Information and Database Management Systems I (CIS 4301)
(Fall 2016)

Instructor: Dr. Markus Schneider

TA: Yang Chen

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

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

1. What is a database? What are its implicit properties? [4 points]
2. What is a DBMS? What are the processes that a DBMS facilitates? [2 points]
3. What are the limitations of a file-based system? [2 points]
4. What is a DDL? What is a DML? Briefly explain them and give one SQL example of each. [4 points]
5. Explain the concept of physical data independence, and its importance in database systems. [2 points]
6. What is a key? Should a key contain only a single value? If yes, explain why. If not, give an example [2 points].
7. Describe the levels of abstraction in a database. [3 points]
8. What is the difference between procedural and nonprocedural DMLs? [4 points].
9. Describe 3 tables that might be used to store information in a social networking system such as Facebook. [3 points]
10. What are the types of binary relationship sets? Explain them. [4 points]
Exercise 2 (Oracle) [30 points]

Consider the following table ‘Student’ maintained by a university.

<table>
<thead>
<tr>
<th>student_id</th>
<th>student_name</th>
<th>state</th>
<th>date_of_birth</th>
<th>account_balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Alex</td>
<td>FL</td>
<td>10/20/1989</td>
<td>+100.00</td>
</tr>
<tr>
<td>1002</td>
<td>Bob</td>
<td>FL</td>
<td>07/23/1992</td>
<td>+68.10</td>
</tr>
<tr>
<td>1003</td>
<td>Caitlyn</td>
<td>CA</td>
<td>03/15/1990</td>
<td>-32.56</td>
</tr>
<tr>
<td>1004</td>
<td>Dave</td>
<td>CA</td>
<td>06/07/1990</td>
<td>+54.50</td>
</tr>
<tr>
<td>1005</td>
<td>Emma</td>
<td>FL</td>
<td>09/08/1989</td>
<td>+89.99</td>
</tr>
<tr>
<td>1006</td>
<td>Freddie</td>
<td>CA</td>
<td>02/01/1989</td>
<td>-110.00</td>
</tr>
<tr>
<td>1007</td>
<td>Gus</td>
<td>NM</td>
<td>05/05/1988</td>
<td>+76.25</td>
</tr>
</tbody>
</table>

(“student_id” 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 Student table.

2. Insert the data into the table.
Hint: Oracle uses a slightly different syntax for dates than standard SQL. Find out how this syntax looks like.

3. Express the following colloquial queries in SQL.
(a) List the names of students from Florida.
(b) List the names and states of students whose name begins with “A.”
Hint: There is an operator named like in SQL that can be used here. Look this operator up in your textbook, or search the Internet for it to understand its syntax and meaning.
(c) For all students with a negative balance and born after 01/01/1990, add $100 to their balance.

4. Count the number of students from Florida or California.
Exercise 3 (ER Model) [40 points]

Consider the following requirements about an online movie review system:

- Every movie has a unique ID, name, year, length, brief description, and the url to its cover.
- Movies are directed and acted by celebrities. The database keeps the name and date of birth of celebrities to identify a celebrity.
- For a celebrity that acts in a movie, the database keeps what role he/she acts. A celebrity might act several roles in one movie.
- Production corporations produce movies. A production corporation has a name, a website, and an address. The address includes street, city, state, and zip code.
- Each online user must have an email address (which is used to log in), a password, and a name. They can also provide age and gender to the system.
- Online users can write reviews for movies. A review has a title, content, a score ranging 1-5, and a timestamp.
- Online users can also make friends. They can add one another as a friend. Friend is bi-directional, meaning “A is a friend of B” implies that “B is a friend of A”.

Design an Entity-Relationship diagram that models the online movie review system and takes into account the requirements listed above. That means that you have to identify suitable entity sets, relationship sets, attributes, keys of entity sets, and so on. Further add the cardinalities (1:1, 1:m, m:1, m:n) to the relationship sets.