Database System Lab 2

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实验目的

- Master the use of relational database language SQL

- Make all SQL jobs pass on the machine

实验平台：

- MySQL（全平台）

  网上教程 http://www.runoob.com/mysql/mysql-tutorial.html

实验内容

1) Establish a database;

2) Data definition: table creation / deletion / modification; index

creation / deletion; view creation / deletion;

3) Data update: use insert / delete / update commands to insert / delete

/ modify table data;

4) Data query: single-table query, multi-table query, nested sub-query;

5) View operation: query and modify data through views;

6) Use the correct instructions to complete the above operations;

7) Complete the experiment report.

实验步骤

（根据实验说明中的实验步骤，将每个步骤中输入的 sql 语句和输出结果截图）

1) **Establish the database:**

● **Select the current database: use ....**

```
mysql> show databases
    -> ;
+--------------------+
| Database           |
+--------------------+
| information_schema |
| mysql              |
| no3170100186       |
| performance_schema |
| sys                |
+--------------------+
5 rows in set (0.01 sec)

mysql> use no3170100186;
Database changed
mysql> show tables;
Empty set (0.00 sec)
```

2) Use SQL statements to create the following book (book), card (borrowing card) and borrow (borrowing record) tables, select the appropriate data type for each field of the table, and fill the corresponding data.

● **Create table book:**

```
mysql> create table book
    -> (
    ->          bno int NOT NULL,
    ->          title char(100) NOT NULL,
    ->          author char(100) NOT NULL,
    ->          year year(4) NOT NULL,
    ->          press char(100) NOT NULL,
    ->          price Double(10,2) NOT NULL,
    ->          total int NOT NULL,
    ->          stock int NOT NULL,
    ->          PRIMARY KEY(bno)
    -> );
Query OK, 0 rows affected (0.02 sec)
```

Insert data:

```
mysql> INSERT INTO book (bno,title,author,YEAR,press,price,total,stock)
    -> VALUES (1,'Database System Concepts', 'Abraham', '2011','McGrawHill', 99.00, 5, 4),
    ->        (2,'Modern Operating Systems','Andrew', '2009', 'Pearson',75.00,3,1),
    ->        (3,'Computer Network','Tanenbaum','2000','Pearson',58.00,4,3);
Query OK, 3 rows affected (0.02 sec)
Records: 3  Duplicates: 0  Warnings: 0
```

Check:

```
mysql> select * from book
    -> ;
+-----+--------------------------+-----------+------+------------+--------+-------+-------+
| bno | title                    | author    | year | press      | price  | total | stock |
+-----+--------------------------+-----------+------+------------+--------+-------+-------+
|   1 | Database System Concepts | Abraham   | 2011 | McGrawHill | 99.00  |     5 |     4 |
|   2 | Modern Operating Systems | Andrew    | 2009 | Pearson    | 75.00  |     3 |     1 |
|   3 | Computer Network         | Tanenbaum | 2000 | Pearson    | 58.00  |     4 |     3 |
+-----+--------------------------+-----------+------+------------+--------+-------+-------+
```

- **Create table card:**

```
mysql> create table card
    -> (
    ->         cno int NOT NULL,
    ->         name char(25) NOT NULL,
    ->         department char(100) NOT NULL,
    ->         type enum('S','T') NOT NULL,
    ->         PRIMARY KEY(cno)
    -> );
Query OK, 0 rows affected (0.02 sec)
```

Insert data:

```
mysql> INSERT INTO card (cno,name,department,type)
    -> VALUES (1,'Jack','CS','T'),
    ->        (2,'Lily','Art','S'),
    ->        (3,'John','CS','S'),
    ->        (4,'Lucy','Physics','S'),
    ->        (5,'Amy','Chemistry','T');
Query OK, 5 rows affected (0.00 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

Check:

```
mysql> select * from card;
+-----+------+-----------+------+
| cno | name | department | type |
+-----+------+-----------+------+
|   1 | Jack | CS        | T    |
|   2 | Lily | Art       | S    |
|   3 | John | CS        | S    |
|   4 | Lucy | Physics   | S    |
|   5 | Amy  | Chemistry | T    |
+-----+------+-----------+------+
5 rows in set (0.00 sec)
```

● **Create table borrow:**

