CSE 4/560 Project1: TinyHub
Due 23:59 09/30/2019 EST
October 3, 2019

1. Submission

Failure to comply with the submission specifications will incur penalties for EACH violation.

- What to submit: A zip file has to be submitted through the 'submit_cse460' ('submit_cse560') submit script by 10/03/2019 11:59PM EST. Only zip extension will be accepted, please **don't** use any other compression methods such as tar or 7zip.
- Zip file naming: Use ubit_proj1 **(NO SPACE!)** for the filename, for example:
- jsmith_proj1.zip, where jsmith is the ubit. The project is an **INDIVIDUAL** project, the filename should contain only one ubit.
- Sub-structure of zip file: On unzipping the zip file, there should be a folder named with your ubit ubit_proj1, under the folder ubit_proj1, there should be two files: (1) a .pdf report, and (2) a .sql SQL file.

2. Description

You are to design and implement the database schema for TinyHub, which is a course enrollment website. It provides simple functions, main functions of TinyHub are the following:

- User management: user sign up, user login/logout.
- Department-course relationship management: create and delete a course.
- Enrollment: Register/ enroll for a course, provide feedback.

Your DB schema must be able to support all the functions listed above. You are required to use E/R modeling (an online E/R diagram tool is https://www.draw.io/) to design and present your database, and map your E/R model to a relational database schema and implement the mapped schema use a RDBMS by a set of CREATE TABLE statements.

RDBMS to be used:

- MySQL(https://dev.mysql.com/downloads/) with version 8.0 or later, you must install MySQL Community Server to use MySQL, and you need one of MySQL Shell and MySQL WorkBench for SQL development. If you need a GUI, you may prefer to use MySQL WorkBench.

You also need to explain how your modeling supports all the required functions. The final product of this is a report (.pdf file), of which the structure will be given later, and a SQL file (.sql file type) which contains all the CREATE TABLE statements you used for implementing your RDB schema.
Note: you ONLY need to design and implement the database schema for the data needed to support the functions, you are NOT required to implement the functions.

3. Requirements of functions

The specific requirements for each function of TinyHub are given in this section. Note that you need to analyze and design the entity sets, attributes and relationship sets by yourself, while this project description only gives some of them for clarifying the system requirements.

3.1 User management

Users can be of three types: Students, Professors, and Staff. Users sign up using their email addresses, the email addresses are used as the TinyHub usernames of the users, users need to set their passwords and display names, where:

- username, password and display names are strings.
- one account, i.e. one username, has only one display name, and one display name corresponds to only one username.
- one email address can be used to register only one account.

Also, each user belongs to a department. Department has an identifying department number. Student can have multiple majors, i.e. a student in Computer Science and Math.

3.2 Course management

Course has a unique course number. The information of a course is provided each semester by Staff in the appropriate department and consists of:

- Name of the course.
- Department of the course.
- The instructor, an instructor has to be a professor. Different professors may teach the same course in different semesters.
- The TAs of this course. All TAs must be students. A course can have many TAs and different TAs in different semesters.
- The prerequisite courses of the course. A course may have zero or more prerequisite courses.

3.3 Student-Course relationship management

- A student can enroll in a course only if
    - that student passes all the prerequisite courses
    - it is being offered by a department they are majoring in

    - The capacity of the course is not full
- Students will have a grade (F/D/C/B/A) with the course, which will be given after the student finishes the course.
- Students can post feedback for the instructor or TAs of the course in which they enrolled.
- Each course has one or more exams. Students who take that course have letter grades on those exams.
- Each exam has a number of problems. Students have scores on those problems.

4. Report template

Here's a template of the report, your report must contain each of the following sections, you can extend this template to include any necessary sections for your design.

- E/R schema: in this section you need to introduce your E/R schema and include a picture of your E/R schema.
- Relational database schema: in this section, you must
    - Discuss briefly how you map the E/R schema to your relational database schema. If any design choice is made in the mapping process, illustrate and explain it briefly.
    - Discuss how your relational database schema satisfies all the requirements listed in section 3.
- Further discussion: in this section, you need to discuss the advantages and disadvantages of your design.