Notebase
Software Design Document

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Table of Contents

1. Introduction

This section explains the purpose of the software design document, the scope of the Notebase application, a brief overview of the document and the constraints of the project respectively.

1.1 Purpose

Notebase is an application that allows users to download and upload handwritten study materials. It is aimed to describe the project in all design aspects clearly.

All team members of the project will use this document as base in the implementation of all features related to software of the project. Also, the potential users of the platform can look up for functionality and design-related information in this document.

In the later stages of the software development, when the requirements should change or some new requirements should be added, all changes should be documented.

1.2 Scope

The main purpose of creating Notebase application is to provide a platform for university students from all over the world which will help students by providing 'extra' handwritten study materials from other students who have taken the course from previous years. This will allow them to study from a plethora of different notes for a specific course.

OBJ1. Provide a mutual trust system among peers where a student needs to upload and see a handwritten material.

OBJ2. Encourage students to contribute and study more.

OBJ3. Creating a community among students.

1.3 Overview

This document contains the system overview and architecture, data design, detailed design, user interface design, testing, software development environment and timeline sections. Readers who wish to have a general idea with a brief overview of this document and a description of the scope of the software should read Part 1 (Introduction). Readers willing to have an idea about the context and design of the platform, and the background to the project should read Part 2 (System Overview). Readers who want to have architecture and design related detailed information should focus on Part 3 (System Architecture) and Part 4 (Data Design). Readers willing to see an overview of the user interface should read Part 5 (User Interface Design).

1.4 Constraints

Visitors have to authenticate with the system in order to start using the application. By registering via the Notebase interface, the system will grant visitors the user title and privileges. After authentication, users are free to interact with the system. Also, only handwritten study materials with pdf extension can be uploaded to the system.

2. System Overview

This section tells about the basis of the project and an overview of the platform and includes platform's context diagram.

2.1 Base of the Project and General Overview

Studying for a course is difficult in college, especially if you only have your own notes as a study material. Our project will help students by providing 'extra' materials for them to study, from other students who have taken the course from previous years. This will allow them to study from a plethora of different notes for a specific course.

The platform will provide a mutual trust system among peers where a student needs to upload a handwritten material, in order to see other study materials (i.e. Quid pro quo). Hence it will encourage students to upload their handwritten notes that they have at their disposal.

Notebase is a web and mobile based online note sharing platform. You need to be identified as a "Student" in order to interact with the platform. Otherwise, the system identifies you as a "Visitor" and wants you register to the system in order to access the platform.

The application starts with user authentication. After the user has authenticated, they will be introduced to the home screen where the users can search a specific document or browse through the materials that are currently on the system.

In order to download or access the study material, the user needs to upload one of their own handwritten study materials to the system. Users can upload a study material by simply navigating to the profile screen by using the bottom navigation bar and clicking the upload button on the profile screen.

Each user has their own profile. This feature allows users to check their upload/download ratio and display their previously downloaded and uploaded study materials. The profile screen also provides an upload button where it takes the user to the upload screen.

Uploading materials to the system is the most important and crucial part of the Notebase application. In order to upload, users will be prompted to upload their study materials and several meta-data concerning this material. The application backend analyzes the soon-to-be uploaded material in a meticulous manner.

2.2 Context Diagram

There are a data repository and an entity of the platform that is Student. The following diagram (Figure 1) is the context diagram which shows the boundaries of Notebase platform and entities' interaction with the platform.