```
mysql> create table borrow
    -> (
    ->         cno int NOT NULL,
    ->         bno int NOT NULL,
    ->         borrow_date date,
    ->         return_date date,
    ->         CONSTRAINT borrow_ID PRIMARY KEY (cno,bno),
    ->         FOREIGN KEY (cno) REFERENCES card(cno),
    ->         FOREIGN KEY (bno) REFERENCES book(bno)
    -> );
Query OK, 0 rows affected (0.01 sec)
```

Insert data:

```
mysql>
mysql> INSERT INTO borrow (cno,bno,borrow_date,return_date)
    -> VALUES (1,1,'2018-1-1','2018-1-14'),
    ->        (1,2,'2018-1-6','2018-1-10'),
    ->        (2,2,'2018-2-3','2018-2-8'),
    ->        (3,3,'2018-2-5','2018-3-1');
Query OK, 4 rows affected (0.01 sec)
Records: 4  Duplicates: 0  Warnings: 0
```

Check:

```
mysql> select * from borrow;
+-----+-----+-------------+-------------+
| cno | bno | borrow_date | return_date |
+-----+-----+-------------+-------------+
|   1 |   1 | 2018-01-01  | 2018-01-14  |
|   1 |   2 | 2018-01-06  | 2018-01-10  |
|   2 |   2 | 2018-02-03  | 2018-02-08  |
|   3 |   3 | 2018-02-05  | 2018-03-01  |
+-----+-----+-------------+-------------+
4 rows in set (0.00 sec)
```

3) Add a field category to the book table; then delete the added category field.

Add and drop code:

```
alter table book add column category char(100);
alter table book drop column category ;
```

Actual running:

Add and show:

```
mysql> alter table book add column category char(100);
Query OK, 0 rows affected (0.08 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> select * from book;
+-----+---------------------------+-----------+------+-----------+-------+-------+-------+----------+
| bno | title                     | author    | year | press     | price | total | stock | category |
+-----+---------------------------+-----------+------+-----------+-------+-------+-------+----------+
|   1 | Database System Concepts  | Abraham   | 2011 | McGrawHill | 99.00 |     5 |     4 | NULL     |
|   2 | Modern Operating Systems  | Andrew    | 2009 | Pearson   | 75.00 |     3 |     1 | NULL     |
|   3 | Computer Network          | Tanenbaum | 2000 | Pearson   | 58.00 |     4 |     3 | NULL     |
+-----+---------------------------+-----------+------+-----------+-------+-------+-------+----------+
```

Drop and show:

```
mysql> alter table book drop column category ;
Query OK, 0 rows affected (0.07 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
+-----+---------------------------+-----------+------+-----------+-------+-------+-------+
| bno | title                     | author    | year | press     | price | total | stock |
+-----+---------------------------+-----------+------+-----------+-------+-------+-------+
|   1 | Database System Concepts  | Abraham   | 2011 | McGrawHill | 99.00 |     5 |     4 |
|   2 | Modern Operating Systems  | Andrew    | 2009 | Pearson   | 75.00 |     3 |     1 |
|   3 | Computer Network          | Tanenbaum | 2000 | Pearson   | 58.00 |     4 |     3 |
+-----+---------------------------+-----------+------+-----------+-------+-------+-------+
```

4) Create an index on the title field of the book table; then delete

the index:

2 ways to create:

alter table book add index index_test(title) ;

create index index_test on book(title);

Delete:

```
drop index index_test on book ;
```

```
mysql> alter table book add index index_test(title) ;
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> drop index index_test on book ;
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> create index index_test on book(title);
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> drop index index_test on book ;
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

5) Create a view book_view for the book table, including five fields: bno, title, press, year, price.

```
create view book_view as select bno,title,press,year,price from book;
```

```
mysql> select * from book_view;
+-----+-------------------------+-----------+------+-------+
| bno | title                   | press     | year | price |
+-----+-------------------------+-----------+------+-------+
|   1 | Database System Concepts| McGrawHill| 2011 | 99.00 |
|   2 | Modern Operating Systems| Pearson   | 2009 | 75.00 |
|   3 | Computer Network        | Pearson   | 2000 | 58.00 |
+-----+-------------------------+-----------+------+-------+
```

```
mysql> create view book_view as select bno,title,press,year,price from book;
Query OK, 0 rows affected (0.00 sec)
```

