Web-Based Student Information Management Application

CS591L1 Final Project

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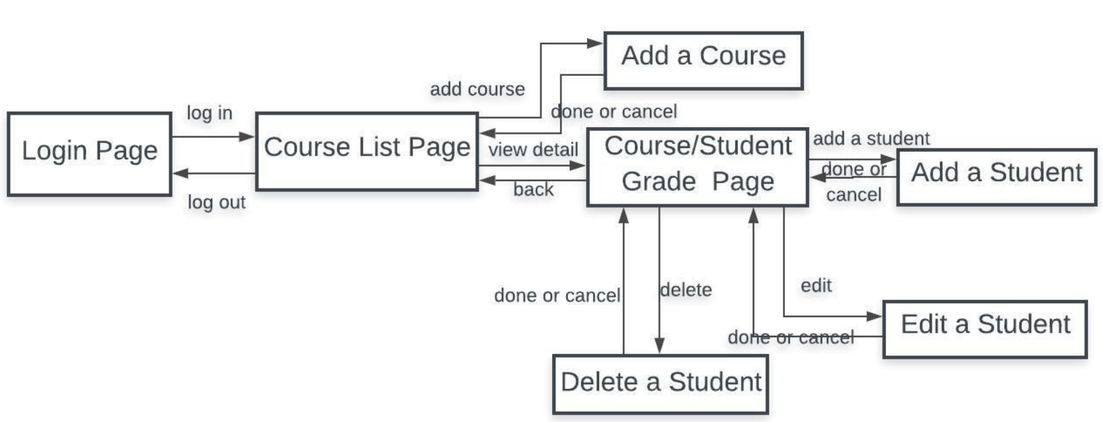
Introduction

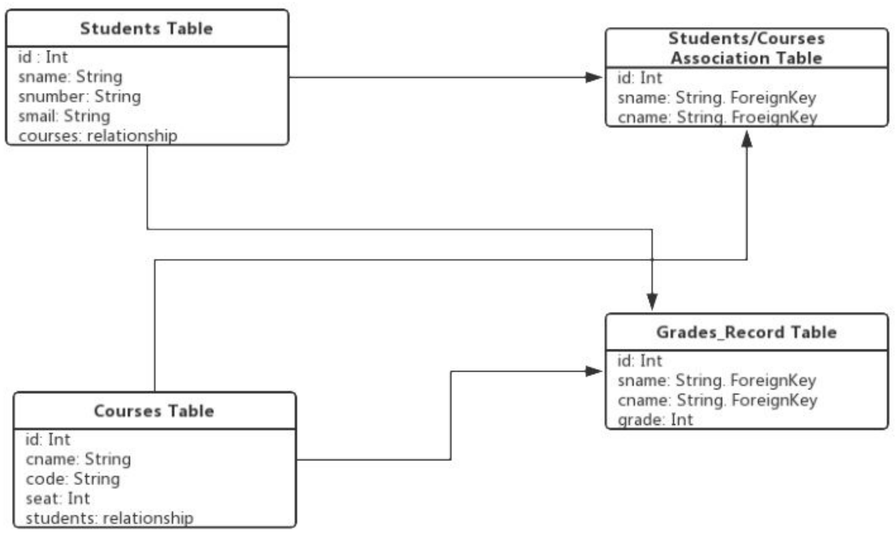
For the final project, we build a webpage-based student information management application using existing embedded libraries. We already learned from lectures that sqlalchemy can be programmer-friendly that it makes us do the same thing as SQL statements without having to write SQL statements as strings. Instead, tables and schemas are represented as classes and objects in python, which are relatively easier for us to manipulate. On this basis, we intend to make a user-friendly application in which users can manipulate data easily on a user interface. Specifically, we use python as the programming language, flask as the web framework to build user interfaces and sqlalchemy as the logical support for the data schema and data manipulation. We want to explore the availability and advantages of using flask and sqlalchemy in building an application.