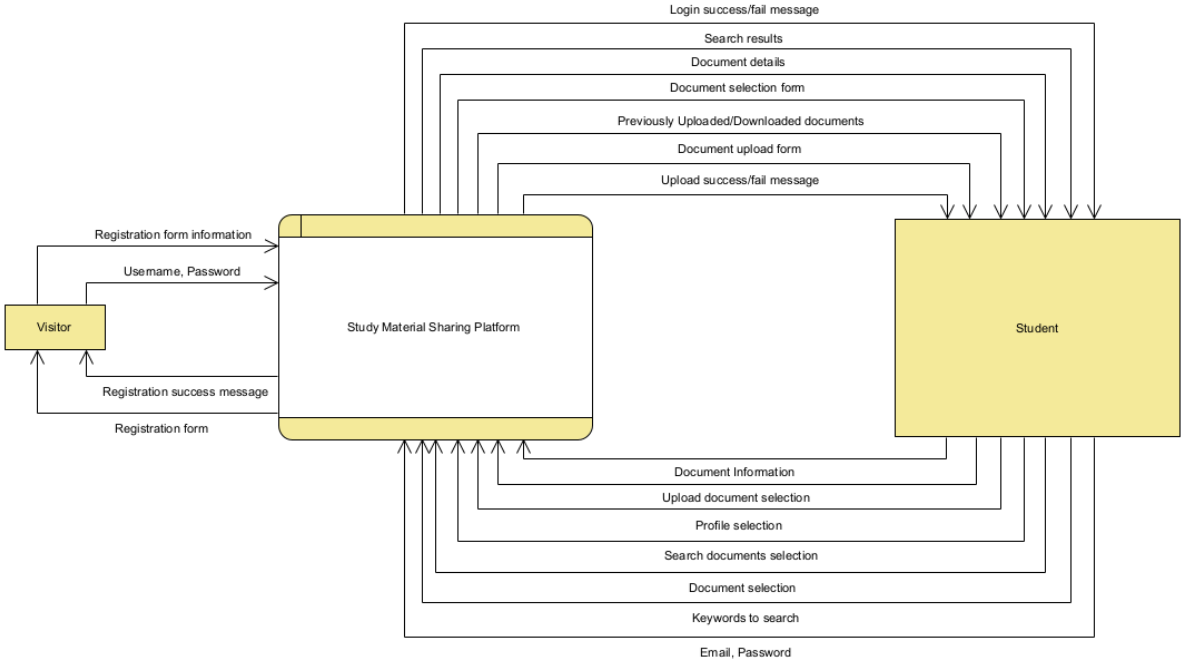


Figure 1: Context Diagram

3. System Architecture

This section includes level-1 data flow diagram and descriptions of the design components.

3.1 Descriptions of Design Components

3.1.1 Entity: Visitor

A person who is not logged in or registered to the Notebase platform.

3.1.2 Entity: Student

A person that is logged in as a student and authorized by the system. Students can interact with the system by browsing, searching, and uploading study materials to the platform.

3.1.3 Process 1: Register

Process 1 is the process of registration to the platform which takes user's personal information and saves it to the Notebase database. Only visitor is able to perform this process.

3.1.4 Process 2: Login

Process 2 is the process of log into the platform. After verifying both of user's username and password, a login success message is sent to the user. If the verification fails, the user receives a login fail message. Only visitor is able to perform this process.

3.1.5 Process 3: Display Documents

Process 3 Displays items that are queried by the student while using the document search feature.

3.1.6 Process 4: Search Documents

Process 4 enables students to search for a particular study material via using the search documents button.

3.1.7 Process 5: Upload Documents

Process 5 is the process of uploading user's handwritten study document to the system as a pdf and inspecting the soon-to-be uploaded pdf to determine whether it is handwritten or not.

3.1.8 Data Store D1: Notebase Database

Notebase database is the data store containing all of user and document-related information and the connections between the data elements.

3.2 Data Flow Diagram

The following level-1 data flow diagram displays the major subsystems, data repository and their interconnections.

