

《数据库系统原理》实验报告（1.1）

题目：交互式 SQL（1）

学号		姓名		日期	2023.10.17
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实验环境：

Docker MariaDB

处理器：11th Gen Intel(R) Core(TM) i5-11300H @ 3.10GHz 3.11 GHz

实验步骤及结果截图：

1. 建立表并查询表结构

1.1 建立并查询 dept 表

```
MariaDB [school_management]> create table dept (
-> no integer not null,
-> name varchar(255) not null,
-> primary key (no)
-> );
Query OK, 0 rows affected (0.013 sec)

MariaDB [school_management]> desc dept
-> ;
+-----+-----+-----+-----+-----+
| Field | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| no    | int(11)       | NO   | PRI | NULL    |       |
| name  | varchar(255)  | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+
2 rows in set (0.001 sec)

MariaDB [school_management]> 
```

1.2 建立并查询 student 表

```
MariaDB [school_management]> create table student ( no integer not null, name varchar(255) not null, age integer not null, d_no integer not null, primary key (no), foreign key (d_no) referen
ces dept(no) );
Query OK, 0 rows affected (0.021 sec)

MariaDB [school_management]> desc student
-> ;
+-----+-----+-----+-----+-----+
| Field | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| no    | int(11)       | NO   | PRI | NULL    |       |
| name  | varchar(255)  | NO   |     | NULL    |       |
| age   | int(11)       | NO   |     | NULL    |       |
| d_no  | int(11)       | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+
4 rows in set (0.001 sec)
```

1.3 建立并查询 course 表

```
MariaDB [school_management]> create table course (
-> no integer not null,
-> name varchar(255) not null,
-> credit integer not null,
-> d_no integer not null,
-> primary key (no),
-> foreign key (d_no) references dept(no)
-> );
Query OK, 0 rows affected (0.015 sec)

MariaDB [school_management]> desc course
-> ;
+-----+-----+-----+-----+-----+
| Field | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| no    | int(11)       | NO   | PRI | NULL    |       |
| name  | varchar(255)  | NO   |     | NULL    |       |
| credit | int(11)       | NO   |     | NULL    |       |
| d_no  | int(11)       | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+
4 rows in set (0.001 sec)

MariaDB [school_management]> 
```

1.4 建立并查询 score 表

```
MariaDB [school_management]> create table score (
-> s_no integer not null,
-> c_no integer not null,
-> score integer not null
-> ,
-> foreign key (s_no) references student(no),
-> foreign key (c_no) references course(no)
-> );
Query OK, 0 rows affected (0.013 sec)

MariaDB [school_management]> desc score
-> ;
+-----+-----+-----+-----+-----+
| Field | Type  | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| s_no  | int(11) | NO   | MUL | NULL    |       |
| c_no  | int(11) | NO   | MUL | NULL    |       |
| score | int(11) | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+
3 rows in set (0.001 sec)

MariaDB [school_management]>
```

2. 查询建立的约束

2.1 查询 student 表的约束

```
MariaDB [school_management]> select table_name, constraint_name, constraint_type from information_schema.TABLE_CONSTRAINTS where table_name="student";
+-----+-----+-----+
| table_name | constraint_name | constraint_type |
+-----+-----+-----+
| student    | PRIMARY         | PRIMARY KEY     |
| student    | student_ibfk_1  | FOREIGN KEY     |
+-----+-----+-----+
2 rows in set (0.000 sec)
```

2.2 查询 dept 表的约束

```
MariaDB [school_management]> select table_name, constraint_name, constraint_type from information_schema.TABLE_CONSTRAINTS where table_name="dept";
+-----+-----+-----+
| table_name | constraint_name | constraint_type |
+-----+-----+-----+
| dept       | PRIMARY         | PRIMARY KEY     |
+-----+-----+-----+
1 row in set (0.000 sec)
```