Architecture and schema

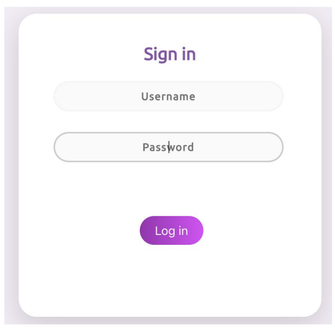
Flowchart

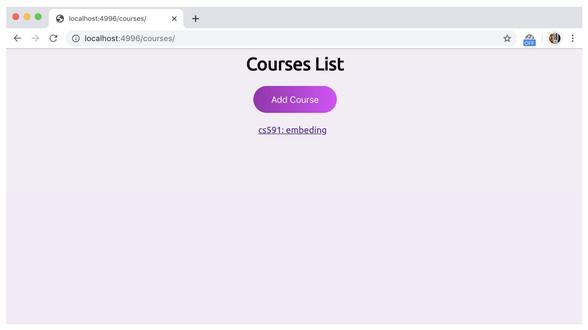


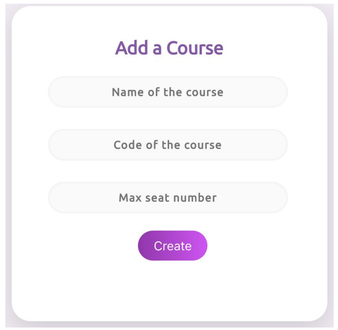
Data Schema

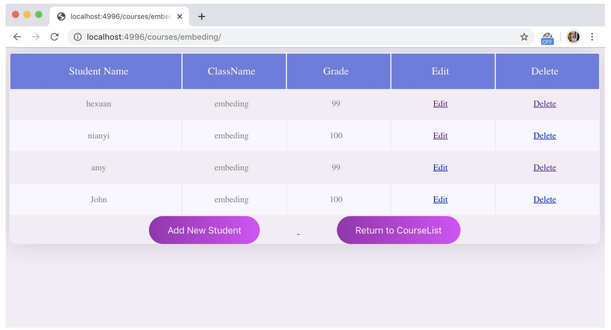


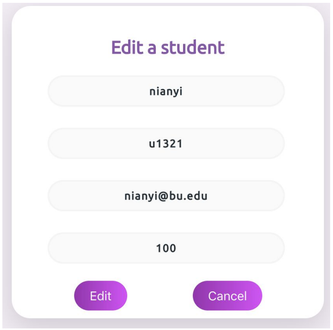
Demo











Comparison with Java Implementation

We know that sqlalchemy uses the deep-embedding technique because it represents tables as classes in python and provides python objects such as a query for us to manipulate. In this project, we implemented this application by python, flask and sqlalchemy. We want to compare this method with java, Java Swing and MySQL implementation and list some similarities and differences.

- Similarities

  In both implementations, the deep embedding is used. In python, we use deep embedding in the backend as stated above. In java implementation, Java Swing is also a deep-embedding but in the front end. It is written in Java and provides objects like JFrame, JPanel, JButton and so on. Users can easily make use of them to design a user interface in java.

- Differences

  Apparently, for us, python, flask, and sqlalchemy is an easier way to implement it. Although Java Swing is also a deep-embedding there is much redundant code when it comes to the graphic user interface in java. We have to listen to all kinds of events and enable many buttons. Instead in python, we build a webpage application and we write some HTML/CSS to implement the user interface part. Moreover, flask enables us to interact with HTML files easily. We use python decorator @app.route and render_template to bind a function to an HTML file and redirect the page. Flask and python allow us easily get the input from the webpage and pass them as parameters in between different HTML files.

- Advantages and Limitations

  Deep embedding provides us with much flexibility while programming. It allows us to make use of a new construct in the host language and these objects can be passed to or returned from functions.
  However, if we transfer a huge amount of data from the database to python and do the query using python function, this could be a disaster because python is a slow interpreted language and much less efficient.