第一次数据库实验 姓名:曾凡浩 学号：20009200713

● 创建数据库

```
mysql> create database BANK713;
Query OK, 1 row affected (0.01 sec)
```

● 展示数据库

```
mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| bank713            |
| information_schema |
| mysql              |
| performance_schema |
| sakila             |
| sys                |
| world              |
+--------------------+
```

● 切换数据库

```
mysql> use bank713
Database changed
```

● 分别建立各表

建立 branch 表

```
mysql> create table BRANCH713(
    -> branch_name char(15),
    -> branch_city char(15),
    -> assets int,
    -> PRIMARY KEY(branch_name)
    -> );
Query OK, 0 rows affected (0.02 sec)
```

建立 customer 表

```
mysql> create table CUSTMER713(
    -> custmer_name char(15),
    -> custmer_street char(15),
    -> custmer_city char(15),
    -> PRIMARY KEY(custmer_name)
    -> );
Query OK, 0 rows affected (0.02 sec)
```

建立 loan 表

```
mysql> create table LOAN713(
    -> loan_number char(15),
    -> branch_name char(15),
    -> amount int,
    -> PRIMARY KEY (loan_number),
    -> FOREIGN KEY (branch_name)
    -> REFERENCES branch713(branch_name)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

建立 borrower 表

```
mysql> create table BORROWER713(
    -> loan_number char(15),
    -> costmer_name char(15),
    -> PRIMARY KEY(costmer_name,loan_number)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

建立 account 表

```
mysql> CREATE TABLE account713 (
    ->     account_number char(10),
    ->     branch_name char(30)  NOT  NULL,
    ->     balance  numeric(12.2),
    ->     PRIMARY KEY (account_number),
    ->     FOREIGN KEY (branch_name)
    ->     REFERENCES branch713(branch_name)
    ->     );
Query OK, 0 rows affected (0.03 sec)
```

建立 depositor 表

```
mysql> create table DEPOSITOR713(
    -> custmer_name char(15),
    -> account_number char(15),
    -> PRIMARY KEY (custmer_name,account_number)
    -> );
Query OK, 0 rows affected (0.01 sec)
```

● 展示数据库中各表

```
mysql> show tables;
+------------------+
| Tables_in_bank713 |
+------------------+
| account713       |
| borrower713      |
| branch713        |
| custmer713       |
| depositor713     |
| loan713          |
+------------------+
6 rows in set (0.00 sec)
```

插入各表数据并展示

branch 表

```
mysql> insert into branch713 (branch_name,branch_city,assets) values ('Brighton','Brooklyn',7100000);
Query OK, 1 row affected (0.01 sec)

mysql> insert into branch713 (branch_name,branch_city,assets) values ('Downtown','Brooklyn',9000000);
Query OK, 1 row affected (0.00 sec)

mysql> insert into branch713 (branch_name,branch_city,assets) values ('Mianus','Horseneck',400000);
Query OK, 1 row affected (0.01 sec)

mysql> insert into branch713 (branch_name,branch_city,assets) values ('North Town','Rye',3700000);
Query OK, 1 row affected (0.01 sec)

mysql> insert into branch713 (branch_name,branch_city,assets) values ('Perryridge','Horseneck',1700000);
Query OK, 1 row affected (0.00 sec)

mysql> insert into branch713 (branch_name,branch_city,assets) values ('Pownal','Bennington',300000);
Query OK, 1 row affected (0.01 sec)

mysql> insert into branch713 (branch_name,branch_city,assets) values ('Redwood','Palo Alto',2100000);
Query OK, 1 row affected (0.01 sec)

mysql> insert into branch713 (branch_name,branch_city,assets) values ('Round Hill','Horseneck',8000000);
Query OK, 1 row affected (0.00 sec)
```

```
mysql> select * from branch713;
+------------+-------------+---------+
| branch_name | branch_city | assets  |
+------------+-------------+---------+
| Brighton   | Brooklyn    | 7100000 |
| Downtown   | Brooklyn    | 9000000 |
| Mianus     | Horseneck   |  400000 |
| North Town | Rye         | 3700000 |
| Perryridge | Horseneck   | 1700000 |
| Pownal     | Bennington  |  300000 |
| Redwood    | Palo Alto   | 2100000 |
| Round Hill | Horseneck   | 8000000 |
+------------+-------------+---------+
8 rows in set (0.00 sec)
```

