CSCI 341: Database Systems
Assignment 3
Executive Summary

Done by: Assetbek Bibol
Zhengis Kosher
Yernur Kenzhaly

We were given 3 separate tasks in our Assignment 3, which made us work and experiment with the database functionalities by using DBMS as MySQL (initially we implemented everything in PostgreSQL), Python, and SQLAlchemy to connect, manipulate, and search the data in our created SQL database. Also, we used the Flask framework to write server-side logic and connect our website's frontend with the database in order to enable the working CRUD functionality in our database through a web database dashboard. Now, a brief overview:

For **Task 1**, we were asked to create a database schema of our SQL database first and then create and insert sample data records into it (this should have been done to test the table manipulation functionalities and query processing described in **Task 2**). Basically, by following the instructions and adding sample records, we have successfully created our database as requested in this task.

Regarding **Task 2**, we have used our database from **Task 1** and connected to it using a Python script file. What is notable here is that we decided to use textual SQL (by "text()" of SQLAlchemy) to our advantage and wrote all the required query types listed in our task, such as viewing job applications, deleting/updating SQL statements, and other simple and complex SQL queries. As a result, we could connect to our database and manipulate or fetch some records resulting from queries by using SQLAlchemy, as required in this particular task.

Finally, in **Task 3**, we tried to do an interesting implementation of the CRUD functionalities of our database through a web application. If we explain it more clearly, we have created a frontend design of our web dashboard that shows our database on the webpage. On this dashboard, you can interact with our SQL database and apply basic CREATE, READ, UPDATE, and DELETE functions. We must add that after analyzing these functionalities in every table, we understood that we need to handle the cases where certain table records change or deletion could lead to reasonable change or deletion of the same record through all related tables (e.g., when deleting a record from a first table, if there is the second table where this record also persists, it would result in deletion of our record from the latter). That is why, after thoughtful consideration and solutions, we have achieved the correct changes to records in our database through our web dashboard.

In addition, we should mention one of the requirements for this task, which is the deployment of our working web dashboard with a connected SQL database. Till this moment, we have done everything utilizing PostgreSQL. So it was late for us to realize that "PythonAnywhere" with the free plan of deployment works only with MySQL (we became worried). After sitting and migrating/changing everything from PostgreSQL to MySQL for 1-2 hours, we have finally managed to make everything work again and finally finish **Task 3**.

Before we end, we must state our own decisions in developing the solutions for certain tasks. In tasks involving Python and Flask, we have used table names in lowercase letters for our convenience. Making them uppercase could create some problems/inconveniences when implementing in Python. For example, "user" for "USER", "caregiver" for "CAREGIVER". Also, we have included different statuses for the "APPOINTMENTS" table, like "Pending", "Accepted", or "Declined". This was not defined in our schema, but we referred to the case study of the caregiver platform. In fact, we thought that it would be better to include most of the things that are also described in the caregiver platform case study.

Overall, this assignment was fascinating and practically helpful in understanding the basics of using databases and designing query solutions in the software development realm, even if we developed basic CRUD in a web application.

IMPORTANT: If you want to have more details about our solutions for tasks, you can visit our GitHub repository: https://github.com/mrbqble/db-assignment-3. Our deployment:https://mrbqble.pythonanywhere.com/

You can read the README.md file in our repository on how to run our programs/database.