

《数据库系统原理》实验报告（1）

题目：DDL 实验语言

学号

姓名

日期

2024.3.26

实验环境：

interesting_jennings

oceanbase/oceanbase-ce:latest

aa259f8fb048

STATUS

Running (51 minutes ago)

Logs

Inspect

Bind mounts

Exec

Files

Stats

sh-4.4# obclient -uroot@sys -h127.1 -P2881

Welcome to the OceanBase. Commands end with ; or \g.

Your OceanBase connection id is 3221493409

Server version: OceanBase_CE 4.2.2.0 (r100010012024022719-c984fe7cb7a4cef85a40323a0d073f0c9b7b8235) (Built Feb 27 2024 19:20:54)

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

obclient [(none)]> create database my_first_db;

Query OK, 1 row affected (0.018 sec)

obclient [(none)]> use my_first_db;

Database changed

obclient [my_first_db]> create table student;

实验步骤及结果截图：

1. 参照下表内容，在数据库中建立教学管理系统相关数据表。

表名：Student

字段	类型	约束
No	Integer	主键，非空
Name	Varchar	非空
Gender	Varchar	非空，只能为 F 或者 M
Age	Integer	非空
D_no	Integer	非空，外键

表名：Dept

字段	类型	约束
No	Integer	主键，非空
Name	Varchar	非空

表名：Course

字段	类型	约束
No	Integer	主键，非空
Name	Varchar	非空
Credit	Integer	非空
D_no	Integer	非空，外键

表名：Score

字段	类型	约束
S_no	Integer	非空，外键
C_no	Integer	非空，外键
Score	Integer	非空

解答：

```
obclient [my_first_db]> create table dept(no int not null,name varchar(20)not null,primary key(no));
Query OK, 0 rows affected (0.034 sec)

obclient [my_first_db]> create table student(no int not null,name varchar(20)not null,gender varchar(1)not null,age int not null,d_no int not null,primary key(no),foreign key(d_no) reference
s dept(no),check (gender in ('F','M')));
Query OK, 0 rows affected (0.075 sec)

obclient [my_first_db]> create table course(no int not null,name varchar(20)not null,credit int not null,d_no int not null,primary key(no),foreign key (d_no) references dept(no));
Query OK, 0 rows affected (0.046 sec)

obclient [my_first_db]> create table score(s_no int not null,c_no int not null,score int not null,foreign key (s_no) references student(no),foreign key (c_no) references course(no));
Query OK, 0 rows affected (0.065 sec)
```

2.使用以下语句查询表结构 DESC<表名>

解答：

```
obclient [my_first_db]> desc student;
```

Field	Type	Null	Key	Default	Extra
no	int(11)	NO	PRI	NULL	
name	varchar(20)	NO		NULL	
gender	varchar(1)	NO		NULL	
age	int(11)	NO		NULL	
d_no	int(11)	NO		NULL	

5 rows in set (0.005 sec)

```
obclient [my_first_db]> desc dept;
```

Field	Type	Null	Key	Default	Extra
no	int(11)	NO	PRI	NULL	
name	varchar(20)	NO		NULL	

2 rows in set (0.006 sec)

```
obclient [my_first_db]> 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		NULL	

4 rows in set (0.005 sec)

```
obclient [my_first_db]> 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 (0.005 sec)

3.使用以下语句查询建立的约束:

```
SELECT table_name, constraint_name, constraint_type
FROM information_schema.TABLE_CONSTRAINTS
WHERE table_name='表名'
```

解答:

```
obclient [my_first_db]> 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_OBCHECK_1711444046718862	CHECK
student	student_OBFK_1711444046716294	FOREIGN KEY

3 rows in set (0.063 sec)

```
obclient [my_first_db]> 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 (0.030 sec)

```
obclient [my_first_db]> 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_OBFK_1711444142870660	FOREIGN KEY

2 rows in set (0.003 sec)

```
obclient [my_first_db]> select table_name,constraint_name,constraint_type from information_schema.table_constraints where table_name='score';
```

table_name	constraint_name	constraint_type
score	score_OBFK_1711444321309918	FOREIGN KEY
score	score_OBFK_1711444321312900	FOREIGN KEY

2 rows in set (0.004 sec)

4. 将 student 中的 name 由 varchar 改为 char(15)。

解答：

```
obclient [my_first_db]> desc student;
```

Field	Type	Null	Key	Default	Extra
no	int(11)	NO	PRI	NULL	
name	varchar(20)	NO		NULL	
gender	varchar(1)	NO		NULL	
age	int(11)	NO		NULL	
d_no	int(11)	NO		NULL	

5 rows in set (0.006 sec)

```
obclient [my_first_db]> alter table student modify name char(15) not null;
Query OK, 0 rows affected (0.466 sec)
```

```
obclient [my_first_db]> desc student;
```

Field	Type	Null	Key	Default	Extra
no	int(11)	NO	PRI	NULL	
name	char(15)	NO		NULL	
gender	varchar(1)	NO		NULL	
age	int(11)	NO		NULL	
d_no	int(11)	NO		NULL	

5 rows in set (0.005 sec)

5. 使用 alter 添加 student 和 course 的 d_no 列及其约束。

解答：

```
obclient [my_first_db]> desc student;
```

Field	Type	Null	Key	Default	Extra
no	int(11)	NO	PRI	NULL	
name	char(15)	NO		NULL	
gender	varchar(1)	NO		NULL	
age	int(11)	NO		NULL	
d_no	int(11)	NO		NULL	

5 rows in set (0.002 sec)

```
obclient [my_first_db]> alter table student modify d_no int null;
Query OK, 0 rows affected (0.042 sec)
```

