TDBC86 - Obligatory Exercise 3
Due date: November 30, 2001 at 17.00

Given is the following relational database schema, which is identical to that of Obligatory Exercise 2:

City(cityName, **country**, longitude, latitude, population)
Country(countryName, continent, totalPopulation, **capital**, currency)
Flight(number, **departure**, **arrival**)

The primary keys are underlined. The attribute **country** in the relation **City** is a foreign key from the **Country** relation. The attribute **capital** in the relation **Country** and the attributes **departure** and **arrival** in the **Flight** relation are foreign keys from the **City** relation. Note that cities are uniquely identified by their names[1].

Find solutions, in Access97-compatible SQL, to each of the queries listed below. Unless specifically stated to the contrary, all duplicates should be eliminated from answers. In addition to the hardcopy solutions, you must submit a file containing the SQL code, via e-mail, to lab-tdbc86@cs.umu.se. The file should be a plain text file, organized so that it is easy to extract the solution to each query and submit it to Access. In the subject line of your mail, put OE3 and the e-mail addresses of all participants in your group. Do not make your solutions publicly readable, while just sending a pointer to a file containing your solutions. This makes it too easy for unscrupulous students to copy your work. Your work is not considered to be submitted (for purposes of lateness) until both the paper and electronic versions are received. A VBA file which contains code to generate a sample database for this schema is available on-line; consult the course web page. You are encouraged to test your solutions on this database. However, you need not submit the results of such tests as part of your solutions.

- 1. Find the names of the cities in Europe which are in a country with a total population of over 10 million.
- 2. Find the country name and continent for countries which have a currency with the substring 'Crown' in its name.
- 3. Find the names of cities in Europe with populations over 1 million which have at least one flight to the USA or have a population over 2 million with a flight to the UK.
- 4. Find the names of all those countries which do not have a city that has a flight to a city in the country Cuba.
- 5. Find the cities which only have flights to cities in Europe.
- 6. Find the countries in Europe that have exactly 2 distinct cities with populations over 1 million.
- 7. Find the average population of the countries that have the Euro currency.

[1] So in an actual database 'Paris, Texas' and 'Paris, France' might be named 'Paris_T' and 'Paris_F'.

- 8. For each country in Europe, list the total number of flights to NYC. List even if the number is zero.
- 9. Find the names of countries in which more than 10% of the population lives in the capital.
- 10. Find the average city population for each country in Europe. Present in descending order.
- 11. Find the northernmost city in Europe. (include all if there is a tie)
- 12. Find the cities which have exactly two flights to NYC.
- 13. Find the names of countries which have cities which have flights to cities that have flights to the country Cuba.
- 14. Find the names of cities which have more flights to USA than flights to Germany.
- 15. For each country in Europe, give the percentage of the population that lives in cities which are listed in the database whenever that percentage is greater than 10% for the country in question.

Notes:

- As stipulated in the course syllabus, this exercise may be done either individually, in a group of two, or in a group of three.
- Remember that there are point penalties for late submission. See the course syllabus.
- For this assignment, it is required that machine-printed solutions be submitted. Handwritten solutions will not be accepted.
- It is not allowed to copy the work of others. The submission must be the original work of the individual(s) in the working group.
- The grader reserves the right to interview members of the working group about the solution.
- So that solutions may be discussed in a class meeting, students and/or groups that are very late in preparing a solution may be required to solve an alternate problem to receive credit for this exercise.
- Remember that a correct solution must work for all instances of the database, and not just for the test file provided.
- If you have solved this problem for a previous offering of the course, you may re-use portions your old solution, subject to the following conditions: (a) You may not work with any partners, except possibly those with whom you worked to prepare the solution in the previous course. (b) You must explicitly note any partners from the previous course with whom you submitted a joint solution for that course. Note that grading criteria may not be identical between years, so that a solution which was found to be satisfactory last year may not be evaluated similarly this year. Also note that the questions this year are not all identical to those of last year.