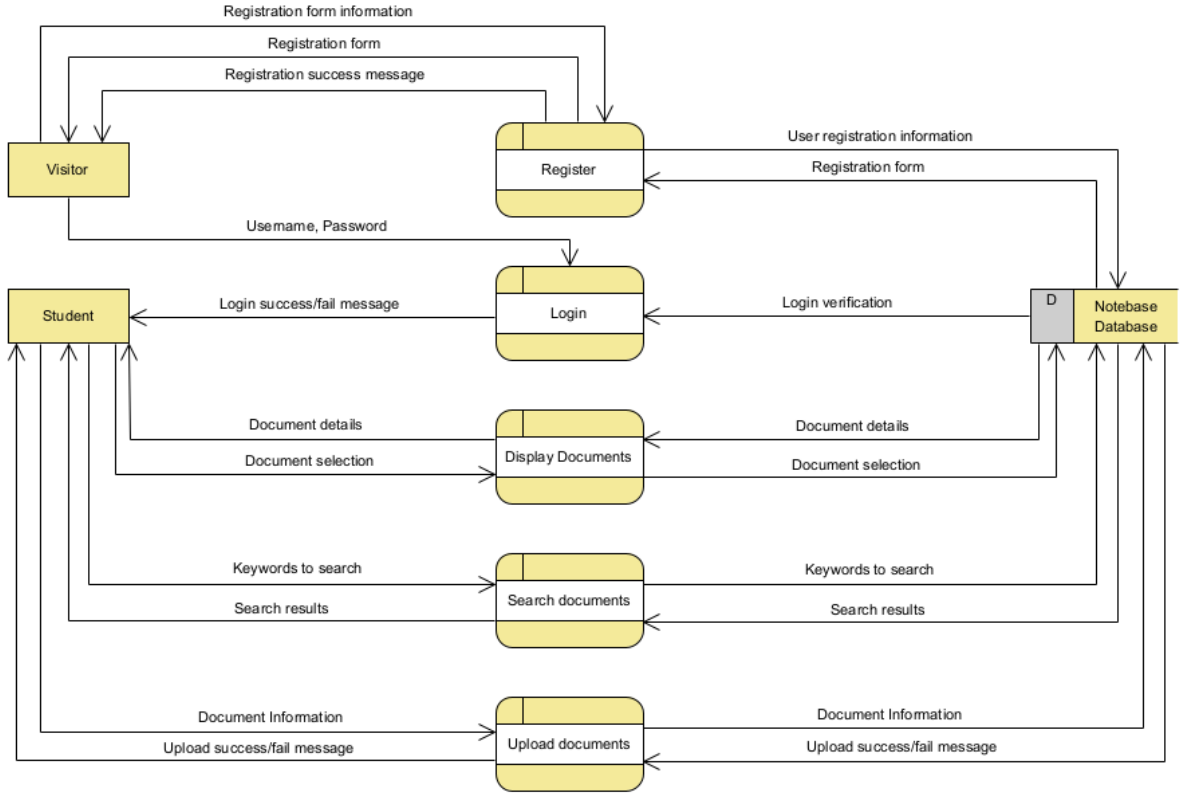


Figure 2: Level-1 Data Flow Diagram

3.3 Class Diagram

The following diagram (Figure 3) represents the class diagram of Notebase platform.

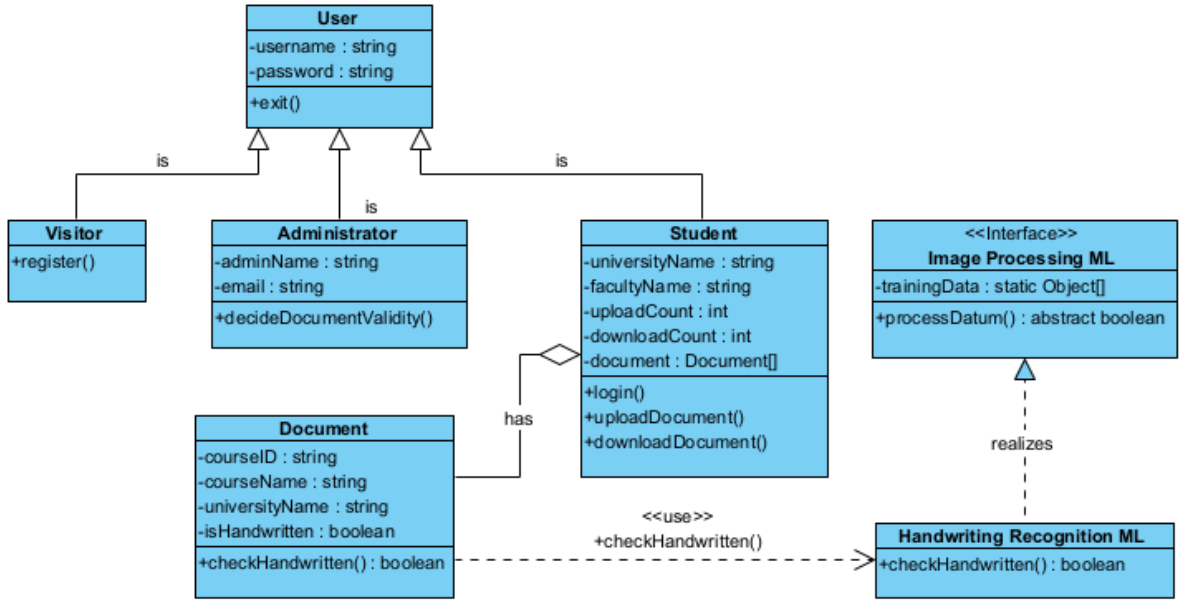


Figure 3: Class Diagram

4. Data Design

4.1 Functions

4.1.1 Registration

F1. Any user can register with filling the form shown in Figure 6.

4.1.2 Log In/Out

F2. Registered user can log in by supplying his/her username and password.

F3. Logged in user can log out.

4.1.3 User profile

F4. Logged in user can edit/change his/her personal information/ password.

4.1.4 Viewing Courses and Materials

F5. Any user can see the most popular courses and materials added on homepage.

F6. Any user can view the materials under courses.

F7. Any user can download the material.

- If the user's upload count less than or equal to download count, user can not download any more materials before upload a new material.

4.1.5 Searching

F8. Any user can search for an courses or materials by typing one or more keywords.

4.1.6 Uploading a Material

F9. Any user can upload a new material onto the platform by filling related form.

F10. Granter can view the material(s) s/he uploaded to the platform.

4.2 Data Restrictions in Registration Forms

4.2.1 Registration Form for User

- Username: Letters and numbers.
- E-mail: English letters, numbers and the characters “.”, “-“, “_”, “@”, “+”.
- Password: Letters, numbers and characters “.”, “_”, “-“, “!”.
- Confirm Password: Letters, numbers and characters “.”, “_”, “-“, “!”.

