INFO-532 Database Systems Homework 1

(Due by Midnight on February 10, 2024, to Brightspace**)**

Please remember to include the following statement at the beginning of your submitted assignment and SIGN it. Your assignment won't be graded without the signed statement.
"I have done this assignment completely on my own. I have not copied it, nor have I given my solution to anyone else. I understand that if I am involved in plagiarism or cheating, I will have to sign an official form that I have cheated and that this form will be stored in my official university record. I also understand that I will receive a grade of 0 for the involved assignment and my grade will be reduced by one level (e.g., from A to A- or from B+ to B) for my first offence, and that I will receive a grade of "F" for the course for any additional offence of any kind."

1. (10 points) Discuss whether or not it is a good idea to create entity sets of Undergraduate Students and Graduate Students and make them sub-entity sets of Students in the ER diagram for the Student Registration System.

2. (70 points) Design an ER diagram for the Student Registration System based on the provided Requirements Document (see Brightspace). Remember to indicate the key for each entity set and the connectivity of each relationship. Use (min, max) format to indicate connectivity. No need to specify connectivity for ternary relationships. (Note 1: Use only information in Section 2 of the Requirements Document to design the ER Diagram. Note 2: Some constraints cannot be represented in the ER diagram naturally, no need to design un-natural structures in the ER diagram just to try to represent such constraints. These constraints will be represented at later stages of the database design process. Question 2 of this homework asks you to list these constraints. Note 3: If you use ERDPlus to draw the ER Diagram, some notations may be different from those introduced in class. Notations from ERDPlus are acceptable.)

3. (20 points) Identify constraints in the Requirements Document for the Student Registration System that cannot be naturally expressed using the ER model discussed in class. First list the constraints not represented in your ER diagram for each entity set separately. Then list the unrepresented constraints involving multiple entity sets or some relationship.

   The following are some examples (please include them in your answer):

   Constraints that cannot be naturally represented in the ER diagram:

   Students:
   - Valid values for status (freshman, sophomore, junior, senior, master, PhD).
   - Valid values for gpa (decimal number between 0 and 4).
   - Students have unique email addresses (additional keys).

   The actual size of a class must not exceed the limit of the class.
   No faculty member can teach classes with overlapping times.