CS348 – Project – Stage 1

Due Date: 11/2/2023

You will develop a database-backed web or mobile application. The goal of this project is to use course concepts in a real application. The project will allow you to practice most of the following concepts:

- Database design
  - Indexing.
- A database query language (most likely SQL).
  - Stored procedures in databases.
- Using a database query language in code (e.g., using SQL in Python or Java).
- Transactions and concurrency.
- Cloud databases

The project will follow a self-learning approach. You will need to choose and learn about a programming language and a web framework to develop your application. The project evaluation will focus on the back-end of the application (especially code and SQL used to access the database). Therefore, **any graphical user interface will be accepted** as long as a regular user can utilize the features of your application.

Sample Application

This is a sample application that presents example database and features. For your project, you will choose a different application.

This application serves student clubs management and regular students. Student clubs organize different types of meetings. Meeting organizers will be able to create a meeting and to invite students to the meeting. Students will be able to RSVP (yes, no, maybe). The system provides reports, such as a list of attendees for a specific meeting and statistics regarding the meetings in a specific period of time.

Note that you only need to develop two main features in the application as described below.

Database Design (sample data organized in tables):

Students(student_id, name, email)
Meetings(id, date, time, duration, description, club_id, room_id, invitedCount, acceptedCount)
MeetingOrganizers(meeting_id, student_id)
Clubs(id, name, address, description)
Rooms (id, building, number, maxCapicity)

Requirements

Your application needs to support two main features:

1. **Requirement 1:** An interface that allows users to add, edit, and delete data in one main table. This may also require adding, editing, or deleting data in other supporting tables. For example, in the previous application you can develop a page for creating, editing, and deleting a meeting.

The page allows the user to choose/change students to be the meeting organizers, which results in adding/editing/deleting rows in the MeetingOrganizers table. If you choose to develop such interface for meetings then you do NOT have to develop interfaces to support add, edit, and delete operations for other tables, such as students, rooms, and clubs.

2. **Requirement 2:** One report interface that allows a user to select which data to display in a report. For example, in the previous application you can develop an interface that allows a user to filter meetings by date (From a start date to an end date), club, and room. Given rooms and clubs are stored in the database, the page retrieves those to build the user interface (e.g., a drop-down list that contains all rooms). After the user picks the room, club, and date range, the application generates a report of the matching meetings and some statistics, such as the average duration time, average number of invited students, average number of accepted invitations, and average attendance rate (attended/invited).

3. **Requirement 3:** database design (e.g., database tables, primary keys, and foreign keys for a relational database).

4. **Requirement 4:** Provide sketches of the user interface of Requirements 1 and 2, including the report generated by Req. 2. You can use PowerPoint to draw how a page or report will look like when you finish development.

5. **Requirement 5:** Use at least two of the following methods: **prepared statements**, **ORM**, and **stored procedures**. Each method should account for at least 20% of your database-access code (e.g., 80% prepared statements and 20% ORM). You may consider using ORM for data entry and updates (Req 1) and use prepared statements for your report (Req 2).

Stage 1 deliverables:

In this stage, you will need to:

1. Write your information in the Excel sheet (link is below). In the spreadsheet (in a new row), write your name, project title, database system you will likely use, programming language, and a short description of the project (3 to 4 sentences). Please note that all project information can be changed until the due date of stage 1. This is totally expected as we progress in the semester and you learn about new concepts and tools.

   Projects Excel Sheet Link: Projects.xlsx

2. A TA will be assigned to you. The TA name and email will be listed in the **project-teams** spread sheet described in the previous point.

3. **Create a shared folder** (e.g., in OneDrive or Google Drive). In your folder, create the "Stage1" document. The stage1 document should not exceed two pages and should include the following information:

a. Your name and email address.
b. Project title.
c. Project description, including the main features that your application will provide.
d. Requirements 3 and 4.

4. Upload a 2 to 5-minutes demo to your shared folder to show that you have started developing Requirement 1. Show at least one operation (add, edit, or delete) that your current project can do.
5. Upload a copy of your code to the shared folder and/or include a link to your GitHub repo.

Frequently Asked Questions

1. You may contact your TA to ask for help. However, the instructor and TAs will not be able to assist you in coding. You can ask for help by posting a question on Campuswire. Multiple students using the same tools are welcome to help one another by answering questions on Campuswire.

2. Can I use any database system? You are encouraged to use a relational database system (because we study those in more detail). However, you can use any database system that supports a query language, transactions, and stored procedures (or provides equivalent features).

Grading:

Stage 1 counts for 30% of the project grade. Your assigned TA will grade your database and user interface design. The TA will also make sure you have started developing Requirement 1.

Stage 2:

The main deliverable of Stage 3 is a final demo of your project. You will record a 5 to 10-minute demo of your project features. You will describe parts of your code where you implemented course concepts (e.g., different types of SQL queries, stored procedures, using indexes, transactions, isolation levels, … etc.). You will also discuss the lessons learned during the project phases. The other deliverables are a url to your application and your application's code (e.g., a GitHub link).

Grading:

Stage 2 counts for 70% of the project grade. Your assigned TA will grade your demo and code.

More details regarding stage 2 will be posted when the stage is assigned.