

database system hw3

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3.8 Consider the bank database of Figure 3.18, where the primary keys are underlined. Construct the following SQL queries for this relational database

a. Find the ID of each customer of the bank who has an account but not a loan.

```
1 select ID from depositor
2 where ID not in(
3     select ID from borrower
4 );
```

b. Find the ID of each customer who lives on the same street and in the same city as customer '12345'.

```
1 select d.ID from customer as d
2 where (customer_street,customer_city) = (
3     select customer_street,customer_city from customer as c where
4     c.ID = 12345;
```

c. Find the name of each branch that has at least one customer who has an account in the bank and who lives in “Harrison”.

```

1  select distinct
2      branch_name
3  from account,
4  (
5      select account_number
6      from depositor as d,
7      (select ID from customer where customer_city = 'Harrison') as e
8      where d.ID = e.ID
9  ) as c
10 where account.account_number = c.account_number

```

3.9 Consider the relational database of Figure 3.19, where the primary keys are underlined. Give an expression in SQL for each of the following queries.

a. Find the ID, name, and city of residence of each employee who works for “First Bank Corporation”.

```

1  select ID, name, city
2  from employee,
3  (select ID from works where company_name = 'First Bank Corporation')
4  as c
5  where employee.ID = c.ID;

```

b. Find the ID, name, and city of residence of each employee who works for “First Bank Corporation” and earns more than \$10000.

```

1 select ID, person_name, city
2 from employee,
3 (
4     select ID
5     from works
6     where company = "First Bank Corporation"
7           and salary > 10000
8 ) as q
9 where employee.ID = q.ID;

```

c. Find the ID of each employee who does not work for “First Bank Corporation”.

```

1 select ID
2 from employee
3 where ID not in (
4     select ID from works where company_name = 'First Bank Corpo-
5     ration');

```

d. Find the ID of each employee who earns more than every employee of “Small Bank Corporation”.

```

1 select ID
2 from works
3 where salary > all
4 (
5     select salary from works where company_name = "Small
6     BankCorporation"
7 );

```

e. Assume that companies may be located in several cities. Find the name of each company that is located in every city in which “Small Bank Corporation” is located.

```

1 select company_name
2 from company as c
3 where not exists
4 (
5     (select city
6       from company as a
7       where a.company_name = 'SmallBank Corporation')
8     except
9     (select city
10      from company as b
11      where b.company_name = c.company_name)
12 );

```

f. Find the name of the company that has the most employees (or companies, in the case where there is a tie for the most).

```

1 select company_name
2 from works
3 group by works
4 having count(distinct ID) >=all
5 (
6     select count(distinct ID) from works group by (company_name)
7 );

```

g. Find the name of each company whose employees earn a higher salary, on average, than the average salary at “First Bank Corporation”.

```
1 select company_name
2 from works
3 group by company_name
4 having avg (salary) >
5 (
6     select avg(salary) as base
7     from works
8     where company_name = 'First Bank Corporation'
9 );
```

3.10 Consider the relational database of Figure 3.19. Give an expression in SQL for each of the following:

a. Modify the database so that the employee whose ID is '12345' now lives in "Newtown".

```
1 update employee
2 set city ="Newtown"
3 where ID ='12345';
```

b. Give each manager of "First Bank Corporation" a 10 percent raise unless the salary becomes greater than \$100000; in such cases, give only a 3 percent raise

```

1  update works
2  set salary = (case
3                  when salary > 100000 then
4                      salary * 1.03
5                  else
6                      salary * 1.1
7                  end
8              )
9  where works.ID in (
10                  select works.ID from works, manages where
11                      works.ID = manages.manager_id
12              )

```

3.11 Write the following queries in SQL, using the university schema.

a. Find the ID and name of each student who has taken at least one Comp. Sci. course; make sure there are no duplicate names in the result

```

1  SELECT DISTINCT name
2  FROM takes
3  JOIN
4      (SELECT course_id
5       FROM course
6       WHERE dept_name = 'Comp. Sci.' )
7  JOIN student;

```

b. Find the ID and name of each student who has not taken any course offered before 2017.

```

1  SELECT ID, name
2  FROM student
3  WHERE ID NOT IN
4      (SELECT ID
5       FROM takes
6       WHERE YEAR<2017);

```

c. For each department, find the maximum salary of instructors in that department. You may assume that every department has at least one instructor.

```
1 SELECT Max(salary),  
2     dept_name  
3 FROM instructor  
4 JOIN department  
5 GROUP BY dept_name;
```

d. Find the lowest, across all departments, of the per-department maximum salary computed by the preceding query.

```
1 SELECT min(topsalary),  
2     dept_name from  
3     (SELECT max(salary) as topsalary,  
4     dept_name  
5     FROM instructor  
6     JOIN department  
7     GROUP BY dept_name);
```

3.15 Consider the bank database of Figure 3.18, where the primary keys are underlined. Construct the following SQL queries for this relational database.

a. Find each customer who has an account at every branch located in “Brooklyn”.

```
1 SELECT *
2 FROM customer AS c
3 WHERE NOT exists(
4     (SELECT branch_name
5     FROM branch
6     WHERE city ="Brooklyn");)
7 except
8     (SELECT branch_name
9     FROM account
10    WHERE account_number IN
11    (SELECT account_number
12     FROM depositor AS d
13     WHERE d.ID= c.ID;)))
```

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

```
1 select sum(amount),branch_name
2 from loan
3 group by branch_name
```

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

```
1 select branch_name from branch
2 where branch.assets > some(
3     select assets from branch where branch_city = "Brooklyn"
4 );
```