Customer 表

```
mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Adams','Spring','Pittsfield');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Brooks','Senator','Brooklyn');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Curry','North','Rye');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Glenn','Sand Hill','Woodside');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Green','Walnut','Stamford');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Hayes','Main','Harrison');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Jognson','Alma','Palo Alto');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Jones','Main','Harrison');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Lindsay','Park','Pittsfield');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Smith','North','Rye');
Query OK, 1 row affected (0.00 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Turner','Putnam','Stamford');
Query OK, 1 row affected (0.01 sec)

mysql> insert into custmer713 (custmer_name,custmer_street,custmer_city) values ('Williams','Nassau','Princeton');
Query OK, 1 row affected (0.01 sec)
```

```
mysql>  select * from custmer713;
+--------------+---------------+--------------+
| custmer_name | custmer_street | custmer_city |
+--------------+---------------+--------------+
| Adams        | Spring        | Pittsfield   |
| Brooks       | Senator       | Brooklyn     |
| Curry        | North         | Rye          |
| Glenn        | Sand Hill     | Woodside     |
| Green        | Walnut        | Stamford     |
| Hayes        | Main          | Harrison     |
| Jognson      | Alma          | Palo Alto    |
| Jones        | Main          | Harrison     |
| Lindsay      | Park          | Pittsfield   |
| Smith        | North         | Rye          |
| Turner       | Putnam        | Stamford     |
| Williams     | Nassau        | Princeton    |
+--------------+---------------+--------------+
12 rows in set (0.00 sec)
```

Loan 表

```
mysql> insert into loan713(loan_number,branch_name,amount) values ('L-11','Round Hill',900);
Query OK, 1 row affected (0.01 sec)

mysql> insert into loan713(loan_number,branch_name,amount) values ('L-14','Downtown',1500);
Query OK, 1 row affected (0.01 sec)

mysql> insert into loan713(loan_number,branch_name,amount) values ('L-15','Perryridge',1500);
Query OK, 1 row affected (0.01 sec)

mysql> insert into loan713(loan_number,branch_name,amount) values ('L-16','Perryridge',1300);
Query OK, 1 row affected (0.00 sec)
```

```
mysql> insert into loan713(loan_number,branch_name,amount) values ('L-17','Downtown',1000);
Query OK, 1 row affected (0.01 sec)

mysql> insert into loan713(loan_number,branch_name,amount) values ('L-23','Redwood',2000);
Query OK, 1 row affected (0.01 sec)
```

```
mysql> insert into loan713(loan_number,branch_name,amount) values ('L-93','Mianus',500);
Query OK, 1 row affected (0.01 sec)
```

```
mysql> select * from loan713
    -> ;
+-------------+-------------+--------+
| loan_number | branch_name | amount |
+-------------+-------------+--------+
| L-11        | Round Hill  |    900 |
| L-14        | Downtown    |   1500 |
| L-15        | Perryridge  |   1500 |
| L-16        | Perryridge  |   1300 |
| L-17        | Downtown    |   1000 |
| L-23        | Redwood     |   2000 |
| L-93        | Mianus      |    500 |
+-------------+-------------+--------+
7 rows in set (0.00 sec)
```

Borrower 表

```
mysql> insert into borrower713 (custmer_name,loan_number) values ('Adams','L-16');
Query OK, 1 row affected (0.01 sec)

mysql> insert into borrower713 (custmer_name,loan_number) values ('Curry','L-93');
Query OK, 1 row affected (0.00 sec)

mysql> insert into borrower713 (custmer_name,loan_number) values ('Hayes','L-15');
Query OK, 1 row affected (0.00 sec)

mysql> insert into borrower713 (custmer_name,loan_number) values ('Jackson','L-14');
Query OK, 1 row affected (0.01 sec)

mysql> insert into borrower713 (custmer_name,loan_number) values ('Jones','L-17');
Query OK, 1 row affected (0.01 sec)

mysql> insert into borrower713 (custmer_name,loan_number) values ('Smith','L-11');
Query OK, 1 row affected (0.00 sec)

mysql> insert into borrower713 (custmer_name,loan_number) values ('Smith','L-23');
Query OK, 1 row affected (0.00 sec)

mysql> insert into borrower713 (custmer_name,loan_number) values ('Williams','L-17');
Query OK, 1 row affected (0.00 sec)
```

```
mysql> select * from borrower713;
+--------------+-------------+
| custmer_name | loan_number |
+--------------+-------------+
| Adams        | L-16        |
| Curry        | L-93        |
| Hayes        | L-15        |
| Jackson      | L-14        |
| Jones        | L-17        |
| Smith        | L-11        |
| Smith        | L-23        |
| Williams     | L-17        |
+--------------+-------------+
8 rows in set (0.00 sec)
```