4.3 Entity-Relation Diagram

The following diagram (Figure 4) shows the relationships of entity sets stored in the database of Notebase platform.

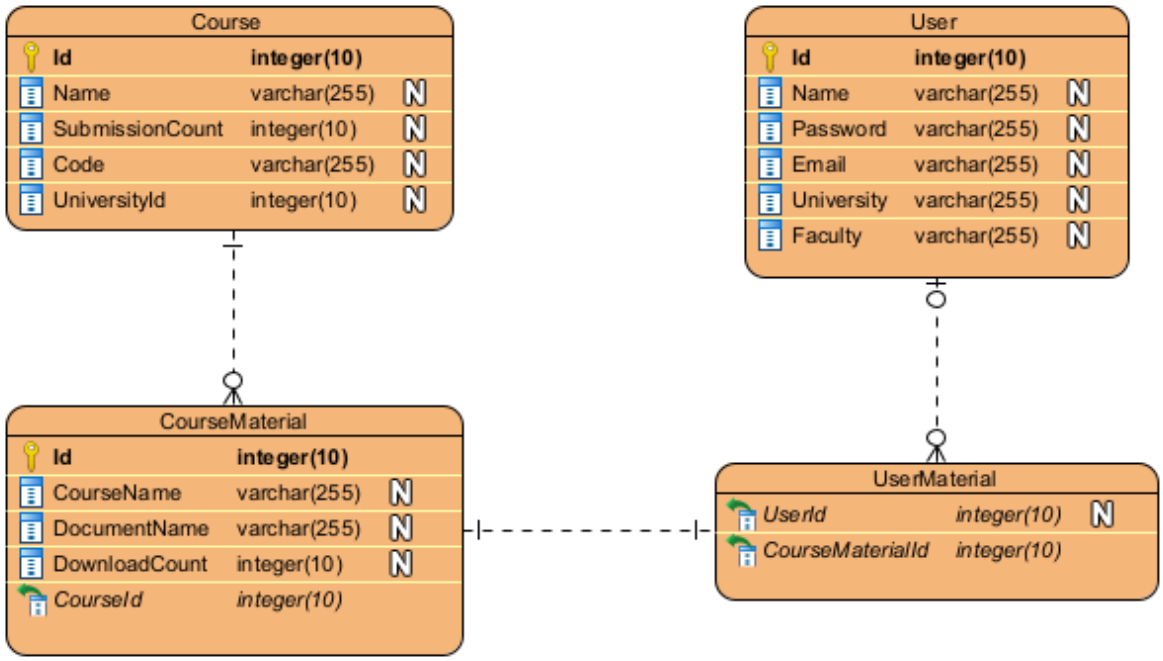


Figure 4: Entity-Relation Diagram

5. User Interface Design

This section briefly describes user interface verbally and provides figures of pages.

5.1 Home Screen

After the user authenticates with the application, a home screen will be displayed. The user can browse different courses and materials in this screen. It can also search for a specific material by clicking the search icon on the top right of the navigation bar.

