

实验报告

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课程名称	数据库系统			学期	2025 年秋季学期
任课教师	刘艳艳	完成日期	20251028	上机课时间	20251023
实验名称	MySQL 实现教务系统的数据库设计				

一、实验要求 (10%)

在教务系统的数据库设计时，完成以下内容：

- (1) 创建教务系统各数据库表，包括：Student, Course, Sc。设置主键和外键，以及用户定义的完整性约束条件。
- (2) 输入数据，体验实体完整性、参照完整性、以及用户定义的完整性约束。
- (3) 实现简单的数据浏览以及数据增删改
- (4) 用附件中的实验报告模板完成实验报告

二、实验内容及步骤 (80%)

- (1) 创建教务系统各数据库表，包括：Student, Course, Sc。设置主键和外键，以及用户定义的完整性约束条件。

```
mysql> CREATE DATABASE edus;
Query OK, 1 row affected (0.02 sec)
```

```
mysql> CREATE TABLE Student (
    -> Sno INT PRIMARY KEY,
    -> Sname VARCHAR(50) NOT NULL,
    -> Ssex ENUM('男', '女') NOT NULL,
    -> Sage INT CHECK (Sage BETWEEN 10 AND 100),
    -> Sdept VARCHAR(50) NOT NULL
    -> );
Query OK, 0 rows affected (0.04 sec)
```

```
mysql> CREATE TABLE Course (
    -> Cno INT PRIMARY KEY,
    -> Cname VARCHAR(100) NOT NULL,
    -> Ccredit DECIMAL(3,1) CHECK (Ccredit >= 0)
    -> );
Query OK, 0 rows affected (0.03 sec)
```

```
mysql> CREATE TABLE SC (
-> Sno INT,
-> Cno INT,
-> Grade DECIMAL(4,1) CHECK (Grade BETWEEN 0 AND 100),
-> PRIMARY KEY (Sno, Cno),
-> FOREIGN KEY (Sno) REFERENCES Student(Sno) ON DELETE CASCADE,
-> FOREIGN KEY (Cno) REFERENCES Course(Cno) ON DELETE CASCADE
-> );
Query OK, 0 rows affected (0.06 sec)
```

```
mysql> CREATE DATABASE edus;
Query OK, 1 row affected (0.02 sec)
```

```
mysql> USE edus;
Database changed
mysql> CREATE TABLE Student (
-> Sno INT PRIMARY KEY,
-> Sname VARCHAR(50) NOT NULL,
-> Ssex ENUM('男', '女') NOT NULL,
-> Sage INT CHECK (Sage BETWEEN 10 AND 100),
-> Sdept VARCHAR(50) NOT NULL
-> );
Query OK, 0 rows affected (0.04 sec)
```

```
mysql> CREATE TABLE Course (
-> Cno INT PRIMARY KEY,
-> Cname VARCHAR(100) NOT NULL,
-> Ccredit DECIMAL(3, 1) CHECK (Ccredit >= 0)
-> );
Query OK, 0 rows affected (0.03 sec)
```

```
mysql> CREATE TABLE SC (
-> Sno INT,
-> Cno INT,
-> Grade DECIMAL(4, 1) CHECK (Grade BETWEEN 0 AND 100),
-> PRIMARY KEY (Sno, Cno),
-> FOREIGN KEY (Sno) REFERENCES Student(Sno) ON DELETE CASCADE,
-> FOREIGN KEY (Cno) REFERENCES Course(Cno) ON DELETE CASCADE
-> );
Query OK, 0 rows affected (0.06 sec)
```

