《数据库系统原理》实验报告（五）					
题目：上机实验课（五）PL/SQL 基础					
学号	1853790	姓名	庄镇华	日期	2020.11.10
实验环境：VMware 虚拟机 Red Hat5 系统下的 oracle 环境					

实验步骤及结果截图：

1 建立 table studentsA

Sno char(9) primary key

Sname char(20) unique

Ssex char(20)

Sage smallint

Sdept char(20)

```
CREATE TABLE  studentsA
(
    Sno char(9) PRIMARY KEY,
    Sname char(20),
    Ssex char(20),
    Sage smallint,
    Sdept char(20),
    CONSTRAINT studentA_u1 UNIQUE (Sname)
);
DESC studentsA;
```

Table created.

Name	Null?	Type
SNO	NOT NULL	CHAR(9)
SNAME		CHAR(20)
SSEX		CHAR(20)
SAGE		NUMBER(38)
SDEPT		CHAR(20)

2 建立 table coursesA

Cno char(4) primary key

Cname char(40)

Cpno char(4)

Ccredit smallint

```
CREATE TABLE coursesA
(
    Cno char(4) PRIMARY KEY,
    Cname   char(40),
    Cpno    char(4),
    Ccredit smallint
);
DESC coursesA;
```

Name	Null?	Type
CNO	NOT NULL	CHAR(4)
CNAME		CHAR(40)
CPNO		CHAR(4)
CCREDIT		NUMBER(38)

3 建立 table SC

Sno char(9)

Cno char(4)

Grade smallint

primary key (Sno,Cno)

foreign key (Sno) references student(Sno)

foreign key (Cno) references course(Cno)

```
CREATE TABLE SC
(
    Sno char(9),
    Cno char(4),
    Grade   smallint,
    PRIMARY KEY (Sno, Cno),
    FOREIGN KEY (Sno) REFERENCES studentsA(Sno),
    FOREIGN KEY (Cno) REFERENCES coursesA(Cno)
);
DESC SC;
```

Name	Null?	Type
SNO	NOT NULL	CHAR(9)
CNO	NOT NULL	CHAR(4)
GRADE		NUMBER(38)

4 插入数据

insert into studentsA values ('200215121','Li Yong','male',20,'CS');

insert into studentsA values ('200215122','Liu Chen','female',19,'CS');

insert into studentsA values ('200215123','Wang Min','female',18,'MA');

insert into studentsA values ('200215125','Zhang Li','male',19,'IS');

SNO	SNAME	SSEX	SAGE	SDEPT
200215121	Li Yong	male	20	CS
200215122	Liu Chen	female	19	CS
200215123	Wang Min	female	18	MA
200215125	Zhang Li	male	19	IS

insert into coursesA(Cno,Cname,Cpno,Ccredit) values
('0001','database','5',4);

insert into coursesA (Cno,Cname,Ccredit) values ('0002','maths',2);

insert into coursesA (Cno,Cname,Cpno,Ccredit) values ('0003','IS','1',4);

insert into coursesA (Cno,Cname,Cpno,Ccredit) values ('0004','OS','6',3);

insert into coursesA (Cno,Cname,Cpno,Ccredit) values ('0005','data
struncture','7',4);

insert into coursesA (Cno,Cname,Ccredit) values ('0006','data process',2);

insert into coursesA (Cno,Cname,Cpno,Ccredit) values
('0007','PASCAL','6',4);

CNO	CNAME	CPNO	CCREDIT
0001	database	5	4
0002	maths		2
0003	IS	1	4
0004	OS	6	3
0005	data struncture	7	4
0006	data process		2
0007	PASCAL	6	4

```
insert into SC values ('200215121','0001',92);
insert into SC values ('200215121','0002',85);
insert into SC values ('200215121','0003',88);
insert into SC values ('200215122','0002',90);
insert into SC values ('200215122','0003',80);
```

SNO	CNO	GRADE
200215121	0001	92
200215121	0002	85
200215121	0003	88
200215122	0002	90
200215122	0003	80

5，作业：创建简单的 PL/SQL 程序

1） 创建一个删除某门课程的过程，并执行一个样例（删除 Cno='0001'的课程），并显示删除后的表格 coursesA

```
CREATE OR REPLACE PROCEDURE DeleteCno(Cno in char)
    IS
BEGIN
    DELETE FROM SC
        WHERE Cno = DeleteCno.Cno;
    DELETE FROM coursesA
        WHERE Cno = DeleteCno.Cno;
END;

EXECUTE DeleteCno('0001');

SELECT * FROM SC;
SELECT * FROM coursesA;
```

SNO	CNO	GRADE
200215121	0002	85
200215121	0003	88
200215122	0002	90
200215122	0003	80

CNO	CNAME	CPNO	CCREDIT
0002	maths		2
0003	IS	1	4
0004	OS	6	3
0005	data struncture	7	4
0006	data process		2
0007	PASCAL	6	4

2） 创建一个建立一门课的过程,并执行一个样例('0008','Chinese',4,3),并显示插入后的表格 coursesA

```
CREATE OR REPLACE PROCEDURE CreateCourse
          (Cno1 in char,
           Cname1 in char,
           Cpno1 in char,
           Ccredit1 in smallint)
    IS
BEGIN
    INSERT INTO coursesA(Cno, Cname, Cpno, Ccredit)
        VALUES (Cno1, Cname1, Cpno1, Ccredit1);
END;


EXECUTE Createcourse('0008', 'Chinese', '4', 3);

SELECT * FROM coursesA;
```

CNO	CNAME	CPNO	CCREDIT
0002	maths		2
0003	IS	1	4
0004	OS	6	3
0005	data struncture	7	4
0006	data process		2
0007	PASCAL	6	4
0008	Chinese	4	3

出现的问题：

删除某门课程的时候，由于 SC 模式中的 Cno 属性以 coursesA 模式中的 Cno 属性为外键约束，所以直接删除某门课程会产生无法删除的错误。

解决方案：

解决方法有很多，下面简单列举三种常见的解法：

1. 直接手动删除 SC 中 Cno 值为要删除课程 Cno 值的所有行，然后再删除该门课程，就可以解决因为约束产生的问题。
2. 重新定义约束，采用级联删除操作

```
/* 级联删除 */
ALTER TABLE XXX
    DROP CONSTRAINT XXX;
ALTER TABLE XXX
    ADD CONSTRAINT XXX FOREIGN KEY(XXX) REFERENCES XXX(XXX) ON DELETE CASCADE;
```

3. 重新定义约束，采用 set null 删除操作

```
/* set null 删除 */
ALTER TABLE XXX
    DROP CONSTRAINT XXX;
ALTER TABLE XXX
    ADD CONSTRAINT XXX FOREIGN KEY(XXX) REFERENCES XXX(XXX) ON DELETE SET NULL;
```