find the names of all customers who live on the same street and in the same city as "Smith".

```
select F.customer_name
from customer F join customer S
using (customer_street, customer_city)
where S.customer_name = 'Smith'
```

c) Find the names of all branches with customers who have an account in the bank and who live in "Harrison".

```
select distinct branch_name
from account natural join depositor natural join customer
where customer_city = 'Harrison'
```

3.9 Consider the employee database of Figure 3.20, where the primary keys are underlined. Give an expression in SQL for each of the following queries.

a. Find the names and cities of residence of all employeeswho work for"First Bank Corporation".

```
select e.employee_name, city
from employee e, works w
where w.company_name = 'First Bank Corporation' and
      w.employee_name = e.employee_name
```

b. Find the names, street addresses, and cities of residence of all employees who work for "First Bank Corporation" and earn more than $10,000.

```
select *
from employee
where employee_name in
      (select employee_name
      from works
      where company name = 'First Bank Corporation' and salary > 10000)
```

c. Find all employees in the database who do not work for "First Bank Corporation".

```
select employee_name
from works
where company_name ≠ 'First Bank Corporation'
```

d. Find all employees in the database who earn more than each employee of "Small Bank Corporation".

```
select employee_name
from works
where salary > all
        (select salary
        from works
        where company_name = 'Small Bank Corporation')
```

e. Assume that the companies may be located in several cities. Find all companies located in every city in which "Small Bank Corporation" is located.

```
select S.company_name
from company S
where (select L.city
        from company L
        where L.company name = S.company_name) contains
                (select R.city
                from company R
                where R.company_name = 'Small Bank Corporation')
```

f. Find the company that has the most employees.

```
select company_name
from works
group by company_name
having count (distinct employee_name) >= all
        (select count (distinct employee_name)
        from works
        group by company_name)
```

g. Find those companies whose employees earn a higher salary, on average, than the average salary at "First Bank Corporation".

```
select company_name
from works
group by company_name
having avg (salary) > (select avg (salary)
                        from works
                        where company_name = 'First Bank Corporation')
```

3.15 Consider the bank database of Figure 3.19, where the primary keys are underlined. Construct the following SQL queries for this relational database.

a) Find all customers who have an account at *all* the branches located in "Brooklyn".

```
with branchcount as
        (select count (*)
        branch
        where branch_city = 'Brooklyn')
select customer_name
from customer C
where branchcount =
        (select count (distinct branch_name)
        from (customer natural join depositor natural join account
                natural join branch) as D
        where D.customer_name = C.customer_name)
```

b) Find out the total sum of all loan amounts in the bank.

```
select sum(amount) from loan
```

c) Find the names of all branches that have assets greater than those of at least one branch located in "Brooklyn".

```
select branch_name
from branch
where assets > some
        (select assets
        from branch
        where branch_city = 'Brooklyn')
```

3.16 Consider the employee database of Figure 3.20, where the primary keys are underlined. Give an expression in SQL for each of the following queries.

a) Find the names of all employees who work for "First Bank Corporation".

```
select employee_name
from works
where company_name = 'First bank Corporation'
```

b) Find all employees in the database who live in the same cities as the companies for which they work.

```
select e.employee_name
from employee e, works w, company c
where e.employee_name = w.employee_name
        and e.city = c.city
        and w.company_name = c.company_name
```

c) Find all employees in the database who live in the same cities and on the same streets as do their managers.

```
select e.employee_name
from employee e, employee w, managers m
where e.employee_name = w.employee_name
        and m.manger_name = w.employee_name
        and e.street = w.street
        and e.city = w.city
```

d) Find all employees who earn more than the average salary of all employees of their company.

```
select employee_name
from works w
where salary > (select avg(salary)
                from works s
                where s.company_name = s.company_name)
```

e) Find the company that has the smallest payroll.

```
select company_name
from works
group by company_name
having sum(salary) <= all (select sum(salary)
                           from works
                           group by company_name)
```