Information and Database Management Systems I (CIS 4301)
(Fall 2014)

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Homework 3

Name:	
UFID:	
Email Address:	

Pledge (Must be signed according to UF Honor Code)

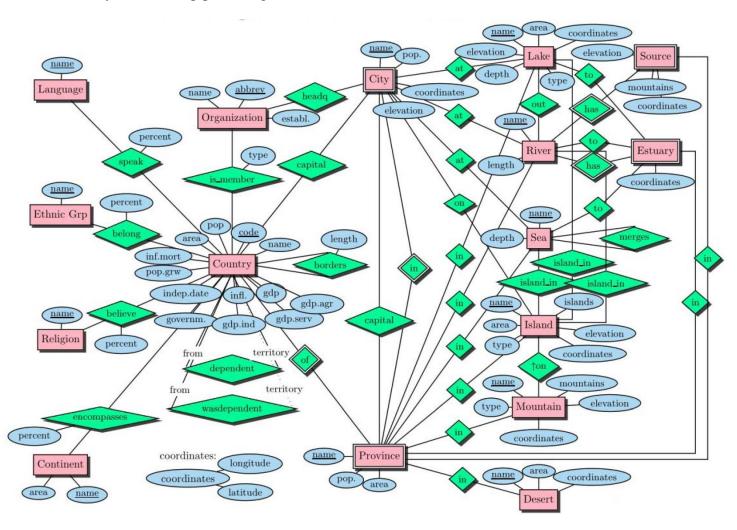On my honor, I have neither given nor received unauthorized aid in doing this assignment.

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Signature

For scoring use only:

	Maximum	Received
Exercise 1	70	
Exercise 2	30	
Total	100	

Exercise 1 (Oracle SQL) [70 points]

About a geo-statistical database you are given the following information and files:

1. Entity-Relationship pertaining to the database schema

Note that the ER diagram uses the original Chen notation where red rectangles indicate entity types, green diamonds indicates relationship types, and blue ovals indicate attributes.

2. You can find a description of the relation schemas and their attributes here as a PDF file.

3. You can find the SQL DDL commands to create the database here as an ASCII file.

4. You can find the SQL DML input commands to populate the database with data here as an ASCII file.

Create and populate this database with the **CISE Oracle** database system. Translate the colloquial queries below into SQL queries and execute them on your database. Submit your SQL

queries and your query results as screenshots. If results are too long, write down the number of rows selected and show the last ten rows. [5 points each]

1. List countries' names and GDPs which are members of NATO and more than 5 percent of their population are Muslims.

2. Find the languages with more than 50 million speakers and then list names of countries in which each of those languages is the most popular language, along with the percentage of each country's population speaking that language. Output country name, language, percentage.

3. Find all rivers which cross at least 10 provinces in the same country.

4. Display all islands in Africa and their areas which have areas>1000 units in descending order of the size.

5. Find the province(s) that has the largest number of islands in the world. Output the country, the province, and the number of islands.

6. Find the province(s) that surrounds every lake that its country has ["surround" means the lake lays fully inside the province]. Output the country and the province.

7. List the 10 countries' names with the highest population density and the percentage of world population each one contains.

8. Find countries that do not have access to any sea but at least 5 provinces with deserts.

9. List all countries' names, GDPs and inflation rates which were dependent sometime in the past and have gained independence to be ruled by any type of monarchy.

10. Display all countries which have people from 6 or more religions with their corresponding count of the number of religions.

11. Find the highest mountain for each continent.

12. List the top five countries that will have the largest population after five years. [Assume population in five years= population this year * $(1 + \text{growth rate})^5$]. Output country, population, and rank.

13. Find capitals of countries that have mountains with an elevation of higher that 7000m. Output countries' and capitals' names.

14. Find the desert(s) that is next to more than 3 countries. Output the desert and the number of countries.

Exercise 2 (Rational Algebra & SQL) [30 points]

(A) For each of the following SQL statements, give an equivalent relational algebra expression, **if possible**. If such an expression cannot be given, explain why. [20 points]

    (1) [6 points]

        SELECT distinct E2.age, E2.rank
        FROM employee E1, employee E2
        WHERE E1.enum > E2.enum

    (2) [7 points]

        SELECT B.section_id,A.student_id
        FROM
            (
        SELECT course.title,course.level,section.section_id
        FROM section NATURAL JOIN course
        WHERE section_id = '321'
) AS B ,
        (
        SELECT title,S.student_id
        FROM   (SELECT section_id,student_id FROM takes WHERE student_id = '123'
        AND grade > 65) AS S NATURAL JOIN section NATURAL JOIN course
) AS A
        WHERE B.title = A.title AND B.level = A.level + 1;

    (3) [7 points]

        SELECT DISTINCT enum
        FROM employee
        WHERE NOT EXISTS
            (SELECT *
           FROM projects WHERE NOT EXISTS
                (SELECT *
                FROM works
               WHERE employee.enum = works.enum AND
                      works.pnum = projects.pnum))

(B) Consider the following database schema where the sales of a shoe store are recorded: [10 points]

sell (date, sh_barcode, customer_id, discount)
shoes (sh_barcode, price, category)
calendar (date, week)
customer (customer_id, name)

Transform the following colloquial queries into SQL queries.

(1) Select the shoes that were sold with the highest discount. [5 points]

(2) Select the shoes that were sold the highest number of times. [5 points]