

《数据库系统原理》实验报告（一）

题目：交互式 SQL (1)

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实验环境：Docker + mariadb

实验步骤及结果截图：

(1) 建立 student、dept、course、score 表：

```
MariaDB [test]> create table student(
-> no int not null primary key,
-> name varchar(20) not null,
-> gender enum('male', 'female') not null,
-> age int not null
-> );
Query OK, 0 rows affected (0.011 sec)
```

```
MariaDB [test]> desc student
-> ;
+-----+-----+-----+-----+-----+-----+
| Field | Type                | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| no    | int(11)             | NO   | PRI | NULL    |       |
| name  | varchar(20)         | NO   |     | NULL    |       |
| gender| enum('male','female')| NO   |     | NULL    |       |
| age   | int(11)             | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
4 rows in set (0.002 sec)
```

```
MariaDB [test]> create table dept(
-> no int not null primary key,
-> name varchar(20) not null
-> );
Query OK, 0 rows affected (0.006 sec)
```

```
MariaDB [test]> desc dept;
+-----+-----+-----+-----+-----+-----+
| Field | Type                | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| no    | int(11)             | NO   | PRI | NULL    |       |
| name  | varchar(20)         | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.001 sec)
```

```
MariaDB [test]> create table course(
-> no int not null primary key,
-> name varchar(20) not null,
-> credit int not null
-> );
Query OK, 0 rows affected (0.008 sec)
```

```
MariaDB [test]> desc course;
+-----+-----+-----+-----+-----+-----+
| Field | Type                | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| no    | int(11)             | NO   | PRI | NULL    |       |
| name  | varchar(20)         | NO   |     | NULL    |       |
| credit| int(11)             | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.001 sec)
```

```
MariaDB [test]> create table score(
-> s_no int not null,
-> c_no int not null,
-> score int not null
-> );
Query OK, 0 rows affected (0.006 sec)
```

```
MariaDB [test]> 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)
```

(2) 将 student 中的 name 由 varchar 改为 char(15):

```
MariaDB [test]> alter table student modify column name char(15);
Query OK, 0 rows affected (0.014 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> desc student
-> ;
+-----+-----+-----+-----+-----+
| Field | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| no    | int(11)       | NO   | PRI | NULL    |       |
| name  | char(15)      | YES  |     | NULL    |       |
| gender| enum('male','female')| NO   |     | NULL    |       |
| age   | int(11)       | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+
4 rows in set (0.002 sec)
```

(3) 用 alter 添加 student 和 course 的 d_no 列及其约束:

```
MariaDB [test]> alter table student add d_no int not null;
Query OK, 0 rows affected (0.009 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [test]> alter table student add foreign key(d_no) references dept(no);
Query OK, 0 rows affected (0.016 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> desc student
-> ;
+-----+-----+-----+-----+-----+
| Field | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| no    | int(11)       | NO   | PRI | NULL    |       |
| name  | char(15)      | YES  |     | NULL    |       |
| gender| enum('male','female')| NO   |     | NULL    |       |
| age   | int(11)       | NO   |     | NULL    |       |
| d_no  | int(11)       | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+
5 rows in set (0.002 sec)
```

```
MariaDB [test]> alter table course add d_no int not null;
Query OK, 0 rows affected (0.008 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [test]> alter table course add foreign key(d_no) references dept(no);
Query OK, 0 rows affected (0.016 sec)
Records: 0 Duplicates: 0 Warnings: 0

MariaDB [test]> desc course;
+-----+-----+-----+-----+-----+
| Field | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+
| no    | int(11)       | NO   | PRI | NULL    |       |
| name  | varchar(20)   | NO   |     | NULL    |       |
| credit| int(11)       | NO   |     | NULL    |       |
| d_no  | int(11)       | NO   | MUL | NULL    |       |
+-----+-----+-----+-----+-----+
4 rows in set (0.002 sec)
```

```
MariaDB [test]> 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)

```
MariaDB [test]> SELECT table_name, constraint_name, constraint_type F
ROM 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 (0.000 sec)

(4) **score** 表中所有约束删除后再建立一次:

原本经过和上面一样的约束操作，**score** 表如下:

```
MariaDB [test]> SELECT table_name, constraint_name, constraint_type F
ROM 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)

删除约束:

```
MariaDB [test]> alter table score drop foreign key score_ibfk_1;
Query OK, 0 rows affected (0.009 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> alter table score drop foreign key score_ibfk_2;
Query OK, 0 rows affected (0.009 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
Query OK, 0 rows affected (0.023 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> alter table score modify column c_no int;
Query OK, 0 rows affected (0.016 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> alter table score modify column score int;
Query OK, 0 rows affected (0.017 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> desc score;
+-----+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| s_no  | int(11) | YES  | MUL | NULL    |       |
| c_no  | int(11) | YES  | MUL | NULL    |       |
| score | int(11) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.001 sec)
```

```
MariaDB [test]> SELECT table_name, constraint_name, constraint_type FROM information_schema.TABLE_
CONSTRAINTS WHERE table_name='score';
Empty set (0.001 sec)
```

重新建立约束:

```
MariaDB [test]> alter table score modify column s_no int not null;
Query OK, 0 rows affected (0.016 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> alter table score modify column c_no int not null;
Query OK, 0 rows affected (0.016 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> alter table score modify column score int not null;
Query OK, 0 rows affected (0.016 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> alter table score add foreign key(s_no) references student(no);
Query OK, 0 rows affected (0.019 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> alter table score add foreign key(c_no) references course(no);
Query OK, 0 rows affected (0.019 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
MariaDB [test]> 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)

MariaDB [test]> 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     |
+-----+-----+-----+
```

出现的问题：

- (1) 开始时创建失败，阅读官方文档后发现需要新建并转到其中，但是新建失败。

```
MariaDB [(none)]> CREATE DATABASE IF NOT EXISTS try1;
ERROR 1044 (42000): Access denied for user 'liechain'@'%' to database 'try1'
```

- (2) 初次尝试难以有效检索到相关功能的对应语句，网上搜索的语句时现报错。

- (3) 删除约束时没有完全掌握约束名称的概念，删除外键约束出现困难。

解决方案：

- (1) 改用 root 登录，可以成功创建并转到数据库中：

```
# mariadb -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 6
Server version: 11.1.2-MariaDB-1:11.1.2+maria-ubu2204 mariadb.org binary distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> CREATE DATABASE IF NOT EXISTS test;
Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]> USE test;
Database changed
```

- (2) 多搜，多尝试。

- (3) 通过检索约束确定外键约束名，成功删除约束。