(2)输入数据，体验实体完整性、参照完整性、以及用户定义的完整性约束。

```
mysql> INSERT INTO Student (Sno, Sname, Ssex, Sage, Sdept) VALUES
-> (1001, '张强', '男', 20, '计算机科学'),
-> (1002, '李艳', '女', 19, '软件工程'),
-> (1003, '王刚', '男', 21, '数据科学'),
```

```
-> (1004, '孙芳', '女', 20, '计算机科学'),
-> (1005, '刘丽', '女', 22, '软件工程');
Query OK, 5 rows affected (0.01 sec)
Records: 5 Duplicates: 0 Warnings: 0
```

```
mysql> INSERT INTO Course (Cno, Cname, Ccredit) VALUES
-> (101, '程序设计基础', 3.0),
-> (102, '数据结构', 3.5),
-> (103, '数据库原理', 3.5),
-> (104, '操作系统', 3.5),
-> (201, '高等数学', 5.0),
-> (202, '线性代数', 3.0);
Query OK, 6 rows affected (0.02 sec)
Records: 6 Duplicates: 0 Warnings: 0
```

```
mysql> INSERT INTO SC (Sno, Cno, Grade) VALUES
-> (1001, 101, 85.5),
-> (1001, 201, 90.5),
-> (1001, 102, 76.5),
-> (1002, 101, 78.0),
-> (1002, 201, 82.0),
-> (1003, 101, 92.5),
-> (1003, 201, 88.0),
-> (1004, 103, 79.0),
-> (1005, 202, 91.0);
Query OK, 9 rows affected (0.01 sec)
Records: 9 Duplicates: 0 Warnings: 0
```

```
mysql> INSERT INTO Student (Sno, Sname, Ssex, Sage, Sdept) VALUES
-> (1001, '张强', '男', 20, '计算机科学'),
-> (1002, '李艳', '女', 19, '软件工程'),
-> (1003, '王刚', '男', 21, '数据科学'),
-> (1004, '孙芳', '女', 20, '计算机科学'),
-> (1005, '刘丽', '女', 22, '软件工程');
Query OK, 5 rows affected (0.01 sec)
Records: 5 Duplicates: 0 Warnings: 0
```

```

mysql> INSERT INTO Course (Cno, Cname, Ccredit) VALUES
-> (101, '程序设计基础', 3.0),
-> (102, '数据结构', 3.5),
-> (103, '数据库原理', 3.5),
-> (104, '操作系统', 3.5),
-> (201, '高等数学', 5.0),
-> (202, '线性代数', 3.0);
Query OK, 6 rows affected (0.02 sec)
Records: 6 Duplicates: 0 Warnings: 0

mysql> INSERT INTO SC (Sno, Cno, Grade) VALUES
-> (1001, 101, 85.5),
-> (1001, 201, 90.5),
-> (1001, 102, 76.5),
-> (1002, 101, 78.0),
-> (1002, 201, 82.0),
-> (1003, 101, 92.5),
-> (1003, 201, 88.0),
-> (1004, 103, 79.0),
-> (1005, 202, 91.0);
Query OK, 9 rows affected (0.01 sec)
Records: 9 Duplicates: 0 Warnings: 0

```

(3) 实现简单的数据浏览以及数据增删改

浏览:

```

mysql> SELECT * FROM Student;
+-----+-----+-----+-----+
| Sno | Sname | Ssex | Sage | Sdept      |
+-----+-----+-----+-----+
| 1001 | 张强   | 男    | 20   | 计算机科学 |
| 1002 | 李艳   | 女    | 19   | 软件工程   |
| 1003 | 王刚   | 男    | 21   | 数据科学   |
| 1004 | 孙芳   | 女    | 20   | 计算机科学 |
| 1005 | 刘丽   | 女    | 22   | 软件工程   |
+-----+-----+-----+-----+
5 rows in set (0.01 sec)

```

```

mysql> SELECT * FROM Course;
+-----+-----+-----+
| Cno | Cname        | Ccredit |
+-----+-----+-----+
| 101 | 程序设计基础 | 3.0     |
| 102 | 数据结构      | 3.5     |
| 103 | 数据库原理    | 3.5     |
| 104 | 操作系统      | 3.5     |

```

```

| 201 | 高等数学 | 5.0 |
| 202 | 线性代数 | 3.0 |
+----+-----+-----+
6 rows in set (0.00 sec)

```

```

mysql> SELECT * FROM Student;
+----+-----+-----+-----+-----+
| Sno | Sname | Ssex | Sage | Sdept |
+----+-----+-----+-----+-----+
| 1001 | 张强 | 男 | 20 | 计算机科学 |
| 1002 | 李艳 | 女 | 19 | 软件工程 |
| 1003 | 王刚 | 男 | 21 | 数据科学 |
| 1004 | 孙芳 | 女 | 20 | 计算机科学 |
| 1005 | 刘丽 | 女 | 22 | 软件工程 |
+----+-----+-----+-----+-----+
5 rows in set (0.01 sec)

```

```

mysql> SELECT * FROM Course;
+----+-----+-----+
| Cno | Cname | Ccredit |
+----+-----+-----+
| 101 | 程序设计基础 | 3.0 |
| 102 | 数据结构 | 3.5 |
| 103 | 数据库原理 | 3.5 |
| 104 | 操作系统 | 3.5 |
| 201 | 高等数学 | 5.0 |
| 202 | 线性代数 | 3.0 |
+----+-----+-----+
6 rows in set (0.00 sec)

```

实体完整性与参照完整性：

```

mysql> INSERT INTO Student VALUES (1001, '赵六', '男', 20, '计算机科学');
ERROR 1265 (01000): Data truncated for column 'Ssex' at row 1
mysql> INSERT INTO Student (Sname, Ssex, Sage, Sdept) VALUES ('钱七',
', '女', 21, '数据科学');
ERROR 1265 (01000): Data truncated for column 'Ssex' at row 1
mysql> INSERT INTO Course VALUES (101, 'Python 编程', 4.0);
ERROR 1062 (23000): Duplicate entry '101' for key 'course.PRIMARY'
mysql> INSERT INTO Course (Cname, Ccredit) VALUES ('Java 编程', 4.0);
ERROR 1364 (HY000): Field 'Cno' doesn't have a default value
mysql> INSERT INTO SC VALUES (1006, 101, 80.0);
ERROR 1452 (23000): Cannot add or update a child row: a foreign key
constraint fails (`edus`.`sc`, CONSTRAINT `sc_ibfk_1` FOREIGN KEY
(`Sno`) REFERENCES `student` (`Sno`) ON DELETE CASCADE)