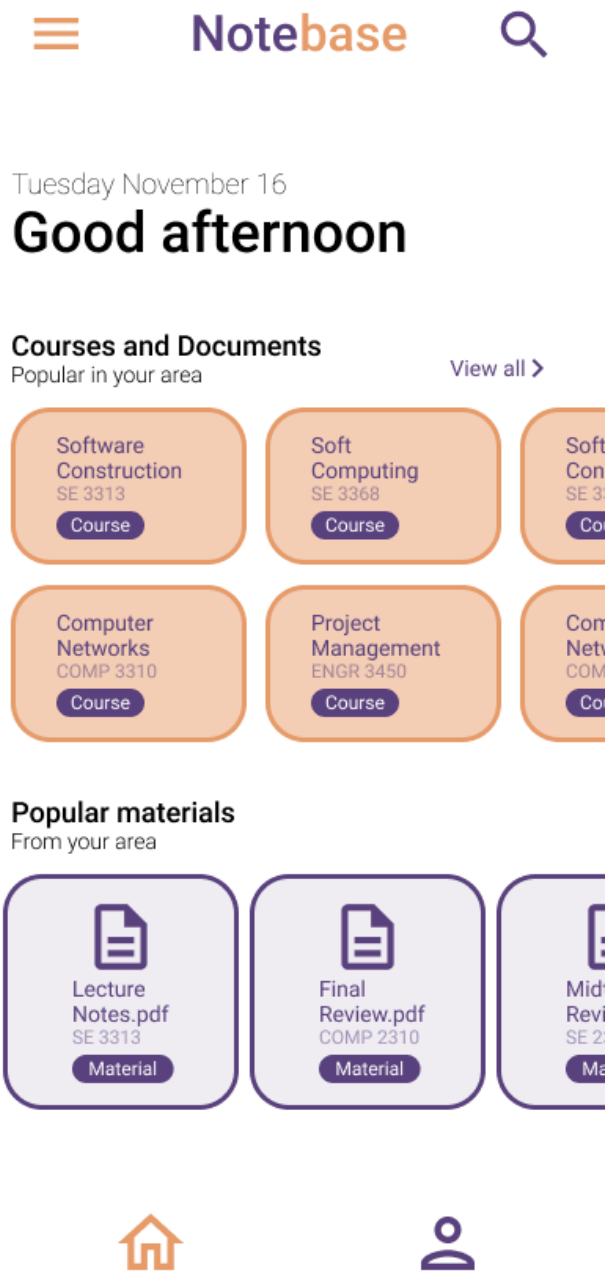


Figure 5: Home Screen

5.2 Login

Once the user correctly enters their credentials, the home screen will be displayed where the user can select different personalized courses and study materials or search them. User can also navigate through their profile page in this screen.

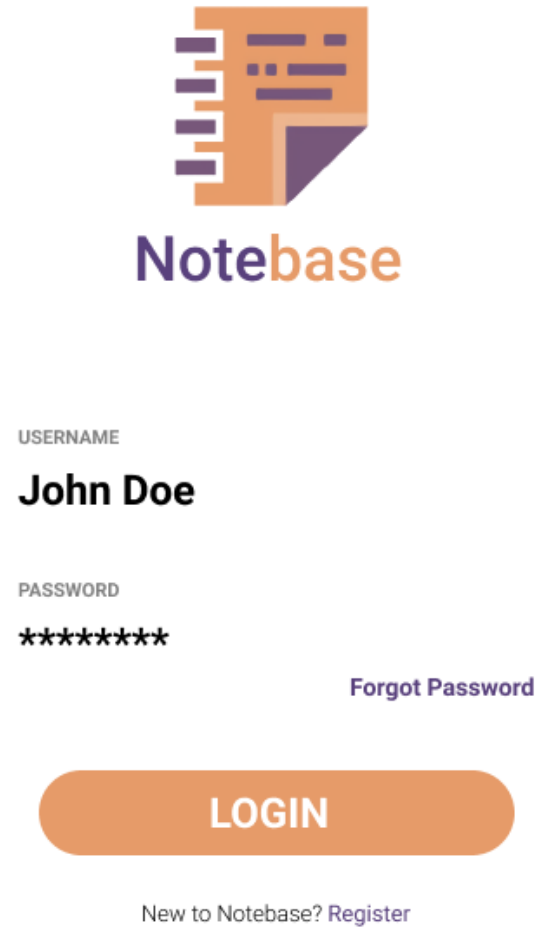


Figure 6: Login Screen

5.3 Register

If the user doesn’t have a credential yet, he or she can register within this screen. After clicking the register button, the application will redirect the user to the login page.

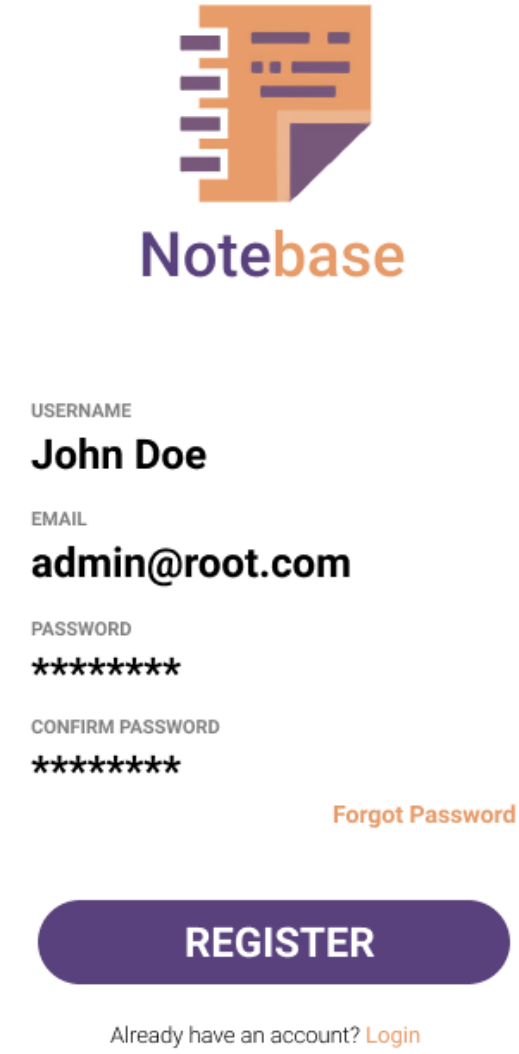


Figure 7: Register Screen

5.4 Search Documents

After clicking the search button on the right of the navigation bar in home screen, application will display a search screen where the user can query for a specific course or study material of their preference.

