Information and Database Management Systems I (CIS 4301)  
(Fall 2016)  
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TA: Yang Peng  

Homework 1

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.  

_______________________________  
Signature  

For scoring use only:

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Maximum</th>
<th>Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise 1</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Exercise 2</td>
<td>30</td>
<td></td>
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<tr>
<td>Exercise 3</td>
<td>40</td>
<td></td>
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<tr>
<td>Total</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Exercise 1 (Knowledge Questions) [30 points]

Provide precise and concise replies for the following statements and questions.

1. What is a DBMS? What are the advantages of using DBMS (list at least four)? [4 points]
2. Define the term “database system”. [2 points]
3. What is a data model? [2 points]
4. Explain the difference between physical data models and logical data models [4 points].
5. Describe the difference between key and primary key [4 points].
6. Explain the difference between physical data independence and logical data independence [4 points].
7. Describe the difference between data definition language and data manipulation language [4 points].
8. Describe the levels of abstraction in a database. [3 points]
9. What are the different kinds of components in an E-R diagram? Explain them. [3 points]
Exercise 2 (Oracle) [30 points]

Consider the following ‘World’ table.

<table>
<thead>
<tr>
<th>name</th>
<th>continent</th>
<th>area</th>
<th>population</th>
<th>gdp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Afghanistan</td>
<td>Asia</td>
<td>652230</td>
<td>25500100</td>
<td>20343</td>
</tr>
<tr>
<td>Albania</td>
<td>Europe</td>
<td>28748</td>
<td>2831741</td>
<td>12960</td>
</tr>
<tr>
<td>Algeria</td>
<td>Africa</td>
<td>2381741</td>
<td>37100000</td>
<td>188681</td>
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<tr>
<td>Andorra</td>
<td>Europe</td>
<td>468</td>
<td>78115</td>
<td>3712</td>
</tr>
<tr>
<td>Angola</td>
<td>Africa</td>
<td>1246700</td>
<td>20609294</td>
<td>100990</td>
</tr>
</tbody>
</table>

(“name” is the primary key)

Use your CISE Oracle account to create this table and perform the operations below. Provide SQL statements for all operations. Show the screenshots of query results from Oracle.
[5 points each]

(1) Create the World table.

(2) Insert the data into the table.

(3) Express the following colloquial queries in SQL.
   (a) List the names of countries from Africa.

   (b) List the names and gdps of countries whose area is smaller than 50,000.

   (c) For countries in Europe, add 1000 to their gdp.

   (4) Calculate the sum gdp of countries from Asia and Africa. Hint: Use the aggregation function “sum” in the same manner as the aggregation function “count” in class.
Exercise 3 (ER Model) [40 points]

This problem is concerned with modeling of a database that stores information about properties managed by AMC, which has been in the business of property management for over a decade. AMC has many properties across states in USA, including Tivoli, Stoneridge, etc. Suppose you are hired by the AMC to design a database to manage the properties. Below we describe the entities and the relations that needed to be captured by your design.

- Each property has a name, street number, street name, zip code and one phone number. The property names are unique. Example: (‘Tivoli’, ‘2841’, ‘SW 13th ST’, ‘32608’, ‘FL’, ‘3522265021’)
- Each property has a number of apartments and each apartment is associated with an apartment number. Each apartment has one or more residents. The information stored for a resident includes his/her name and sex. Assuming names are unique among the residents in an apartment.
- An employee of AMC is uniquely identified by his/her SSN. Moreover, we store his/her name.
- An employee may work at several properties of AMC. For instance, Smith is working at “Tivoli” on Tuesday and Friday and at “Stoneridge” on Monday, Wednesday and Thursday. For every employee we record the percentage of time he or she works at each property. Thus, employee ‘Smith’ would be recorded as working at 40% at Tivoli and 60% at “Stoneridge”.
- Each property has one property manager and one leasing manager. Each property/leasing manager may manage zero, one or multiple properties. For each leasing manager, we need to record his/her highest education degree and for each property manager, we need to record his/her number of years working in this area.

Design the E.R. diagram for the small database described above. Make sure to indicate the primary and partial keys, cardinality constraints, weak entities (if applicable).