中山大学数据科学与计算机学院本科生实验报告

(2020学年秋季学期)

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一、实验题目

SQL查询语句练习(嵌套查询、集合运算)

二、实验目的

1. 熟悉SQL的**数据查询语言**,能够使用SQL语句对数据库进行**嵌套查询、集合运算。**

三、实验内容

1. 嵌套查询

- o 通过实验验证对子查询的两个限制条件:不能使用order by子句;外层select语句变量可以用在子查询中,但反之不行。
- 体会**相关子查询**和**不相关子查询**的不同:相关子查询要使用外层select语句提供的数据;不相关子查询即内层子查询不依赖于外层select语句。
- 。 考察4类谓词的用法,包括:
 - 第1类,IN, NOT IN;
 - 第2类,带有**比较运算符**的子查询;
 - 第3类,SOME,ANY或ALL谓词的子查询;
 - 第4类,带有EXISTS谓词的子查询。

2. **集合运算**

○ 使用保留字 UNION、INTERSECT、EXCEPT进行集合或、交、减运算。

四、实验过程

1. 查询选修C++课程的成绩比姓名为 ZNKOO的学生高的所有学生的编号和姓名:

查询语句为:

```
select students.sid, sname
from (STUDENTS inner join CHOICES on STUDENTS.sid = CHOICES.sid) inner
join COURSES on COURSES.cid = CHOICES.cid
where cname = 'c++' and CHOICES.score > (
    select score
    from (STUDENTS inner join CHOICES on STUDENTS.sid = CHOICES.sid)
inner join COURSES on COURSES.cid = CHOICES.cid
where sname = 'ZNKOO' and cname = 'c++')
```

执行结果为(由于结果项数过多,此处仅截取部分):

```
sid sname

1 801896423 tvsstf

2 802025580 kzmocaxs

3 802634993 lfiqsmo

4 802689924 ypzoj

5 817330273 wvotlsp

6 817472105 fykkgj

7 817494447 gqarlaz

8 817561872 fswkxm

9 817792775 edinfq

10 818255853 gqsuqbo

11 832938343 poxcea

12 833021258 dibvj

13 833108078 kapssuam

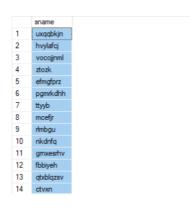
14 833314585 jlwmhrt
```

2. 找出和学生883794999或学生850955252的年级一样的学生的姓名:

查询语句为:

```
select sname
from STUDENTS
where grade = (
select grade
from STUDENTS
where sid = '883794999' or sid = '850955252')
```

执行结果为(仅截取部分):



3. 查询没有选修Java的学生名称:

查询语句为:

```
select distinct sname
from STUDENTS
sexcept
select distinct sname
from (STUDENTS inner join CHOICES on STUDENTS.sid = CHOICES.sid) inner
join COURSES on COURSES.cid = CHOICES.cid
where cname = 'Java'
```

执行结果为:

```
orząwkxn
2
    sktfrpi
3
    ilalscn
4
    rosskmf
5
    kwzmpy
6
    jhhrwhw
8
    zaydr
9
    cmjeph
10 kpum
11
12 bmbxeplo
13 ytsqzdk
14 qgkesyqqo
```

4. 找出课时最少的课程的详细信息:

查询语句为:

```
1 select *
2 from COURSES
3 where hour <= all (
4    select hour
5 from COURSES)</pre>
```

执行结果为:

```
        cid
        cname
        hour

        1
        10024
        use case
        18

        2
        10034
        windows
        18
```

5. 查询工资最高的教师的编号和开设的课程号:

查询语句为:

```
select TEACHERS.tid, cid
from TEACHERS inner join CHOICES on TEACHERS.tid = CHOICES.tid
where salary is not null
except
select TEACHERS.tid, cid
from TEACHERS inner join CHOICES on TEACHERS.tid = CHOICES.tid
where salary < some (
    select salary
from TEACHERS)</pre>
```

执行结果为(共84项,仅截取部分):

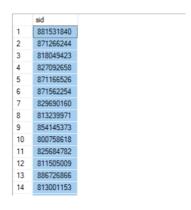
```
tid cid
1 214445507 10016
2 204711560 10029
3 204711560 10002
4 204711560 10003
5 214445507 10023
7 204711560 10024
8 287866460 10013
9 204711560 10045
10 214445507 10025
11 277877392 10021
12 204711560 10006
13 204711560 10006
13 204711560 100048
```

6. 找出选修课程ERP成绩最高的学生编号:

查询语句为:

```
select sid
from CHOICES inner join COURSES on CHOICES.cid = COURSES.cid
where score >= all (
    select score
    from CHOICES inner join COURSES on CHOICES.cid = COURSES.cid
where cname = 'ERP' and score is not null)
and cname = 'ERP' and score is not null
```

执行结果为:



7. 查询没有学生选修的课程名称:

查询语句为:

```
select distinct cname
from COURSES
sexcept
select distinct cname
from COURSES inner join CHOICES on COURSES.cid = CHOICES.cid
```

执行结果为:

cname

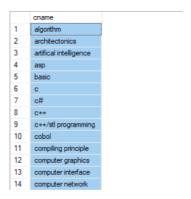
结果为空。

8. 查询讲授课程UML的教师所讲授的所有课程名称:

查询语句为:

```
select distinct cname
from COURSES inner join CHOICES on COURSES.cid = CHOICES.cid inner join (
select distinct tid
from COURSES inner join CHOICES on COURSES.cid = CHOICES.cid
where cname = 'UML') as D on D.tid = CHOICES.tid
```

执行结果为:



9. 使用集合交运算,查询既选修了database又选修了UML课程的学生编号:

查询语句为:

```
select sid
from COURSES inner join CHOICES on CHOICES.cid = COURSES.cid
where cname = 'database'
intersect
select sid
from COURSES inner join CHOICES on CHOICES.cid = COURSES.cid
where cname = 'UML'
```

执行结果为:

```
800432697
    802445853
2
3
   805916031
4
   808872915
   813559934
   816025343
   816840832
8
   818314833
   819632378
9
10 827126907
11
    835171985
12 836928859
13 842527141
14 842765888
```

10. 使用集合减运算,查询选修了database却没有选修UML课程的学生编号:

查询结果为:

```
select sid
from COURSES inner join CHOICES on CHOICES.cid = COURSES.cid
where cname = 'database'
except
select sid
from COURSES inner join CHOICES on CHOICES.cid = COURSES.cid
where cname = 'UML'
```

执行结果为:

	sid
1	800230908
2	800266130
3	800654557
4	800898608
5	800988010
6	801147943
7	801188913
8	801230082
9	801266324
10	801332759
11	801597743
12	801638011
13	801683742
14	802145052