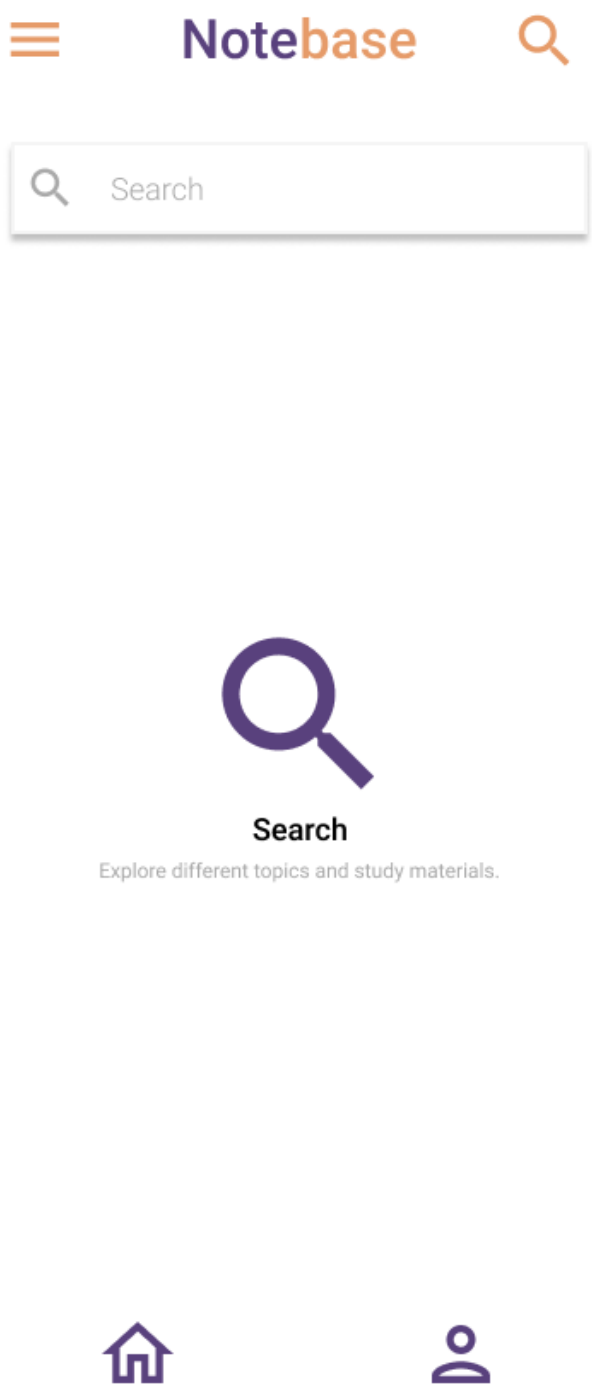


Figure 8: Search Documents

5.4 Profile Screen

Notebase provides their users a ratio-based course material access system. In order a user to download and/or display a study material, he or she needs to upload their own materials themselves. Users can see their own upload/download ratio on the top right of their profile screen.

