

Database Systems and Web (15B11CI312)

PRACTICE PROBLEMS

JOINS & NESTED QUERIES

Source:

Ramakrishnan, Gehrke, Database Management Systems, Mcgraw-Hill, 3rd Edition, Addison-Wesley, 2006.

Problem Set I

Consider the following schema:

Flights(flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: real)

Aircraft(aid: integer, aname: string, cruisingrange: integer)

Certified(eid: integer, aid: integer)

Employees(eid: integer, ename: string, salary: integer)

cruising range: the maximum distance from a base that the fuel capacity of a ship or aircraft will allow it to travel and then return safely at cruising speed

1. Find the names of aircraft such that all pilots certified for them earn more than \$80K.
2. For each pilot who is certified for more than three aircraft, find the eid and the maximum cruisingrange of the aircraft for which they are certified
3. Find the names of pilots whose salary is less than the price of the cheapest route from LA to Honolulu
4. For all aircraft with cruisingrange > 1000, find the name of the aircraft and the average salary of all pilots certified for it
5. Find the names of pilots certified on some Boeing aircraft
6. Find the aids of all aircraft that can be used on routes from LA to Chicago.
7. Find the eids of employees who make the highest salary

SOLUTIONS

1. Find the names of aircraft such that all pilots certified for them earn more than \$80K

```
select a.aid
from   aircraft a
      where not exists (
        select *
        from employees e, certified c
        where e.eid = c.eid and c.aid = a.aid and e.salary < 80000);
```

2. for each pilot who is certified for more than three aircraft, find the eid and the maximum cruisingrange of the aircraft for which they are certified

```
select c.eid, max (A.cruisingrange)
from   certified c, aircraft a
      where c.aid = a.aid
      group by c.eid
      having count (*) > 3;
```

3. Find the names of pilots whose salary is less than the price of the cheapest route from LA to Honolulu

```
select e.ename
from employee e
where e.salary < (select min (f.price)
                  from flights f
                  where f.from = 'LA' and f.to = 'Honolulu');
```

4. For all aircraft with cruisingrange > 1000, find the name of the aircraft and the average salary of all pilots certified for it

```
select a.aid, avg(e.salary)
from aircraft a, employees e, certified c
where a.aid = c.aid and c.eid = e.eid and a.cruisingrange > 1000
group by a.aid;
```

5. Find the names of pilots certified on some Boeing aircraft

```
select e.ename
from   employees e, certified c, aircraft a
where  e.eid = c.eid and c.aid = a.aid and a.aname = 'boeing';
```

6. Find the *aids* of all aircraft that can be used on routes from LA to Chicago.

```
select a.aid
from   aircraft a
where  a.cruisingrange >
      (select min (f.distance)
       from   flights f
       where  f.from = 'LA' and f.to = 'Chicago');
```

7. Find the eids of employees who make the highest salary.

```
SELECT E.eid  
FROM Employees E  
WHERE E.salary = ( Select MAX (E2.salary)  
FROM Employees E2 );
```


Problem Set II

Consider the following schema

Suppliers(*sid*: integer, *sname*: string, *address*: string)

Parts(*pid*: integer, *pname*: string, *color*: string)

Catalog(*sid*: integer, *pid*: integer, *cost*: real)

1. Find the pnames of parts for which there is some supplier.
2. Find the snames of suppliers who supply every part
3. Find the snames of suppliers who supply every red part
4. Find the pnames of parts supplied by Acme Widget and no one else
5. Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all suppliers who supply that part)
6. For each part, find the sname of the supplier who charges the most for it.
7. Find the sids of suppliers who supply only red parts
8. Find the sids of suppliers who supply a red part and a green part.
9. Find the sids of suppliers who supply a red part or a green part.
0. For every supplier that *only supplies green parts*, print the name of the supplier and the total number of parts that they supply
1. For every supplier that supplies a red part and a green part, print the name and price of their most expensive part

SOLUTIONS

1. Find the pnames of parts for which there is some supplier.

Select p.pname from parts p, catalog c where p.pid = c.pid;

2. Find the snames of suppliers who supply every part

Select c.sid from catalog c, parts p

On c.pid = p.pid

Group by c.sid Having COUNT (*) =
(Select Count (*) from parts);

Or

select s.sname

from suppliers s

where not exists ((select * from parts p)

except

(select c.pid from catalog c where c.sid = s.sid));

3. Find the snames of suppliers who supply every red part

Select c.sid from catalog c, parts p on c.pid = p.pid

WHERE p.color = "Red"

Group by c.sid Having COUNT (*) =

(Select Count (*) from parts WHERE color = "Red");

4. Find the pnames of parts supplied by Acme Widget and no one else

select p.pname

from parts p, catalog c, suppliers s

where p.pid = c.pid and c.sid = s.sid

AND s.sname = 'Acme Widget'

AND not exists (select * from catalog c1, suppliers s1

where p.pid = c1.pid and c1.sid = s1.sid

AND s1.sname <> 'Acme Widget');

5. Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all suppliers who supply that part)

```
select distinct c.sid
```

```
from catalog c
```

```
where c.cost > (select avg(c1.cost) from catalog c1 where c1.pid = c.pid);
```

6. For each part, find the sname of the supplier who charges the most for it.

```
select p.pid, s.sname
```

```
from parts p, suppliers s, catalog c
```

```
where c.pid = p.pid and c.sid = s.sid
```

```
AND c.cost = (select max (c1.cost) from catalog c1 where c1.pid = p.pid);
```

7. Find the sids of suppliers who supply only red parts

```
SELECT sid FROM Catalog WHERE sid NOT IN  
  (SELECT DISTINCT s.sid FROM Catalog c, Parts p  
   WHERE p.color <> "Red" AND p.pid = c.pid);
```

or

```
select distinct c.sid from catalog c, parts p  
  Where not exists (select * from parts p where p.pid = c.pid and p.color <> 'red');
```

8. Find the sids of suppliers who supply a red part and a green part.

```
select distinct c.sid
```

```
from catalog c, parts p
```

```
where    c.pid = p.pid and p.color = 'red'
```

```
INTERSECT
```

```
select distinct c.sid
```

```
from catalog c, parts p
```

```
where    c.pid = p.pid and p.color = 'green';
```

Can also be solved using EXIST

9. Find the sids of suppliers who supply a red part or a green part.

same as above, use UNION instead of intersect

10. For every supplier that *only supplies green parts*, print the name of the supplier and the total number of parts that they supply

```
select s.sname, count(*)  
From suppliers s, parts p, catalog c  
Where p.pid = c.pid and c.sid = s.sid  
group by s.sname, s.sid  
having every (p.color = 'green');
```


11. For every supplier that supplies a red part and a green part, print the name and price of their most expensive part

```
select s.sname, max(c.cost)
from   suppliers s, parts p, catalog c
where  p.pid = c.pid and c.sid = s.sid
group by s.sname, s.sid
having some (p.color = 'green') and some (p.color = 'red');
```