Account 表

```
mysql> insert into account713(account_name,branch_name,balance) values ('A-101','Downtown',500);
ERROR 1054 (42S22): Unknown column 'account_name' in 'field list'
mysql> ^C
mysql> insert into account713(account_number,branch_name,balance) values ('A-101','Downtown',500);
Query OK, 1 row affected (0.00 sec)

mysql> insert into account713(account_number,branch_name,balance) values ('A-102','Perryridge',400);
Query OK, 1 row affected (0.01 sec)

mysql> insert into account713(account_number,branch_name,balance) values ('A-201','Brighton',900);
Query OK, 1 row affected (0.01 sec)

mysql> insert into account713(account_number,branch_name,balance) values ('A-215','Mianus',700);
Query OK, 1 row affected (0.01 sec)

mysql> insert into account713(account_number,branch_name,balance) values ('A-217','Brighton',750);
Query OK, 1 row affected (0.01 sec)

mysql> insert into account713(account_number,branch_name,balance) values ('A-222','Redwood',700);
Query OK, 1 row affected (0.01 sec)

mysql> insert into account713(account_number,branch_name,balance) values ('A-305','Round Hill',350);
Query OK, 1 row affected (0.01 sec)
```

建立各表

Depositor 表

- 3.2

建立各表

```
mysql> create table employee(
    -> employee_name char(15),
    -> street char(15),
    -> city char(15),
    -> PRIMARY KEY(employee_name)
    -> );
Query OK, 0 rows affected (0.02 sec)
```

```
mysql> create table company(
    -> company_name char(30),
    -> city char(15),
    -> PRIMARY KEY(company_name)
    -> );
Query OK, 0 rows affected (0.02 sec)
```

```
mysql> create table works(
    -> employee_name char(15),
    -> company_name char(30),
    -> salary int,
    -> PRIMARY KEY(employee_name,company_name),
    -> FOREIGN KEY(employee_name)
    -> REFERENCES employee(employee_name),
    -> FOREIGN KEY(company_name)
    -> REFERENCES company(company_name)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

```
mysql> create table manages(
    -> employee_name char(15),
    -> manager_name char(15),
    -> PRIMARY KEY(employee_name,manager_name),
    -> FOREIGN KEY(employee_name)
    -> REFERENCES employee(employee_name)
    -> );
Query OK, 0 rows affected (0.02 sec)
```

适当添加元素后展示各表

```
mysql> select * from employee;
+---------------+----------+----------+
| employee_name | street   | city     |
+---------------+----------+----------+
| Alice         | Zhuyuan  | Xi an    |
| Bob           | Haitang  | Shanghai |
| Jone          | Haitang  | Shanghai |
| Zengfanhao    | Zhuyuan  | Xi an    |
+---------------+----------+----------+
4 rows in set (0.00 sec)
```

```
mysql>  select * from works;
+----------------+------------------------+----------+
| employee_name  | company_name           | salary   |
+----------------+------------------------+----------+
| Alice          | First Bank Corporation |   13000  |
| Bob            | Small Bank Corporation |    5000  |
| Jone           | Big Bank Corporation   |   30000  |
| Zengfanhao     | First Bank Corporation |   20000  |
+----------------+------------------------+----------+
4 rows in set (0.00 sec)
```

```
mysql> select * from company;
+------------------------+----------+
| company_name           | city     |
+------------------------+----------+
| Big Bank Corporation   | Shanghai |
| First Bank Corporation | Xi an    |
| Small Bank Corporation | Shanghai |
+------------------------+----------+
3 rows in set (0.00 sec)
```

```
mysql> select * from manages;
+----------------+----------------+
| employee_name  | manager_name   |
+----------------+----------------+
| Alice          | Zengfanhao     |
+----------------+----------------+
1 row in set (0.00 sec)
```

A、