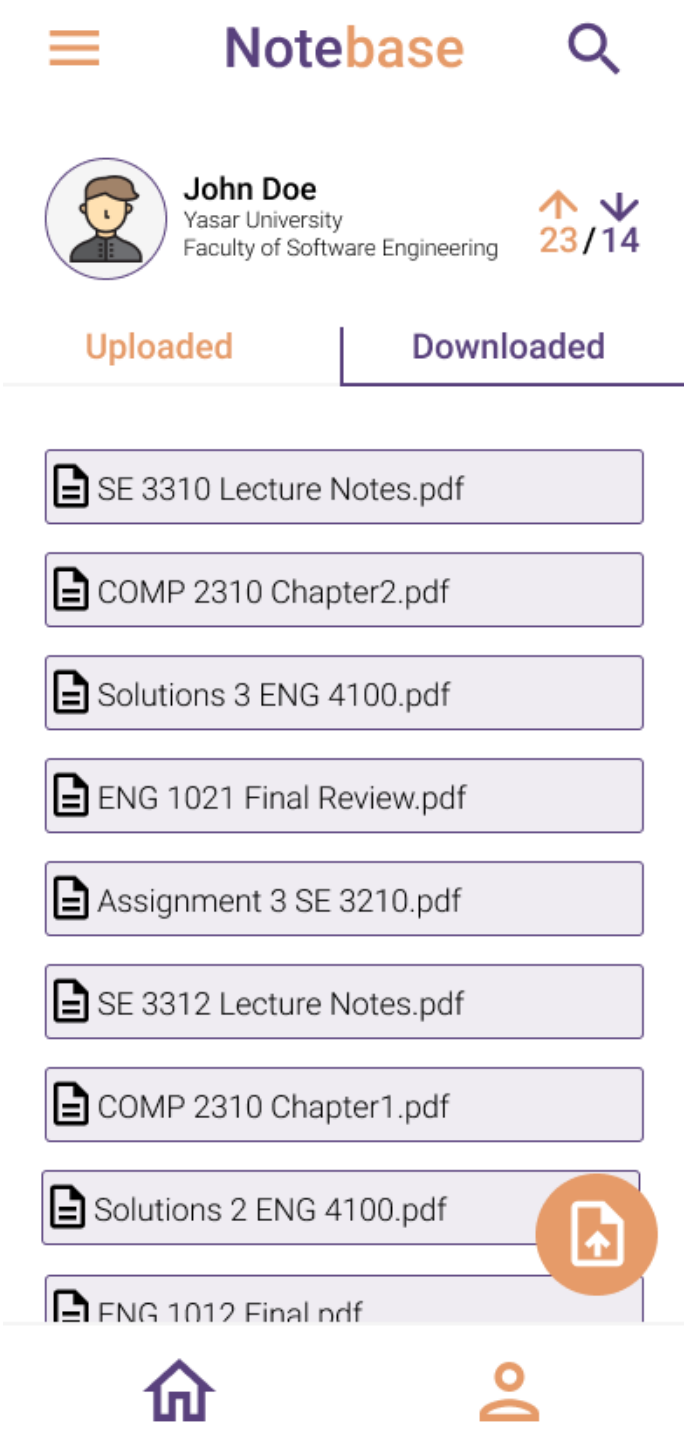


Figure 9: Profile Screen

5.5 Upload Screen

Whenever a user wants to upload their own study materials to the system, they can click the floating action button with the upload icon on their profile screen.

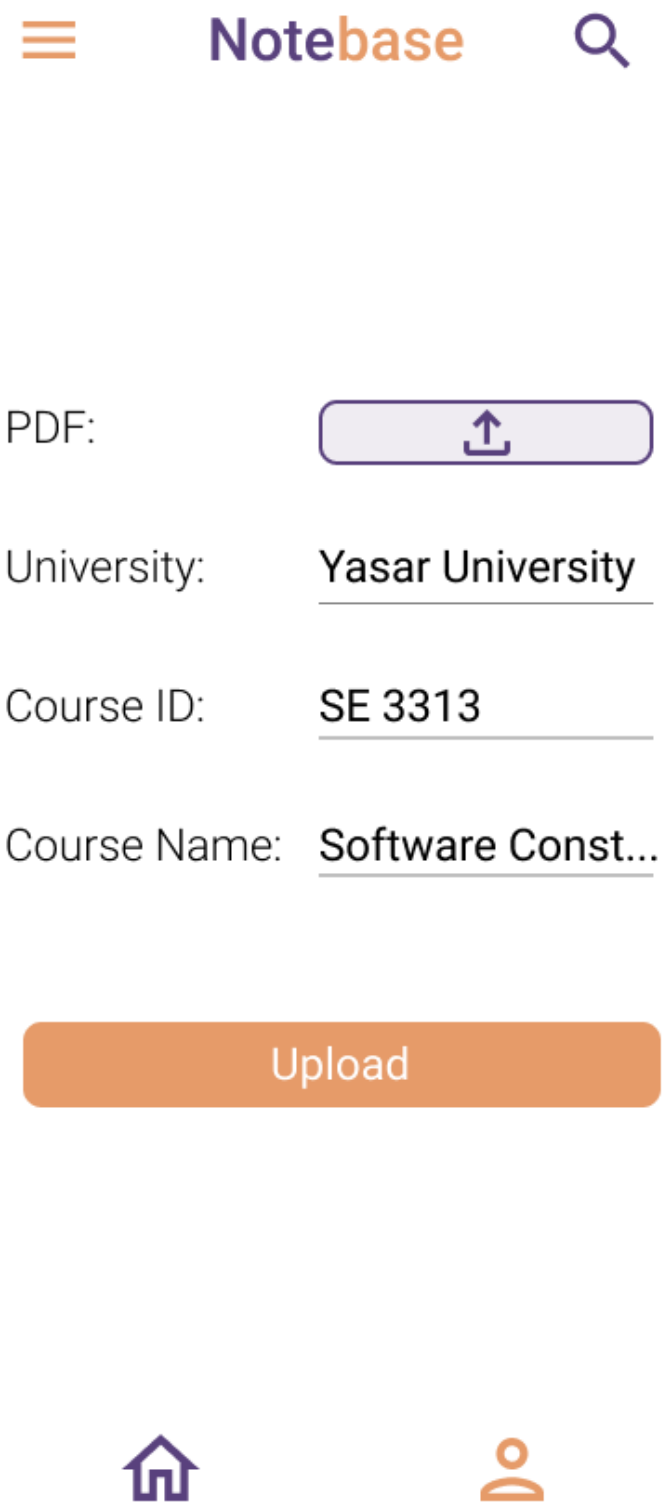


Figure 10: Upload Screen

6. Requirements Traceability List

The following table shows the links between the user requirements and test cases.