2.3 查询 course 表的约束

```
MariaDB [school_management]> select table_name, constraint_name, constraint_type from information_schema.TABLE_CONSTRAINTS where table_name="course";
+-----+-----+-----+
| table_name | constraint_name | constraint_type |
+-----+-----+-----+
| course     | PRIMARY         | PRIMARY KEY     |
| course     | course_ibfk_1   | FOREIGN KEY     |
+-----+-----+-----+
2 rows in set (0.001 sec)
```

2.2 查询 score 表的约束

```
MariaDB [school_management]> select table_name, constraint_name, constraint_type from information_schema.TABLE_CONSTRAINTS where table_name="score";
+-----+-----+-----+
| table_name | constraint_name | constraint_type |
+-----+-----+-----+
| score      | score_ibfk_1    | FOREIGN KEY     |
| score      | score_ibfk_2    | FOREIGN KEY     |
+-----+-----+-----+
2 rows in set (0.001 sec)
```

3. 将 student 表中的 name 列属性由 varchar 改为 char(15)

```
MariaDB [school_management]> alter table student
-> modify name char(15)
-> ;
Query OK, 0 rows affected (0.029 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [school_management]> desc student
-> ;
+-----+-----+-----+-----+-----+-----+
| Field | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| no    | int(11)   | NO   | PRI | NULL    |       |
| name  | char(15)  | YES  |     | NULL    |       |
| age   | int(11)   | NO   |     | NULL    |       |
| d_no  | int(11)   | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.002 sec)
```

4. 用 alter 添加 course.d_no 及其约束

```
MariaDB [school_management]> desc course
-> ;
+-----+-----+-----+-----+-----+-----+
| Field | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| no    | int(11)   | NO   | PRI | NULL    |       |
| name  | varchar(255) | NO   |     | NULL    |       |
| credit | int(11)   | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.001 sec)

MariaDB [school_management]> alter table course add(d_no integer not null references dept(no));
Query OK, 0 rows affected (0.029 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [school_management]> desc course
-> ;
+-----+-----+-----+-----+-----+-----+
| Field | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| no    | int(11)   | NO   | PRI | NULL    |       |
| name  | varchar(255) | NO   |     | NULL    |       |
| credit | int(11)   | NO   |     | NULL    |       |
| d_no  | int(11)   | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.002 sec)
```

5. 将 score 表中所有约束删除后再建立一次 查看表信息核约束信息

```
MariaDB [school_management]> desc score
-> ;
+-----+-----+-----+-----+-----+-----+
| Field | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| s_no  | int(11)   | NO   | MUL | NULL    |       |
| c_no  | int(11)   | NO   | MUL | NULL    |       |
| score | int(11)   | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.001 sec)

MariaDB [school_management]> show create table score
-> ;
+-----+
--+
| Table | Create Table
+-----+
|
+-----+
--+
| score | CREATE TABLE `score` (
  `s_no` int(11) NOT NULL,
  `c_no` int(11) NOT NULL,
  `score` int(11) NOT NULL,
  KEY `s_no` (`s_no`),
  KEY `c_no` (`c_no`),
  CONSTRAINT `score_ibfk_1` FOREIGN KEY (`s_no`) REFERENCES `student` (`no`),
  CONSTRAINT `score_ibfk_2` FOREIGN KEY (`c_no`) REFERENCES `course` (`no`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci |
+-----+
--+
1 row in set (0.000 sec)
```

删除约束

```
MariaDB [school_management]> alter table score drop index s_no
-> ;
Query OK, 0 rows affected (0.018 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [school_management]> alter table score drop index c_no
-> ;
Query OK, 0 rows affected (0.015 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [school_management]> desc score
-> ;
+-----+-----+-----+-----+-----+
| Field | Type  | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| s_no  | int(11) | NO   |     | NULL    |       |
| c_no  | int(11) | NO   |     | NULL    |       |
| score | int(11) | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+
3 rows in set (0.001 sec)

MariaDB [school_management]>
```

