

The following document has been created during one of the university assignment. The following queries indicates my efficiency in SQL.

The relational schema for the Academics database is as follows:

DEPARTMENT(deptnum , descrip, instname, deptname, state, postcode)

ACADEMIC(acnum , deptnum*, famname, givenname, initials, title)

PAPER(panum , title)

AUTHOR(panum*, acnum*)

FIELD(fieldnum , id, title)

INTEREST(fieldnum*, acnum* , descrip)

Some notes on the Academics database:

- An academic department belongs to one institution (instname) and often has many academics. An academic only works for one department.
- Research papers (PAPER) are often authored by several academics, and of course an academic often writes several papers (AUTHOR).
- A research field (FIELD) often attracts many academics and an academic can have interest in several research fields (INTEREST).

3.1) List the deptnum and total number of academics for CS departments, in alphabetical order of deptname. CS departments are departments whose deptname contains the phrase "Computer ... Science" or "Computing ... Science" in upper case or lower case letters. You must use the NATURAL JOIN operator.

```
select deptnum, count (acnum), deptname  
  
from department natural join academic  
  
where upper (deptname)like '%COMPUTER SCIENCE%'  
  
or upper (deptname)like '%COMPUTING SCIENCE%'  
  
group by deptnum, deptname;
```

3.2) List research fields where at least one academic is interested in. List the fieldnum, ID and title of these research fields. You must use a subquery.

```
select field.fieldnum, field.id, field.title
```

```
from field
minus
select field.fieldnum, field.id, field.title
from field left join interest on field.fieldnum = interest.fieldnum
group by field.fieldnum, field.id, field.title
having count(acnum)=0;
```

3.3) Find papers that have three or more authors. Give the panum, title and number of authors for these papers.

```
select panum, title, count(acnum)
from paper natural join author
group by panum, title
having count(acnum)>=3
```

3.4) For EACH academic, compute the total number of papers s/he has written. Output should include the acnum and total number of papers for each academic. In particular, an academic without any papers should have zero(0) as number of papers in the output. You must use a JOIN operator.

```
select academic.acnum ,count(author.ACNUM)
from academic left join author on academic.acnum = author.acnum
group by academic.acnum
```

3.5) Give the total number of academics that do not have research interests. You must use the NOT IN operator.

```
select count(acnum)
from academic
where acnum
not in
(select acnum
from interest)
```

3.6) Are there any research fields where less than 20, including zero, academics are interested in. List the fieldnum, ID, title and number of interested academics for these research fields.

```
select field.fieldnum, field.id, field.title, count (acnum)  
from field left join interest on field.fieldnum = interest.fieldnum  
group by field.fieldnum, field.id, field.title  
having count(acnum)<20
```

3.7) Find the papers whose title contain the string 'data' and where at least one author is from the department with deptnum 100. List the panum and title of these papers. You must use the EXISTS operator. Ensure your query is case-insensitive.

```
returning too many values  
select title,panum  
from paper  
where upper (title) like '%DATA%'  
and exists  
(select author.acnum  
from academic, author  
where academic.acnum = author.acnum  
and deptnum=100)
```

3.8) Return the research interest that has the largest number of interested academics. You must not use MAX. Note: An SQL query that lists all research interests in decreasing order of their total number of interested academics is incorrect.

```
select fieldnum  
from interest  
group by fieldnum  
having count (acnum) >= all(  
select count (acnum)
```

from interest

group by fieldnum)

3.9) The following SQL query is intended to find academics (acnum) who are ONLY interested in "Data" (descrip) fields. But it is incorrect. Give the correct SQL query.

select acnum

from interest

where upper(descrip) like '%DATA%';

select acnum

from interest

where upper (DESCRIP) like '%DATA%'

minus

select acnum

from interest

where upper (DESCRIP) not like '%DATA%';

3.10) Consider the SQL query given below, give the English explanation for the output of a) the subquery, and b) the whole SQL query. Literal explanation will receive zero mark.

select distinct AC1.givename, AC1.famname, AC2.givename, AC2.famname

from academic AC1, author AU1, academic AC2, author AU2

where AC1.acnum=AU1.acnum

and AC2.acnum=AU2.acnum

and AU1.panum=AU2.panum

and AU2.acnum>AU1.acnum

and not exists

(select *

from Interest I1, Interest I2

where I1.acnum =AC1.acnum

and I2.acnum=AC2.acnum

and I1.fieldnum=I2.fieldnum);

This query displays academics who have co-authored papers with colleagues but do not share same research interest.