

数据库理论作业(第三章)

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3.11

a.

```
select distinct name
from student natural join takes natural join course
where course.dept_name="Comp.Sci"
```

b.

```
select id, name
from student
except
(select id, name
from
student natural join takes
where year < 2009
)
```

c.

```
select dept,max(salary)
from instructor
group by dept
```

d.

```
select min(max_salary)
from(
select dept,max(salary) as max_salary
from instructor
group by dept
)
```

3.12

a.

```
insert into course
values("CS-001","Weekly Seminar","Comp.Sci",0)
```

b.

```
insert into section
values("CS-001",1,"Fall",2009,NULL,NULL,NULL)
```

c.

```
insert into takes
    select ID,"CS-001",1,"Fall",2009,NULL
    from student
    where dept_name="Comp. Sci"
```

d.

```
delete from takes
where course_id="CS-001" and sec_id=1 and semester="Fall" and year=2009
and
ID in (
select id
from student
where name="Chavez"
)
```

e.

```
delete from takes
where course_id = "CS-001"

delete from section
where course_id = "CS-001"

delete from course
where course_id="CS-001"
```

如果没有先删除这门课程的授课信息就直接删除该课程，则会和外码约束冲突。因为section关系中的courses_id是引用course关系的外码，而takes关系中的course_id、sec_id、semester、year等属性是引用section关系的外码，如果先删除这门课程的授课信息则会引起外码冲突，执行删除的事务将被取消。

f.

```
delete from takes
where course_id in(
select course_id
from course
where lower(title) like '%database%'
)
```

3.13

```
create table person(
driver_id varchar(20),
name varchar(20),
address varchar(50),
primary key (driver_id)
)

create table car(
license varchar(50),
model varchar(50),
year int,
primary key (license)
)

create table accident(
report_number int,
date_ date,
location varchar(50),
primary key (report number)
)

create table owns(
driver_id varchar(20),
license varchar(50),
primary key (driver_id)
foreign key (driver_id) references person
)

create table participated(
```

```
report_number int,  
license varchar(50),  
driver_id varchar(20),  
damage_amount int,  
primary key (report_number, license)  
foreign key (report_number) references accident)  
foreign key (license) references car  
)
```

3.14

a.

```
select count(*)  
from person natural join owns natural join participated natural join  
accident  
where person.name="John Smith"
```

b.

```
update participated  
set damage_amount=3000  
where report_number="AR2197"and  
license="AABB2000"
```

3.15

a.

```
with account_num as(  
select count(*)  
from branch  
where branch_city="Brooklyn"  
)  
select customer_name  
from customer natural join depositor natural join account natural join  
branch  
where branch_city="Brooklyn"  
group by customer_name  
having count(*)=account_num
```

b.

```
select sum(amount)
from loan
```

c.

```
select branch_name
from branch
where assets > some(
  select assets
  from branch
  where branch_city = "Brooklyn"
)
```

3.19

证明：设集合S是一个查询的结果，若 $x \neq \text{all } S$ ，则对于S中的所有元素s，都有x不等于s，即x不在集合S里面，即 $x \text{ not in } S$ 。

若 $x \text{ not in } S$ ，则任意取S中的元素s，x不等于s，则x大于或对于s，即 $x \neq \text{all } S$ 。

3.23

答：因为查询的属性course_id、semester、year、sec_id都是section表的主码，因此连接之后不会产生额外的元组，也不会有元组的减少，因此在from子句中加上与section的连接不会改变查询结果。