CS343 H1 Y Section 5101 & 2002 Second Term Test Fall 2003

November 5th 2003

This is a **closed** book, notes, neighbors exam. You have 50 minutes for a total of 150 points. Write your answers in the space provided after each question. You will not be given any credits for anything written outside the page. You will not be given any credits for anything written using a pencil.

Print your First name: _____

Print your Last name: _____

Print your student number: _____

Circle your Tutorial Room: **WI 524** **UC 52**

I do not know rule If for any questions I write the following sentence "I do not know the answer" I will be automatically rewarded by a mark equal to 20% of the mark of the question.

I acknowledge and SIGN that this booklet is complete (8 pages, 6 Questions) and 1 appendix (2 pages):

Question	Points	Maximum points
1		20
2		20
3		20
4		30
5		30
6		30
Total		150

Schema

Consider the following relational schema describing an atlas (the complete schema can be found in appendix).

```
continent(name, area);
country(name, continent, population);
province(name, country, capital, population);
city(name, country, province);
```

Answer the following question using valid DB2 SQL instructions.

Question 1 (20 points)

List the name of the countries of the continent whose name (containing only 7 characters) begins by these letters: ’americ’ in alphabetical order.

```
SELECT name
FROM country
WHERE continent like ’americ%’
order by name
;
```

Question 2 (20 points)

Give the number of cities for each country in the continent whose name is ’asia’ in ascending order.

```
select ci.country, count(ci.name)
from city ci, country c
where c.name = ci.country
      and c.continent = ’asia’
group by ci.country
order by 2 asc
;
```

Question 3-a (10 points)

Write a query that will check whether it exists a value in the attribute country of the relation city that is not a valid country. The output will be a list of cities that violate the condition.

```
select name
from city ci
where not exists (select name
                  from country co
                  where co.name = ci.country)
```

Question 3-b (10 points)

Write the ddl instruction that checks automatically the condition listed above.

```
alter table city add constraint city_fk_country
     foreign key (country) references country;
```

Question 4 (30 points)

Give the name of the countries that have the most cities.

```
select ci.country
from city ci
group by ci.country
having count(*) = (
  select max (number_city)
  from  (select count(*) as number_city
         from city
         group by country
        ) as t
  )
;
```

Question 5 (30 points)

List the countries name in the continent ’asia’ that have a larger population than any of the countries in ’europe’.

```
     select name
     from country
     where continent = ’asia’ and
     population > (select max(population)
                   from country
                   where continent = ’europe’
                  )
;
```

Question 6 (30points)

For each country in the country table list its name with together the population of the country and the sum of the population of its provinces. The output relation must contain as many tuples as the country relation does.

```
with pro_coun(name, sum_pop) as (
      select country, sum(population)
      from province
      group by country
)
select c.name, c.population, p.sum_pop
from country c left outer join pro_coun p on c.name = p.name
;

OR

select c.name, c.population, p.sum_pop
from country c left outer join (
       select country as name, sum(population) as sum_pop
       from province
       group by country
       ) as p on c.name = p.name
;
```