```

```

mysql> INSERT INTO SC VALUES (1001, 301, 75.0);
ERROR 1452 (23000): Cannot add or update a child row: a foreign key
constraint fails (`edus`.`sc`, CONSTRAINT `sc_ibfk_2` FOREIGN KEY
(`Cno`) REFERENCES `course` (`Cno`) ON DELETE CASCADE)

```

```

mysql> INSERT INTO Student VALUES (1001, '赵六', '男', 20, '计算机科学');
ERROR 1265 (01000): Data truncated for column 'Ssex' at row 1
mysql> INSERT INTO Student (Sname, Ssex, Sage, Sdept) VALUES ('钱七', '女', 21, '数据科学');
ERROR 1265 (01000): Data truncated for column 'Ssex' at row 1
mysql> INSERT INTO course VALUES (101, 'Python 编程', 4.0);
ERROR 1062 (23000): Duplicate entry '101' for key 'course.PRIMARY'
mysql> INSERT INTO Course (Cname, Ccredit) VALUES ('Java 编程', 4.0);
ERROR 1364 (HY000): Field 'Cname' doesn't have a default value
mysql> INSERT INTO SC VALUES (1006, 101, 80.0);
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`edus`.`sc`, CONSTRAINT `sc_ibfk_1` FOREIGN KEY (`Sno`) REFERENCES `student` (`Sno`) ON DELETE CASCADE)
mysql> INSERT INTO SC VALUES (1001, 301, 75.0);
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`edus`.`sc`, CONSTRAINT `sc_ibfk_2` FOREIGN KEY (`Cno`) REFERENCES `course` (`Cno`) ON DELETE CASCADE)

```

增删改：

```

mysql> INSERT INTO Student VALUES (1006, '郑十', '男', 20, '数据科学');
Query OK, 1 row affected (0.06 sec)

```

```

mysql> UPDATE Student SET Sage=20 WHERE Sno=1002;

```

```

Query OK, 1 row affected (0.01 sec)

```

```

Rows matched: 1 Changed: 1 Warnings: 0

```

```

mysql> DELETE FROM SC WHERE Sno=1001 AND Cno=102;

```

```

Query OK, 1 row affected (0.02 sec)

```

```

mysql> SELECT * FROM Student;

```

Sno	Sname	Ssex	Sage	Sdept
1001	张强	男	20	计算机科学
1002	李艳	女	20	软件工程
1003	王刚	男	21	数据科学
1004	孙芳	女	20	计算机科学
1005	刘丽	女	22	软件工程
1006	郑十	男	20	数据科学

```

6 rows in set (0.00 sec)

```

```

mysql> SELECT * FROM SC;

```

Sno	Cno	Grade
1001	101	85.5
1001	201	90.5
1002	101	78.0
1002	201	82.0
1003	101	92.5
1003	201	88.0
1004	103	79.0
1005	202	91.0

```
8 rows in set (0.00 sec)
```

```
mysql> INSERT INTO Student VALUES (1006, '郑十', '男', 20, '数据科学');
Query OK, 1 row affected (0.06 sec)
```

```
mysql> UPDATE Student SET Sage=20 WHERE Sno=1002;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

```
mysql> DELETE FROM SC WHERE Sno=1001 AND Cno=102;
Query OK, 1 row affected (0.02 sec)
```

```
mysql> SELECT * FROM Student;
```

Sno	Sname	Ssex	Sage	Sdept
1001	张强	男	20	计算机科学
1002	李艳	女	20	软件工程
1003	王刚	男	21	数据科学
1004	孙芳	女	20	计算机科学
1005	刘丽	女	22	软件工程
1006	郑十	男	20	数据科学

```
6 rows in set (0.00 sec)
```

```
mysql> SELECT * FROM SC;
```

Sno	Cno	Grade
1001	101	85.5
1001	201	90.5
1002	101	78.0
1002	201	82.0
1003	101	92.5
1003	201	88.0
1004	103	79.0
1005	202	91.0

```
8 rows in set (0.00 sec)
```

三、心得总结（写出自己在完成实验过程中遇到的问题、解决方法，以及体会、收获等）（10%）

刚开始写代码的时候，忘记了一些语法，从 ppt 中复习后重新开始构思。一开始数据库反复建立又反复删除，总是想做到完美但总是出现小的问题。后来不着急写代码，先把表的列都想好，约束也都想好，随后直接打出来，得到一个基本的数据库。

在此基础之上，参照课上的例题与知识，给出了测试实体完整性等的语句，完成了基本的操作。