数据库系统实验
实验报告

题目	(实验 4)
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一 、实验环境

1、 操作系统： Windows 10
2、 DBMS： mysql

二 、实验内容

用已掌握的方法创建数据库jxgl，并创建三个表

```
create database jxgl default character set utf8;
```

然后转到这个数据库里面,开始输入建表的命令

```
use jxgl;
```

```sql
Create Table Student
(   Sno CHAR(7) NOT NULL ,
    Sname VARCHAR(16),
    Ssex CHAR(2) DEFAULT '男' CHECK (Ssex='男' OR Ssex='女'),
    Sage SMALLINT CHECK(Sage>=15 AND Sage<=45),
    Sdept CHAR(2),
    PRIMARY KEY(Sno)
)  ENGINE = InnoDB;

Create Table COURSE
(   Cno CHAR(2) NOT NULL ,
    Cname VARCHAR(20),
    Cpno CHAR(2),
    Credit SMALLINT,
    PRIMARY KEY(Cno),
    foreign key(cpno) references course(cno)
) ENGINE = InnoDB;

Create table sc
(   sno char(7) not null,
    cno char(2) not null,
    grade smallint null check(grade is null or (grade between 0 and 100)),
    Primary key(sno,cno),
    Foreign key(sno) references student(sno),
    Foreign key(cno) references course(cno)
)  ENGINE = InnoDB;
```
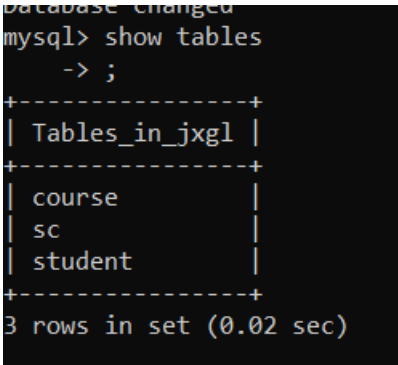
可以看到表格创建成功，使用

```
show tables;
```


表格完成，现在开始往表格中录入数据,

首先将表格放在下面

student

Sno	Sname	Ssex	Sage	Sdept
2005001	钱横	男	18	Cs
2005002	王林	女	19	Cs
2005003	李民	男	20	Is
2005004	赵欣然	女	16	Ma

course

cno	cname	cpno	credit
1	数据库系统	5	4
2	数学分析	NULL	2
3	信息系统导论	1	3
4	操作系统原理	6	3
5	数据结构	7	4
6	数据处理基础	NULL	4
7	C语言	6	7

sc

Sno	Cno	Grade

Sno	Cno	Grade
2005001	1	87
2005001	2	67
2005001	3	90
2005002	2	95
2005003	3	88

student

```
insert into student values('2005001','钱横','男',18,'Cs');
insert into student values('2005002','王林','女',19,'Cs');
insert into student values('2005003','李民','男',20,'Is');
insert into student values('2005004','赵欣然','女',16,'Ma');
```

course

```
insert into course values('1','数据库系统','5',4);
insert into course values('2','数学分析',null,2);
insert into course values('3','信息系统导论','1',3);
insert into course values('4','操作系统原理','6',3);
insert into course values('5','数据结构','7',4);
insert into course values('6','数据处理基础',null,4);
insert into course values('7','C语言','6',7);
```

sc

```
insert into sc values('2005001','1',87);
insert into sc values('2005001','2',67);
insert into sc values('2005001','3',90);
insert into sc values('2005002','2',95);
insert into sc values('2005003','3',88);
```

插入时得到结果均为

```
Query OK, 1 row affected (0.00 sec)
```

表明表内数据输入成功

通过select命令查询到表内具体数据如下

```
mysql> select *from student;
+---------+-----------+------+------+-------+
| Sno     | Sname     | Ssex | Sage | Sdept |
+---------+-----------+------+------+-------+
| 2005001 | 钱横      | 男   |   18 | Cs    |
| 2005002 | 王林      | 女   |   19 | Cs    |
| 2005003 | 李民      | 男   |   20 | Is    |
| 2005004 | 赵欣然    | 女   |   16 | Ma    |
+---------+-----------+------+------+-------+
4 rows in set (0.00 sec)
```

```
mysql> select *from course;
+-----+--------------------+------+--------+
| Cno | Cname              | Cpno | Credit |
+-----+--------------------+------+--------+
| 1   | 数据库系统         | 5    |      4 |
| 2   | 数学分析           | NULL |      2 |
| 3   | 信息系统导论       | 1    |      3 |
| 4   | 操作系统原理       | 6    |      3 |
| 5   | 数据结构           | 7    |      4 |
| 6   | 数据处理基础       | NULL |      4 |
| 7   | C语言              | 6    |      7 |
+-----+--------------------+------+--------+
7 rows in set (0.00 sec
```

```
mysql> select *from sc;
+---------+-----+-------+
| sno     | cno | grade |
+---------+-----+-------+
| 2005001 | 1   |    87 |
| 2005001 | 2   |    67 |
| 2005001 | 3   |    90 |
| 2005002 | 2   |    95 |
| 2005003 | 3   |    88 |
+---------+-----+-------+
5 rows in set (0.00 sec)
```