```
mysql> select employee_name, city
    -> from company, works
    -> where works.company_name='First BANK Corporation' and works.company_name=company.company_name;
+----------------+------+
| employee_name  | city |
+----------------+------+
| Alice          | Xian |
| Zengfanhao     | Xian |
+----------------+------+
2 rows in set (0.01 sec)
```

B、

```
mysql> select works.employee_name, street, company.city
    -> from works, employee, company
    -> where works.company_name='First BANK Corporation' and salary>=10000 and works.company_name=company.company_name and works.employee_name=employee.employee_name;
+----------------+---------+------+
| employee_name  | street  | city |
+----------------+---------+------+
| Alice          | Zhuyuan | Xian |
| Zengfanhao     | Zhuyuan | Xian |
+----------------+---------+------+
2 rows in set (0.00 sec)
```

C、

```
mysql> select works.employee_name
    -> from works
    -> where company_name != 'First BANK Corporation';
+---------------+
| employee_name |
+---------------+
| Jone          |
| Bob           |
+---------------+
2 rows in set (0.01 sec)
```

D、

```
mysql> select employee_name, company_name
    -> from works
    -> where salary>all(select salary
    ->                  from works
    ->                  where company_name='Small Bank Corporation');
+---------------+------------------------+
| employee_name | company_name           |
+---------------+------------------------+
| Alice         | First Bank Corporation |
| Jone          | Big Bank Corporation   |
| Zengfanhao    | First Bank Corporation |
+---------------+------------------------+
3 rows in set (0.00 sec)
```

E、

```
mysql> select company_name
    -> from company
    -> where city in (select city
    ->                from company
    ->                where company_name='Small Bank Corporation');
+------------------------+
| company_name           |
+------------------------+
| Big Bank Corporation   |
| Small Bank Corporation |
+------------------------+
2 rows in set (0.00 sec)
```

F、

```
mysql> with employee_num(company_name, num) as (
    -> select company_name , count(employee_name)
    -> from works
    -> group by company_name)
    -> select company_name
    -> from employee_num
    -> where num>=all(select num from employee_num);
+------------------------+
| company_name           |
+------------------------+
| First Bank Corporation |
+------------------------+
1 row in set (0.00 sec)
```

G、

```
mysql> with company_avgsalary(company_name,avg_salary) as (
    -> select company_name, avg(salary)
    -> from works
    -> group by company_name),
    -> Favg (salary) as(
    -> select avg(salary)
    -> from works
    -> where company_name='First Bank Corporation')
    -> select company_name
    -> from company_avgsalary,Favg
    -> where avg_salary>Favg.salary;
+---------------------+
| company_name        |
+---------------------+
| Big Bank Corporation |
+---------------------+
1 row in set (0.00 sec)
```

- 3.9

A、

```
mysql> select employee_name
    -> from works
    -> where company_name='First Bank Corporation';
+---------------+
| employee_name |
+---------------+
| Alice         |
| Zengfanhao    |
+---------------+
2 rows in set (0.00 sec)
```

B、

```
mysql> with A(employee_name,city) as (
    -> select employee_name ,city
    -> from works natural join company)
    -> select A.employee_name
    -> from A,employee
    -> where A.employee_name=employee.employee_name;
+---------------+
| employee_name |
+---------------+
| Jone          |
| Alice         |
| Zengfanhao    |
| Bob           |
+---------------+
4 rows in set (0.00 sec)
```

C、

```
mysql> select manages.employee_name
    -> from manages,employee as A,employee as B
    -> where A.street=B.street and A.city =B.city and manages.employee_name=A.employee_name and manages.manager_name=B.e
mployee_name;
+---------------+
| employee_name |
+---------------+
| Alice         |
+---------------+
1 row in set (0.00 sec)
```

D、

```
mysql> with avg (company_name,salary) as (
    -> select company_name,avg(salary)
    -> from works
    -> group by company_name)
    -> select employee_name
    -> from works,avg
    -> where works.company_name=avg.company_name and works.salary>avg.salary;
+---------------+
| employee_name |
+---------------+
| Zengfanhao    |
+---------------+
1 row in set (0.00 sec)
```

E、

```
mysql> with company_sum(company_name,sum) as (
    -> select company_name,sum(salary)
    -> from works
    -> group by company_name)
    -> select company_name
    -> from company_sum
    -> where sum<=all(select min(sum)
    ->                from company_sum);
+----------------------+
| company_name         |
+----------------------+
| Small Bank Corporation |
+----------------------+
1 row in set (0.00 sec)
```