CS157A Database Project

A Web Application for Study Materials

Team 29

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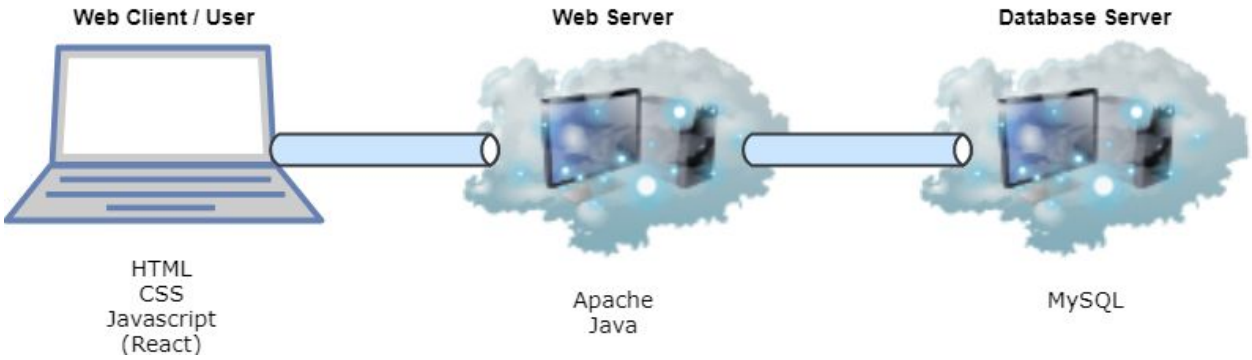
1. Project Description
    - For our project, we will be making a web application that allows users to easily create, use, and organize study materials. These study materials will include tools like flashcards, quizzes, or even graphs.
    - The goal of this project is to use a database management system to create something useful and powerful. As a result of this, team members can expect to learn more about using databases to create useful applications. This is a skill useful to all who will work with software and databases. A secondary goal is to create an application that enables users to create new and engaging methods to review content. Perhaps this application can even be used to study for CS157A quizzes and exams.
    - The stakeholders of this project will primarily comprise of students across all levels of education who are looking for different methods to study.
2. System Environment
    - The program is meant to run within a client's browser. The GUI interface will thus be made using HTML, CSS, and Javascript (using the React library). This will then connect to a web server made using

Apache Tomcat. This web server will provide the client with the code necessary to run the program, including java code within a JSP file that will assist in delivering content from the database. This server will thus be responsible for connecting the client with the database. The database will be managed using MySQL version 8. This can all be seen in the following diagram.



3. Functional Requirements

   <u>How users will access the system:</u>

   - Users and stakeholders will be able to access our system through using any popular browser and typing in the url link to their respective address bar. Once on the website, they will be able to either browse as an unregistered user with only read capabilities or login with credentials to acquire registered user and admin privileges to respective study material.

Functions:

- Sign up - Users will be able to become registered users by filling out all required fields in the account creation page.
- Login - Users will need to authenticate themselves through a username and password to acquire registered user/admin privileges.
- Create/Delete Folders - Registered users will be able to create folders to organize sets and diagrams. They will able to rename and reorder the folders within their home page.
- Create/Delete sets of flashcards - Registered users will be given the ability to make/rename sets of flashcards. The user that creates the set will have admin access to the set and the flashcards within.
- Escalate user privileges - Admins will be able to escalate privileges to registered users to allow create, update and destroy functionality to the respective item.
- Create/Read/Update/Destroy Flashcards - Users with access will be given CRUD functionality for flash cards based on their privilege level. Each flashcard will have text or images on either side of the flashcard to denote key terms, questions and concepts. The GUI implementation will closely resemble that of flashcards in real life.

- Generate practice test from flashcards - Users will be given the functionality of simulating a practice test by randomly shuffling their flashcards order and prompting for them to match the text or image on to its respective definition, concept. The GUI implementation will consist of showing one side of the flashcard and allowing the user to flip over to the other side of the flashcard to see if they answered the question right.
- Create diagrams - Registered users will be able to make diagrams that consist of a background image and ways to make notes on specific parts of that background image. The GUI will consist of clickable areas of the image that when clicked presents the notes attached to that part of the image.
- Browse/search sets and diagrams - Users will be able to see available study material and search for desired sets and diagrams based on keywords.
- Favorite/save sets and diagrams - Registered users will be able to press a button to favorite a set and diagram. All favorited diagram can be easily accessed later on through the users home page.

4. Non- Functional Issues

- Graphical User Interface (GUI) - The Graphical User Interface will be hosted on a web application using ReactJS that the user will be able to directly interact with, including editing and viewing the terms/definitions in different forms to enhance the learning experience. Diagram labeling will make use interactive image JavaScript libraries.

    Our GUI will feature many of the generally accepted Graphical User Interface Design principles including but not limited to, clarity, comprehensibility, configurability, consistency, control, simplicity, and efficiency. Clarity and comprehensibility will be seen through user controlled functions, visual elements, and text that will allow the user to implicitly know what actions to do next. Configurability will be demonstrated through the nature of the application as the user will be able to create their own study set with their own terms and diagrams. With these study terms, the user will be able to use a variety of learning methods and tools to study the set. The User Interface will be simple and consistent across screens with a simple, similar look and use such that when the same function is invoked multiple times, it will yield the same result. With simplicity, we will incorporate

efficiency such that the user does not need to go through multiple actions or screens in order to complete a task. Lastly, the user will control all interactions with the interface in a manner that all actions will result from a user request in a quick manner.

- Security - Each user account will be protected by a username and password created by the user. All data and study sets will be associated with the respective user with access controls specified in the next section. All user account information will be stored on the server and logins will only take place when the user provides an email and password that exists for an associated account in the application. An encrypted https connection will be implemented between the user and server.
- Access Control - Users will have view access to all publicly available flashcard sets regardless if the user is logged in or not. Write and edit access will be limited to the author of the study set using login credentials to verify so. From a high level, the user that creates the study set is the administrator of the study set while everyone else is a consumer and/or viewer of it.