1、基于jxgl数据库，使用sql语句表达以下查询

（1）检索年龄大于23岁的男生的学号和姓名

输入代码如下

```
select sno,sname
from student
where ssex='男' and sage>23;
```

运行结果

```
mysql> select sno,sname
    -> from student
    -> where ssex='男' and sage>23;
Empty set （0.00 sec）
```

(2)检索至少选择一门课程的女学生的姓名

输入代码如下

```
select sname
from student,sc
where student.sno=sc.sno and ssex='女';
```

运行结果

```
+--------+
| sname  |
+--------+
| 王林    |
+--------+
1 row in set (0.00 sec)
```

(3)检索王林不学的课程的课程号

输入代码如下

```
select cno
from course
where cno not in
(select cno
from student, sc
where student.sno = sc.sno and sname='王林 ');
```

运行结果为

```
+-----+
| cno |
+-----+
| 6   |
| 3   |
| 1   |
| 4   |
| 7   |
| 5   |
+-----+
6 rows in set (0.00 sec)
```

(4)检索至少选修两门课程的学生学号

输入代码如下

```
select sno
from sc
group by sno
having count(*)>=2;
```

运行结果如下

```
+---------+
| sno     |
+---------+
| 2005001 |
+---------+
1 row in set (0.00 sec)
```

（5）检索全部学生都选修的课程号和课程名

输入代码如下

```sql
select course.cno,course.cname
from sc,course
where sc.cno=course.cno
group by sc.cno
having count(*)=
(select count(*)
from student);
```

运行结果如下

```
Empty set (0.00 sec)
```

(6)检索选修了所有三学分每门课程的学生的平均成绩

输入代码如下

不存在一门三学分的课没人选

```sql
select avg(grade)
from sc as X
where not exists
(    select Y.cno
     from course as Y
     where Y.cno not in
     (    select Z.cno
          from sc as Z
          where Z.cno = X.cno
     ) and credit = 3)
group by X.sno;
```

运行结果如下

```
Empty set (0.00 sec)
```

2、基于jxgl数据库，使用sql语句表达以下查询

（1）统计有学生选修的课程门数

输入代码如下

```
select count(*)
from course
where course.cno in
(select cno from sc
);
```

运行结果

```
+----------+
| count(*) |
+----------+
|        3 |
+----------+
1 row in set (0.00 sec)
```

(2)求选修4号课程的学生的平均年龄

输入代码如下

```
select avg(sage)
from student,sc
where student.sno=sc.sno and sc.cno='4';
group by student.sno;
```

运行结果

```
Empty set (0.00 sec)
```

(3)求学分为 3 的每门课程的学生平均成绩

输入代码如下

```
select avg(grade)
from sc,course
where sc.cno=course.cno and course.credit=3
group by sc.cno;
```

运行结果

```
+-----------+
| avg(grade) |
+-----------+
|   89.0000 |
+-----------+
1 row in set (0.00 sec)
```

(4)统计每门课程的学生选修人数，要求超过3人的课程才统计，要求输出课程号和选修人数，查询结果按人数降序排列，若人数相同，按课程号升序排列

输入代码如下

```
select cno,count(sno)
from sc
group by cno
having count(sno)>3
order by count(sno) desc, cno asc;
```

运行结果如下

```
Empty set (0.01 sec)
```

(5)检索学号比"王林"同学大而年龄比她小的学生姓名

输入代码如下

```
select sname
from student
where student.sno>(select sno from student where sname='王林')
and
student.sage<(select sage from student where sname='王林');
```

运行结果如下

```
+----------+
| sname    |
+----------+
| 赵欣然   |
+----------+
1 row in set (0.00 sec)
```

(6)检索姓名以"王"开头的所有学生的姓名和年龄

输入代码如下

```
select sname,sage
from student
where student.sname like '王%';
```

运行结果如下

```
+--------+------+
| sname  | sage |
+--------+------+
| 王林   |   19 |
+--------+------+
1 row in set (0.00 sec)
```

(7)在sc表中检索成绩为空值的学生的学号和课程号

输入代码如下

```
select sno,cno
from sc
where grade is null;
```

运行结果如下

```
Empty set (0.00 sec)
```

(8)求年龄大于女学生平均年龄的男学生的姓名和年龄

输入代码如下

```
select sname,sage
from student
where ssex='男' and sage>(select avg(sage)
                          from student
                          where ssex='女');
```

运行结果如下

```
+--------+------+
| sname  | sage |
+--------+------+
| 钱横   |   18 |
| 李民   |   20 |
+--------+------+
2 rows in set (0.00 sec)
```

(9)求年龄大于所有女学生年龄的男学生的姓名和年龄

输入代码如下

```
select sname,sage
from student
where ssex='男' and sage>(select max(sage)
                          from student
                          where ssex='女');
```

运行结果如下

```
+--------+------+
| sname  | sage |
+--------+------+
| 李民   |   20 |
+--------+------+
1 row in set (0.00 sec)
```

(10)检索选修 4 门以上课程的学生总成绩(不统计不及格课程)，并要求按总成绩的降序排列出来

输入代码如下

```sql
select sum(grade)
from sc
where grade>=60
group by sno
having count(*)>4
order by sum(grade) desc;
```

运行结果如下

```
Empty set (0.00 sec)
```