

## CENG316 – Database Systems, Spring 2023

### Assignment 1: Entity-Relationship Modelling

#### Instructions:

- **Due: Friday, March 31, 23:59:59, SUBMIT TO LMS**
- This is NOT a group assignment. You must complete whole assignment on your own.
- Plagiarism and copying one another's work will not be tolerated. If detected in any question, you may get a zero for the whole assignment.

#### Explanations:

- The purpose of this assignment is to give you a practice in designing a small database system by expressing informal descriptions in an ER diagram. Just like in real life, if you feel that you need more details to complete your design, use your common sense.
- If you feel unsure about some of your design choices, explain explicitly what assumptions you have made and how you designed model in the light of these assumptions.
- Writing explanations is optional. You can get full points without writing explanations of your diagram, if it is correct and matches with the specifications.
- You are required to use a software to draw your diagrams. **Hand-drawing will not be accepted** for the following reasons:
  - It discourages you from improving your diagram, because it's quite difficult to re-do operations.
  - Being able to use a drawing program is a good skill for life and work.
- You can use any program you want to draw your diagrams. Below are some examples of the web-based software, but you are not limited to use them. Visio, PowerPoint, and Adobe Photoshop can also be useful.
  - Excalidraw
  - Lucidchart
  - draw.io
  - yEd
  - Dia
  - Visual Paradiagm
  - ....
- Upload your diagrams + optional explanations as a **single PDF file called "studentid\_assignment1.pdf"**.
- Making your submission available to us is **your** responsibility. Therefore, after uploading your file, TEST IT. Check you have uploaded the **correct file**, and be sure your file is uploaded **without errors. If we cannot open your file, we cannot grade it.**

#### Problem 1. Database Design for a Career Advising Center (50 points)

The Career Advising Center at a University will have a "Career Advising Website" so they can better manage the student requests for career advising appointments. The Career Advising Center would like to assign appropriate Industry Advisors with students based on career area. Draw an E-R diagram that represents the specifications listed below.

- a) Every Industry Advisor has an area (or areas) of expertise, that is, they are knowledgeable in providing career advice for particular career areas (e.g. Arts, Education, Engineering, Healthcare, Marketing, etc...).
- b) Students come to the Career Advising Center to get career advice in a particular career area. Students who log into the system will have a profile with their basic information - first name, last name, studentID, phone number, email and a career area which they select from a list of career areas.
- c) Industry Advisors also have their basic information - first name, last name, facultyID, office location, phone, email, and area(s) of expertise (area of expertise taken from the same list of career areas the Students have.)
- d) Assume each student is interested in only one career area (e.g. Engineering) whereas Industry Advisors can have more than one career area listed as their areas of expertise.
- e) Students can request an advising session and based on their career area an appropriate Industry Advisor will be assigned.
- f) An advising session will be scheduled between the student and an Industry Advisor at a specific date and time, in a particular location, and for a specific career area (for example, to indicate this advising session is to discuss the Engineering career area.) At the end of the advising session the student has the opportunity to rate their experience with a simple numeric rating (e.g. 1 to 10).

## **Problem 2. Database Design for an Airport Domain (50 points)**

Consider a model of an airport with planes, models of planes, test of planes, and technicians. Draw an ER diagram that represents the specifications listed below.

- a) Planes have a unique registration number. Airplane Models are each identified by a model number (e.g. DC-80), and each have a capacity and a weight.
- b) A number of technicians work at the airport. You need to store for each the name, phone number, address, and salary.
- c) The airport has a number of tests that are used regularly to ensure that airplanes are safe. Each test has a unique FAA (Federal Aviation Administration) number, a name, and a maximum possible score.
- d) Each airplane is of one specific model.
- e) Each technician is an expert on one or more plane models. His or her expertise may overlap with that of other technicians.
- f) The airport must keep track of each time a given airplane is tested using a given test. For each testing event, the information needed is the date, the number of hours spent doing the test, and the score that the airplane received on the test.

### **Grading Criteria for Each Problem:**

Technical Correctness (including match between specifications and design) (35 points)

Notational Correctness (15 points)