```
obclient [my_first_db]> desc student;
```

Field	Type	Null	Key	Default	Extra
no	int(11)	NO	PRI	NULL	
name	char(15)	NO		NULL	
gender	varchar(1)	NO		NULL	
age	int(11)	NO		NULL	
d_no	int(11)	YES		NULL	

5 rows in set (0.002 sec)

```
obclient [my_first_db]> 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		NULL	

4 rows in set (0.007 sec)

```
obclient [my_first_db]> alter table course modify d_no int null;
Query OK, 0 rows affected (0.035 sec)
```

```
obclient [my_first_db]> 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)	YES		NULL	

4 rows in set (0.002 sec)

6. 将 score 表中所有约束删除后再建立一次

解答:

```
obclient [my_first_db]> select table_name,constraint_name,constraint_type from information_schema.table_constraints where table_name='score';
+-----+-----+-----+
| table_name | constraint_name | constraint_type |
+-----+-----+-----+
| score      | score_OBFK_1711444321309918 | FOREIGN KEY     |
| score      | score_OBFK_1711444321312900  | FOREIGN KEY     |
+-----+-----+-----+
2 rows in set (0.038 sec)
```

```
obclient [my_first_db]> alter table score drop constraint OBFK_1711444321309918;
ERROR 3940 (HY000): Constraint 'OBFK_1711444321309918' does not exist.
obclient [my_first_db]> alter table score drop constraint score_OBFK_1711444321309918;
Query OK, 0 rows affected (0.045 sec)
```

```
obclient [my_first_db]> select table_name,constraint_name,constraint_type from information_schema.table_constraints where table_name='score';
+-----+-----+-----+
| table_name | constraint_name | constraint_type |
+-----+-----+-----+
| score      | score_OBFK_1711444321312900  | FOREIGN KEY     |
+-----+-----+-----+
1 row in set (0.003 sec)
```

```
obclient [my_first_db]> alter table score drop constraint score_OBFK_1711444321312900;
Query OK, 0 rows affected (0.031 sec)
```

```
obclient [my_first_db]> select table_name,constraint_name,constraint_type from information_schema.table_constraints where table_name='score';
Empty set (0.002 sec)
```

```
obclient [my_first_db]> 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 (0.002 sec)
```

```
obclient [my_first_db]> alter table score modify s_no int null;
Query OK, 0 rows affected (0.033 sec)
```

```
obclient [my_first_db]> alter table score modify c_no int null;
Query OK, 0 rows affected (0.030 sec)
```

```
obclient [my_first_db]> alter table score modify score int null;
Query OK, 0 rows affected (0.030 sec)
```

```
obclient [my_first_db]> desc score;
```

```
+-----+-----+-----+-----+-----+-----+
| Field | Type   | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| s_no  | int(11)| YES  |     | NULL    |       |
| c_no  | int(11)| YES  |     | NULL    |       |
| score | int(11)| YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.002 sec)
```



```

obclient [my_first_db]> alter table score modify s_no int not null;
Query OK, 0 rows affected (0.139 sec)

obclient [my_first_db]> alter table score modify c_no int not null;
Query OK, 0 rows affected (0.137 sec)

obclient [my_first_db]> alter table score modify score int not null;
Query OK, 0 rows affected (0.137 sec)

obclient [my_first_db]> alter table score add constraint NO_000 foreign key(s_no) references student(no);
Query OK, 0 rows affected (0.139 sec)

obclient [my_first_db]> alter table score add constraint NO_001 foreign key(c_no) references course(no);
Query OK, 0 rows affected (0.141 sec)

obclient [my_first_db]> 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)

obclient [my_first_db]> select table_name,constraint_name,constraint_type from information_schema.table_constraints where table_name='score';
+-----+-----+-----+
| table_name | constraint_name | constraint_type |
+-----+-----+-----+
| score      | NO_000          | FOREIGN KEY     |
| score      | NO_001          | FOREIGN KEY     |
+-----+-----+-----+
2 rows in set (0.003 sec)

```

出现的问题：（问题与下面的解决方案每条对应）

1. 按照教程搭建好环境后，首先确定了是在搭建好 oceanbase 后的地方直接编写代码，但表格不能成功建立

2. 建表顺序问题，一开始我按照题目给定的顺序建立表格，出现以下情况

```
obclient [my_first_db]> create table student(no int not null,name varchar(20)not null,gender varchar(1)not null,age int not null,d_no int not null,primary key(no),foreign key(d_no) referen
s dept(no),check (gender in ('F','M')));
ERROR 1146 (42S02): Table doesn't exist
```

3. 对于第五题理解有误，认为是要添加 d_no 列，但是 d_no 列已经存在

4. 对于第六题理解不够全面，起初只删除了外码这一约束

解决方案：

1. 要先建立数据库才能在数据库里建立表格，

```
obclient [(none)]> create database my_first_db;
Query OK, 1 row affected (0.018 sec)
```

```
obclient [(none)]> use my_first_db;
Database changed
obclient [my_first_db]> create table student(;
```

至此成功建立 database 后，再在 my_first_db 里面创建 table 就可以了。

2. 出现建表失败的原因是 student 的外码依赖于 dept,因此需要先建立 dept 才能建立 student，也就是说在建立多个表格时要先建立没有外码的表格，对于有外码的表格来说，被参照关系要在参照关系之前建立。

3. 其实题意 alter 是改变，意思就是改变 student 和 course 两个表格对于 d_no 的约束，即改变非空或者外码的约束

4. 约束包括非空和外码，因此在利用 cconstraint_name 删除掉外码之后，还要通过 alter 来删除非空，至此才是完全删除了约束，之后再分别建立外码和非空，注意外码要重新命名新的 cconstraint_name