重建 score 约束

```
MariaDB [school_management]> alter table score add constraint s_number foreign key(s_no) references student(no)
-> ;
Query OK, 0 rows affected (0.037 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [school_management]> alter table score add constraint c_number foreign key(c_no) references course(no)
-> ;
Query OK, 0 rows affected (0.034 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [school_management]> desc score
-> ;
+-----+-----+-----+-----+-----+
| Field | Type  | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| s_no  | int(11) | NO   | MUL | NULL    |       |
| c_no  | int(11) | NO   | MUL | NULL    |       |
| score | int(11) | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+
3 rows in set (0.003 sec)
```

出现的问题:

1. 未指定使用 database, 未创建自定义 database

```
MariaDB [(none)]> create table student();
ERROR 1046 (3D000): No database selected
MariaDB [(none)]>
```

```
MariaDB [(none)]> show databases
-> ;
+-----+
| Database |
+-----+
| information_schema |
| mysql      |
| performance_schema |
| school_management |
| sys        |
+-----+
5 rows in set (0.000 sec)

MariaDB [(none)]> use information_schema
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [information_schema]> create table student();
ERROR 1044 (42000): Access denied for user 'root'@'localhost' to database 'information_schema'
MariaDB [information_schema]>
```

2. 删除外键关系, 出现无法删除的情况

```
MariaDB [school_management]> alter table student drop index d_no
-> ;
ERROR 1553 (HY000): Cannot drop index 'd_no': needed in a foreign key constraint
```

解决方案:

1. 创建 database 并进入创建的 database 中

创建 database school_management 并 use 创建的 database

```
MariaDB [(none)]> show databases
-> ;
+-----+
| Database |
+-----+
| information_schema |
| mysql |
| performance_schema |
| school_management |
| sys |
+-----+
5 rows in set (0.000 sec)
```

```
MariaDB [(none)]> use school_management
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
MariaDB [school_management]> show tables;
+-----+
| Tables_in_school_management |
+-----+
| course |
| dept |
| score |
| student |
+-----+
4 rows in set (0.000 sec)
```

2. 首先删除外键，继续删除 index

查看 table 的 constraints 的名称:

```
MariaDB [school_management]> show create table course
-> ;
+-----+
| Table | Create Table
+-----+
| course | CREATE TABLE `course` (
  `no` int(11) NOT NULL,
  `name` varchar(255) NOT NULL,
  `credit` int(11) NOT NULL,
  `d_no` int(11) NOT NULL,
  PRIMARY KEY (`no`),
  KEY `d_no` (`d_no`),
  CONSTRAINT `course_ibfk_1` FOREIGN KEY (`d_no`) REFERENCES `dept` (`no`)
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_general_ci |
+-----+
1 row in set (0.000 sec)
```

Drop 外键

```
MariaDB [school_management]> alter table course drop foreign key course_ibfk_1
-> ;
Query OK, 0 rows affected (0.014 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

Drop index

```
MariaDB [school_management]> alter table course drop index d_no
-> ;
Query OK, 0 rows affected (0.016 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

若想删除该表项:

```
MariaDB [school_management]> desc course
-> ;
+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+
| no | int(11) | NO | PRI | NULL | |
| name | varchar(255) | NO | | NULL | |
| credit | int(11) | NO | | NULL | |
| d_no | int(11) | NO | | NULL | |
+-----+
4 rows in set (0.001 sec)
```

```
MariaDB [school_management]> alter table course
-> add(d_no integer not null references dept(no));
ERROR 1060 (42S21): Duplicate column name 'd_no'
MariaDB [school_management]> alter table course drop d_no
-> ;
Query OK, 0 rows affected (0.017 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [school_management]> desc course
-> ;
+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+
| no | int(11) | NO | PRI | NULL | |
| name | varchar(255) | NO | | NULL | |
| credit | int(11) | NO | | NULL | |
+-----+
3 rows in set (0.001 sec)
```

