COMP 3005 - Winter 2024- Project: Health and Fitness Club Management System

Instructor: Ahmed El-Roby and Abdelghny Orogat

Due: April 10, 2024 (11:59 PM)

1 Problem Statement

Design and implement an application for a Health and Fitness Club Management System. This system will serve as a comprehensive platform catering to the diverse needs of club members, trainers, and administrative staff.
Members should be able to register and manage their profiles, establish personal fitness goals (you can determine suitable fitness goals such as weight and time, and members will set the values), and input health metrics. They should have access to a personalized dashboard that tracks exercise routines, fitness achievements, and health statistics. Members can schedule, reschedule, or cancel personal training sessions with certified trainers. Additionally, they should be able to register for group fitness classes.
Trainers should have the ability to manage their schedules and view member profiles.
Administrative Staff should be equipped with features to manage room bookings, monitor fitness equipment maintenance, update class schedules, oversee billing, and process payments for membership fees, personal training sessions, and other services.

Functions to Implement:
Member Functions:

1. User Registration
2. Profile Management (Updating personal information, fitness goals, health metrics)
3. Dashboard Display (Displaying exercise routines, fitness achievements, health statistics)
4. Schedule Management (Scheduling personal training sessions or group fitness classes. The system must ensure that the trainer is available)

Trainer Functions:

1. Schedule Management (Trainer can set the time for which they are available.)
2. Member Profile Viewing (Search by Member's name)

Administrative Staff Functions:

1. Room Booking Management
2. Equipment Maintenance Monitoring
3. Class Schedule Updating
4. Billing and Payment Processing (Your system should assume integration with a payment service [**Note:** Do not actually integrate with a payment service])

You are not required to demonstrate the entire sequence of operations, but rather focus on individual operations. For instance, when a new member joins, the subsequent step involves scheduling a session. Following that, the system generates a bill, the member makes a payment, and then the system confirms the transaction. I do not anticipate you to follow this sequence explicitly. Instead, I only need you to provide an operation (function) in your code along with its corresponding SQL code. You are encouraged to test these functions separately in your demo video.
The requirement lacks all the necessary details for building your system. Therefore, you must incorporate these details yourself as you follow the guidelines outlined in the requirements.

2 Project Report

The project aims to design a software program based on the functionalities outlined earlier. This involves the initial step of designing a relational database capable of storing the necessary data to implement these functions effectively. When designing the database schema, it is important to consider the entities and relationships specified in the project requirements for efficient management and retrieval of information. Assumptions will be made to facilitate the implementation process, with clear documentation provided in the report. You need to submit one report file that contains the following sections. You can add other sections, but the following sections (except Bonus Features) must be in the report:

2.1 Conceptual Design

Explain the conceptual design of the database: the ER-diagram for the Health and Fitness Club, and assumptions made regarding cardinalities and participation types. Ensure that assumptions align with the problem statement in Section 1.

2.2 Reduction to Relation Schemas

Consolidate your ER-diagram into relational schemas using the most effective method for mapping ER components to tables.

2.3 DDL File

Transform your Relational Database Schema into a data definition language (DDL) statements file with a **'.sql'** extension. By executing this file on PostgreSQL, your database should be successfully created. Ensure to define the constraints (other than primary keys and foreign keys that are already included in the Schema).

2.4 DML File

Provide a data manipulation language (DML) file, with a **'.sql'** extension, containing sample data for each table. This data will be utilized to demonstrate your application.

2.5 Implementation

Your application can assume the form of a Command-Line Interface, a Web application, or a Desktop-based application. Please describe your application's architecture, ensuring the utilization of a relational database. You can employ any programming language to implement your application.

2.6 Bonus Features (Optional)

Enhance your system with bonus features to earn extra marks. These may include views, indexes, triggers, a recommendation system, or integrating wearable devices to track workouts. You can receive up to 10% more marks based on comparing the workload to the entirety of the project. The evaluation considers both effort and novelty. Effort, representing 10% or more of the overall project effort, merits 10 marks. Novelty is given more weight if the feature is innovative.

2.7 GitHub Repository

Upload your source code to a public GitHub repository. Include a comprehensive README and a directory titled "SQL" with ddl and dml files.

3 Instructions for Submission

Adhere to these guidelines:

Video Demonstration: Submit a video that is at most 15 minutes long and thoroughly demonstrates your application. The video should:

- Quickly explain the ER model.
- Quickly show how the ER model was mapped to the schema.
- Go through the DDL and DML files without details and point the TA to where they can find them in the project folder.
- Walk through each functionality in the requirements.
- Provide a brief overview of the code structure, emphasizing critical components.
- Ensure clarity and focus, especially when presenting the user interfaces.
- Make sure that the video is well-paced, with a clear voiceover, and covers all essential aspects of your project.
- For groups, all members must participate in the video demonstration and showcase what they implemented.

Video Submission: Upload your video to platforms like YouTube or Vimeo. Ensure the video is accessible to the TAs. TAs will grade based on the video demonstration. Ensure your application functions as described and that the video is of high quality.

4 Group Rules

Collaboration is encouraged, but groups should consist of no more than three students. **All members must participate in both the database design and implementation phases.**

All groups, including one-student and two-students groups, must implement all requirements. However, groups of two students will receive a 10% bonus of their total project grade, which will be added to their final grade. For instance, if a group of two students receives 28 out of 30, each student will receive 2.8 points to be added to their final grade, which is out of 100.

Groups of one student will receive a 20% bonus. For example, a score of 28 out of 30 will receive an additional 5.6 points.