6) Modify the debit card named Lucy in the card table and change its category from student to teacher; then delete Amy's debit card.

```
update card
set type = 'T'
Where name = 'Lucy';
```

Show:

```
mysql> update card
    -> set type = 'T'
    -> Where name = 'Lucy'
    -> ;
Query OK, 1 row affected (0.00 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

```
mysql> select * from card;
+-----+-------+------------+------+
| cno | name  | department | type |
+-----+-------+------------+------+
|   1 | Jack  | CS         | T    |
|   2 | Lily  | Art        | S    |
|   3 | John  | CS         | S    |
|   4 | Lucy  | Physics    | T    |
```
改]

```
delete from card where name = 'Amy';
```

```
mysql>  delete from card where name = 'Amy';
Query OK, 1 row affected (0.00 sec)

mysql> select *from card;
+-----+-------+------------+------+
| cno | name  | department | type |
+-----+-------+------------+------+
|   1 | Jack  | CS         | T    |
|   2 | Lily  | Art        | S    |
|   3 | John  | CS         | S    |
|   4 | Lucy  | Physics    | S    |
+-----+-------+------------+------+
```

7) List the number of library cards for each department

```
mysql> select count(*),department from card group by department;
+----------+------------+
| count(*) | department |
+----------+------------+
|        1 | Art        |
|        2 | CS         |
|        1 | Physics    |
+----------+------------+
```

8) List the names of all books borrowed by the student:

```
select distinct title from book natural join borrow;
```

```
mysql> select distinct title from book natural join borrow;
+--------------------------+
| title                    |
+--------------------------+
| Database System Concepts |
| Modern Operating Systems |
| Computer Network         |
+--------------------------+
3 rows in set (0.00 sec)
```

9) List the books with the most stocks:

Code:

```
select bno,title,stock from book t1
where t1.stock in (select max(t2.stock) as max_stock from book t2);
```

```
mysql> select bno,title,stock from book t1
    -> where t1.stock in (select max(t2.stock) as max_stock from book t2);
+-----+--------------------------+-------+
| bno | title                    | stock |
+-----+--------------------------+-------+
|   1 | Database System Concepts |     4 |
+-----+--------------------------+-------+
1 row in set (0.00 sec)
```

10) Use the book_view view to query the information of books published by

Pearson

```
mysql> select * from book_view where press='Pearson';
+-----+-------------------------+---------+------+-------+
| bno | title                   | press   | year | price |
+-----+-------------------------+---------+------+-------+
|   2 | Modern Operating Systems| Pearson | 2009 | 75.00 |
|   3 | Computer Network        | Pearson | 2000 | 58.00 |
+-----+-------------------------+---------+------+-------+
2 rows in set (0.00 sec)
```

11) Update the book_view view to change the year of the Modern Operating Systems book to 2011. Then observe whether the data in the book table changes accordingly.

Code:

```
update book_view
set year = '2011'
Where title = 'Modern Operating Systems';
```

```
mysql> update book_view
    ->   set year = '2011'
    ->   Where title = 'Modern Operating Systems';
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from book_view;
+-----+-------------------------+-----------+------+-------+
| bno | title                   | press     | year | price |
+-----+-------------------------+-----------+------+-------+
|   1 | Database System Concepts| McGrawHill| 2011 | 99.00 |
|   2 | Modern Operating Systems| Pearson   | 2011 | 75.00 |
|   3 | Computer Network        | Pearson   | 2000 | 58.00 |
+-----+-------------------------+-----------+------+-------+
3 rows in set (0.01 sec)
```

The result is that the original table will change too;

