实验3 SQL数据完整性

实验目的:

1. 熟悉通过SQL进行数据完整性控制的方法。

实验平台:

1. 数据库管理系统: MySQL

实验内容和要求:

- 1. 定义若干表,其中包括primary key,foreign key和check的定义。
- 2. 让表中插入数据,考察primary key如何控制实体完整性。
- 3. 删除被引用表中的行,考察foreign key中on delete子句如何控制参照完整性。
- 4. 修改被引用表中的行的primary key,考察foreign key中on update子句如何控制参照完整性。
- 5. 修改或插入表中数据,考察check子句如何控制校验完整性。
- 6. 定义一个assertion,并通过修改表中数据考察断言如何控制数据完整性。
- 7. 定义一个trigger,并通过修改表中数据考察触发器如何起作用。

实验过程:

1. 建立多个新表,包含主键与外键。

```
create table department
 2
       (dept_name varchar(20),
 3
        building
                      varchar(15),
 4
        budget
                           numeric(12,2) check (budget > 0),
 5
        primary key (dept_name)
 6
       ):
   create table student
8
                  varchar(5),
       (ID
9
                       varchar(20) not null,
        name
        dept_name
                       varchar(20),
10
        primary key (ID),
11
12
        foreign key (dept_name) references department
   (dept_name)
13
       ):
14 #注意表的建立顺序,由于student参照了department,必须先建立department。
```

2. 向表中插入数据,

```
insert into department values ('Finance', 'Painter', '120000');
insert into department values ('History', 'Painter', '50000');
insert into department values ('Music', 'Packard', '80000');
insert into department values ('Physics', 'Watson', '70000');
```

	dept_name	building	budget
•	Finance	Painter	120000.00
	History	Painter	50000.00
	Music	Packard	80000.00
	Physics	Watson	70000.00
	NULL	NULL	NULL

再插入重复主键的记录。

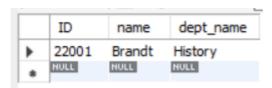
```
1 insert into department values ('Physics', 'Newyo', '90000');
```

出现错误信息。

21:11:34 insert into department values ('Physics', 'Newyo', '90000') Error Code: 1062. Duplicate entry 'Physics' for key 'department.PRIMARY' 0.000 sec

3. 删除被引用表中的行,考察foreign key 中on delete 子句如何控制参照完整性。 首先向student表中插入一条记录。

```
1 insert into student values ('22001', 'Brandt', 'History');
```



然后删除 'History' 这个系。发现报错(已提前关闭安全模式)。

```
Delete from department where dept_name = 'History';
```

21:20:25 Delete from department where dept_name = 'History' Error Code: 1451. Cannot delete or update a parent row: a foreign key constraint fails (testyh.student, CONSTRAINT student_ibfk_1 FOREIGN KEY (dept_name)

REFERENCES department (dept_name)) 0.015 sec

4. 修改被引用表中的行的primary key,考察foreign key 中on update 子句如何控制参照完整件。

```
update department
set dept_name = 'Math'
where building = 'Painter';
```

出现错误信息。

21:25:59 update department set dept_name = 'Math' where building = 'Painter' Error Code: 1451. Cannot delete or update a parent row: a foreign key constraint fails (testyh.student, CONSTRAINT student_ibfk_1 FOREIGN KEY (dept_name) REFERENCES department (dept_name)) 0.015 sec

5. 修改或插入表中数据,考察check子句如何控制校验完整性。

```
1 insert into department values ('Math', 'Nothing', '-8888');
```

报错信息:

21:29:23 insert into department values ('Math', 'Nothing', '-8888') Error Code: 3819. Check constraint 'department_chk_1' is violated. 0.000 sec

6. 定义一个assertion,并通过修改表中数据考察断言如何控制数据完整性。

```
1 Create assertion money
2 check
3 (not exists (select * from department
4 Where budget>80000));
```

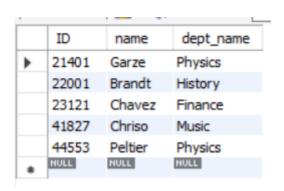
MySQL 不支持断言,无法执行,报错。

7. 定义一个trigger, 并通过修改表中数据考察触发器如何起作用。

原先表department:

	dept_name	building	budget
•	Finance	Painter	120000.00
	History	Painter	50000.00
	Music	Packard	80000.00
	Physics	Watson	70000.00
	NULL	NULL	NULL

原先表student:



```
9 end;$$
10 Delimiter;
11
12 #更新department
13 update department
14 set budget = '50000';
15 where dept_name = 'Physics';
```

更新后department的数据:

	dept_name	building	budget	
•	Finance	Painter	120000.00	
	History	Painter	50000.00	
	Music	Packard	80000.00	
	Physics	Watson	50000.00	
	NULL	NULL	NULL	

更新后student的数据:

