CS 411W Lab II

Product Specification

<John Crotzer, Gold Team>

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Version: 2
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1 Introduction

Study Buddy is a web-based application that takes the aim of enhancing the process of study group formation using software technologies. It will connect users from all over the world interested in forming a study group. Study Buddy not only aims to raise grades and aid students in passing stressful exams but also aims to improve overall mental health.

1.1 Purpose

Users will be able to create an account. Users will then choose different learning styles and study habits to best ensure pairing with other likeminded individuals. Study Buddy will also utilize third party applications to provide communication avenues for the users. Users will mostly include students enrolled in high school or college classes. However, it may also serve useful for people passionate about a particular subject area.

1.1.1 Scope

Study Buddy will reduce the amount of time it takes interested parties to form a study group. This benefit provided by Study Buddy maximizes the amount of study time for each user. This increase of study time affords the user to be even more prepared for up coming examinations. The more prepared the user is the more confidant that person is in taking stressful exams. This confidence leads to lower stress levels. The Study Buddy application not only helps improve the user’s knowledge. It also helps reduce stress, increasing mental health wellness.

Study Buddy prototype will offer a wide range of features to demonstrate. The prototype will allow users to create an profile account. During this time users will be able to select study preferences and pick their preferred learning style. The prototype will allow demonstration of the
core feature found in Study Buddy, that is the Intelligent Matching algorithm. It will use proprietary software to search through Study Buddy’s database to provide the user with a list of like-minded people to form a study group with. The prototype will allow access to a third-party APIs to facilitate communication between the users of the formed study group. The complete list of prototype features can be found in the right column in Table 1.

<table>
<thead>
<tr>
<th>Features</th>
<th>STUDY BUDDY Final Product</th>
<th>STUDY BUDDY Prototype</th>
</tr>
</thead>
<tbody>
<tr>
<td>GUI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Login</td>
<td>Allows user entry of authentication credentials</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>New User</td>
<td>Allows a user to create an account</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Study Preference Setting</td>
<td>Allows users to set study preferences for intelligent buddy matching algorithm</td>
<td>Will be implemented with limited study preference fields</td>
</tr>
<tr>
<td>Search for buddies</td>
<td>Allows user to search for study buddies</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Create a study group</td>
<td>Allows user to create a study group</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Set wait time</td>
<td>Allows user to set wait time in case of no matched buddies found</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Web Application</td>
<td>The way in which the user will interact with the Study Buddy application using a web browser</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Mobile Application</td>
<td>The way in which the user will interact with the Study Buddy application using their smartphone device</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Private Message</td>
<td>Allows users to send and receive private messages within the Study Buddy App</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Block buddies</td>
<td>Allows users to block buddies with different goals</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Partner match by subject of interest</td>
<td>Matching Study Buddies by their own subject interest</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Intelligent Buddy Matching</td>
<td>Matching Study Buddies with the proprietary algorithm</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Google Hangout Integration</td>
<td>Allows users to integrate their Google Hangouts accounts for setting meeting times and web conferencing</td>
<td>Will be implemented</td>
</tr>
<tr>
<td>Google Drive Integration</td>
<td>Allow users to share documents</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Slack Integration</td>
<td>Allows users to integrate their Slack accounts, allowing channels to be made to aid in communication between Study Buddies</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Git Integration</td>
<td>for creating repositories to share with your study buddies</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Codeshare integration</td>
<td>Allows users to share their code real time with their Study Buddies</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Schedule syncing</td>
<td>Allows users to make matches with Study Buddies based on the availability they input</td>
<td>Will not be implemented</td>
</tr>
<tr>
<td>Rate your buddy</td>
<td>Allows users to provide feedback on their Study Buddies</td>
<td>Will not be implemented</td>
</tr>
</tbody>
</table>

Table 1 Features Table
1.2 Definitions, Acronyms, and Abbreviations

Auditory Learner - best comprehend information by listening to information rather than reading it or seeing it visually.

Business Logic - The programming that manages communication between an end user interface and a database.

CRUD - Stands for Create, Read, Update, and Delete. Basic database/application operations.

Entity Class - A simple Java Class with member variables and getter and setter methods defined.

JPA - Java Persistence Application Programming Interface is an API for handling all database operations such as storing or retrieve entities from the database.

JSF - Java server faces is a java framework that couples the view and servlet into one managed component.

Kinesthetic Learner - best comprehend information by participating in activities or solving problems in a hands-on manner.

Learning outcomes – statements that identify the knowledge, skills, or abilities learners should gain by the end of a particular assignment, class, course, or program.

Modern Interface Design - the process of making manageable interfaces for computing devices, with a focus on current styles.

ORM- Object-relational mapping. Technique for persisting objects into a database table. Tables are modeled after Entity classes.
Procrastination - delaying or postponing a task, which needs to be completed, often to the detriment of the procrastinator.

Prototype - the prototype of Study Buddy will be a reduced scale version of the final product, and will demonstrate the functionality of the completed product in a simulated environment.

Reading/Writing Learner - best comprehend information by reading texts to further absorb information by condensing and rephrasing it in traditional lecture and note-taking environments.

Study Group - a small group of students with similar goals who meet regularly to review course material and prepare for exams.

Visual Learner - best comprehend information by visualizing relationships and ideas through maps, charts, diagrams and even essays.

Web Application - an application that uses a website as the interface
1.3 References

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1.4 Overview

Section 2 of the product specification will contain the technical details that will make up the Study Buddy application. It will list in detail all APIs utilized by Study Buddy be they both external or internal. It will layout all the major functional components that will make up Study Buddy.

2 General Description

The prototype will be written in the Java programming language. It will utilize a Microsoft SQL Server as it’s data storage mechanism. It will follow the best practices laid out in the Java Enterprise Edition specification. The prototype will be hosted inside a glassfish application container.

2.1 Prototype Architecture Description

Study Buddy will make use of several components to provide users with a robust user experience. Java Server Faces (JSF) is a front-end framework that will serve as the view component of the Study Buddy application. JSF will allow the coupling of the front-end view and the servlet for easy development. JSF components alongside HTML component tags will make up the user interface with a clean minimalistic view. The data source component will be handled by the Java Persistence API. This API will help the application communicate with the SQL Server database engine to issue basic CRUD commands. Glassfish is the application container component. This component will house Study Buddy’s source code along with other third-party libraries such as, Google’s Guava library. Glassfish provides mechanisms for
dependency injection and class lifecycle management. A MFCD diagram is show to illustrate this process in Figure 1.

![Diagram](image)

Figure 1 Major Functional Components Diagram

### 2.2 Prototype Functional Description

The major functional components of the Study Buddy prototype include the following:

- **Create User Account**: This function provides the ability for users to create and account specifying a Username, password, and email address it.

- **Assign Preferences to User**: This function receives user preferences and assigns them to the passed in user. This will be persisted into the database for storage.

- **Search for Matches**: This function will receive a user’s preferences and take that information and query the database for other users who match the required user preferences. A list of users will be provided by the function.
• Establish User communication: This function will make the appropriate calls to Google Hangouts API for communication between study group members.

• Hash User Password: This function will be responsible for converting a plain text password into a one-way hash.

• Password Verification: This function will provide the logic for authenticating passwords.

2.3 External Interfaces

Java Persistence API is the interface responsible for communicating with the application container to persist data in the database engine. JPA will utilize a Java Database Connection (JDBC) driver which will act as a mechanism converting JPQL which is the java query language into the correct SQL syntax the SQL Server database engine expects. Google hangout’s API will be leveraged as well to provide stable communication between study group members.

2.3.1 Hardware Interfaces

Study Buddy is strictly a software solution to the problem domain. It utilizes no hardware interfaces.

2.3.2 Software Interfaces

Study Buddy will be built using the Java Enterprise Edition platform. This specification provides several APIs from within its specification to assist in building a stable application. The Enterprise Java Bean API (EJB) and Context and Dependency Injection API (CDI) will be leverage by the application to control java class lifecycle by using annotations to control when classes keep and lose their state. EJB and CDI also provide annotations for dependency
injection of classes. This decouples a class from its dependencies for clearer code and easier testing.

2.3.3 User Interfaces

The user interface will be utilizing JSF as the front-end framework. It will also make use of standard Hyper Text Markup Language and Cascading Style Sheets in creating a smooth and elegant page view. Supplementing the JSF framework is a third party add on called Prime Faces. Prime Faces is a user interface API that enhances the already robust JSF library components.

2.3.4 Communications Protocols and Interfaces

Users will be able to access Study Buddy through Chrome or Firefox web browsers. This application will be available for all computing devices capable of hosting web browser, such as desktop computers and mobile phones. Study Buddy will communicate with the web browser through standard Hyper Text Transfer Protocol.