```
mysql> select * from book;
+-----+-------------------------+-----------+------+-----------+-------+----
| bno | title                   | author    | year | press     | price | to
+-----+-------------------------+-----------+------+-----------+-------+----
|   1 | Database System Concepts| Abraham   | 2011 | McGrawHill| 99.00 |
|   2 | Modern Operating Systems| Andrew    | 2011 | Pearson   | 75.00 |
|   3 | Computer Network        | Tanenbaum | 2000 | Pearson   | 58.00 |
+-----+-------------------------+-----------+------+-----------+-------+----
3 rows in set (0.00 sec)
```
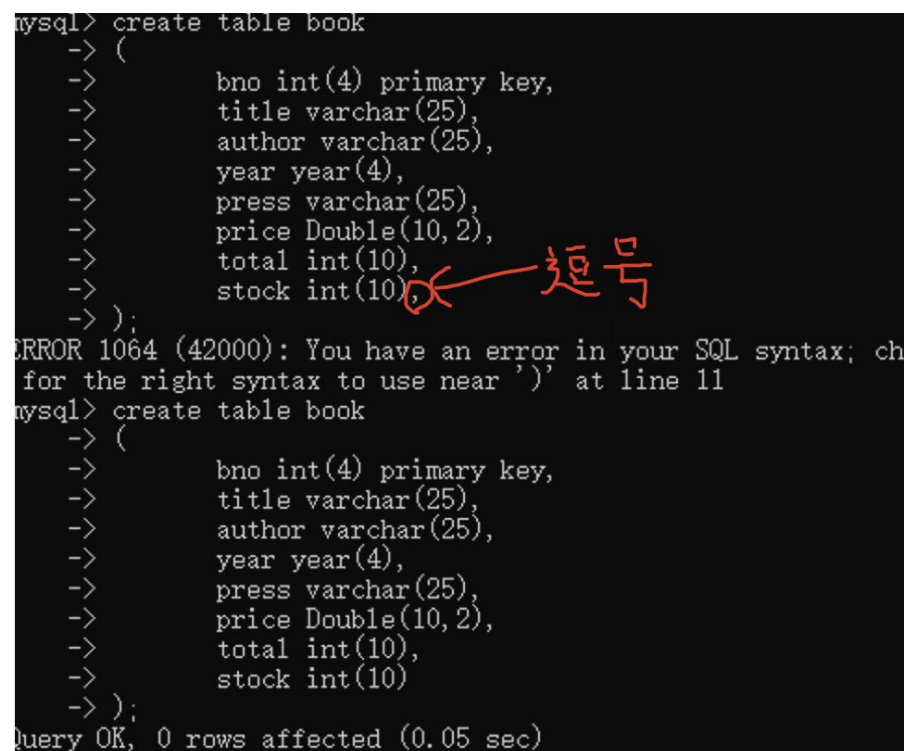
实验感想

1. **Many types of data version 5.7 is not supported;**

Number is not supported

create table T_BOOKS

(

       cno number(10) primary key,

       name varchar(25),

       Department varchar(25)

       type enum('S','T') not null;

);

2. **At the end of building the table, you cannot add ',';**

3. **Many problems were found in the process of using the database:**

```
mysql> insert into book
    -> (bno, title, author, year, press, price, total, stock)
    -> VALUES(1, ' Database System Concepts' , ' Abraham' , '
ERROR 1064 (42000): You have an error in your SQL syntax; che
 for the right syntax to use near 'System Concepts' , ' Abrah
```

- Because there is not enough data space for 'Database System
  Concepts'(only 25):

```
mysql> create table book
    -> (
    ->          bno int(4) primary key,
    ->          title varchar(25),
    ->          author varchar(25),
    ->          year year(4),
    ->          press varchar(25),
    ->          price Double(10, 2),
    ->          total int(10),
    ->          stock int(10)
    -> );
Query OK, 0 rows affected (0.05 sec)
```

- Because the quotation marks is not in the right form and it will get to this:

   And in this case, you need to input a quotation to get back to the
  original mode;
- The capitalization is the same in the code, but the table names and
  column names are different.

```
+-------+-------+--------------+-------------+
| Cno   | bno   | Borrow_date  | Return_date |
+-------+-------+--------------+-------------+
```

4.when using add and drop like this:

```
alter table book add column category char(100);
alter table book drop column category char(100);
```

```
ERROR 1064 (42000): You have an error in your SQL syntax;
 for the right syntax to use near 'char(100)' at line 1
```

Drop can not add the type of data in the end;