ID	Related Part of Document	Functional Requirements	Test Cases
U1	4.1.1, 4.2	F1	T1, T2
U2	4.1.2	F2	T3
U3		F3	T4
U4	4.1.3	F4	T5
U5	4.1.4	F5	T6
U6		F6	T7,T8,T9
U7		F7	T10
U8	4.1.5	F8	T11
U9	4.1.6	F9,F10	T12,T13

Table 1: Requirements Traceability List

7. Testing

The following table shows the test cases and expected outputs to apply in testing phase of the project.

ID	Test Case	Expected Output
T1	Go to registration page.	View registration form for user.
T2	Go to registration page, fill the registration form.	-If one or more of the entered data is/are not in the desired data type, then see error message. -If all valid, then view the log in page.
T3	Go to log in page, enter e-mail and password, click on "Login".	-If any of the entered data is not valid, then see error message. -If both entered datas are valid, view the homepage as logged in.
T4	When logged in, click on drawer menu icon, then click on 'Exit'.	Go to homepage as logged out.
T5	When logged in, go to 'Profile' page.	View user informations and uploaded and downloaded materials.
T6	Go to homepage.	View the most popular courses and materials.
T7	Click on 'View All'.	View all of the courses.
T8	Select one course from course list.	View the related materials in that course.
T9	Select one material from material list.	View the material's features.
T10	While applying T8, click on 'Download'.	Download the related material.
T11	Go to 'Search' page and type one or more keywords.	List the related courses and materials.
T12	Click on 'Add' button.	View the material adding page.
T13	When applying T11, fill the addition form of material.	-If any of the entered data is not valid, then see error message. -If both are valid, view the material's page.

Table 2: Testing

8. System Development Environment

This section includes hardware and software tools that will be used during all phases of the project.

8.1 Hardware

The following hardware is planned to use:

- DESKTOP-LHG4AOE Intel(R) Core(TM) i5-3470 CPU @ 3.20GHz 3.20 GHz
- Dell-PI5BJ47 Intel(R) Core(TM) i7-8750H CPU @ 2.20GHz 2.21 GHz
- Macbook Pro, Apple M1, 8GB RAM
- DESKTOP-G3J8D0G Intel(R) Core(TM) i7-10510U CPU @ 1.80GHz 2.30 GHz

8.2 Software Tools

- **PostgreSQL:**
  A relational database management system.
- **phpMyAdmin:**
  A software application that is used for configuring, managing, and administering all components within the server.
- **Android Studio:**
  Compiler for Android.
- **Visual Studio Code:**
  Text editor for JavaScript, Python, and Front-end Frameworks.
- **Selenium:**
  A portable software-testing framework for web applications.
- **XCode+:**
  Compiler for IOS.
- **SSH:**
  Provides remote access to files for the Linux build system.
- **React Native Debugger:**
  Auxiliary tool for React Native.
- **Anaconda Navigator:**
  Temporary codebase and test environment for AI related code.

9. Timeline

Figure 11 shows the estimated timeline of the project. (Large-sized figures of the chart can be seen in Appendix B.)

Task Mode	Task Name	Duration	Start	Finish	Predecessors
	Notebase Project	**256 days**	**9/17/21**	**5/30/22**	
	Fall Semester	**105 days**	**9/17/21**	**12/30/21**	
	Project Proposal	12 days	9/17/21	9/28/21	
	Software Project Plan	14 days	10/13/21	10/26/21	
	Requirements Document	21 days	11/1/21	11/21/21	4
	Software Design Document	21 days	11/30/21	12/20/21	5FS+1 day
	Presentation	1 day	12/30/21	12/30/21	
	Spring Semester	**113 days**	**2/7/22**	**5/30/22**	
	Iteration 1	**33 days**	**2/7/22**	**3/11/22**	
	AI Modeling	33 days	2/7/22	3/11/22	
	Graphical User Interface	33 days	2/7/22	3/11/22	
	Iteration 2	**17 days**	**3/24/22**	**4/9/22**	**9**
	Frontend Implementation	17 days	3/24/22	4/9/22	9
	Backand Configuration	17 days	3/24/22	4/9/22	9
	Iteration 3	**11 days**	**4/18/22**	**4/28/22**	**12**
	Database and AI	11 days	4/18/22	4/28/22	12
	AI and Server Configuration	11 days	4/18/22	4/28/22	12
	Iteration 4	**19 days**	**4/29/22**	**5/17/22**	
	Testing	15 days	4/29/22	5/13/22	15
	Fixes	4 days	5/14/22	5/17/22	19
	Presentation and Demo	1 day	5/30/22	5/30/22	

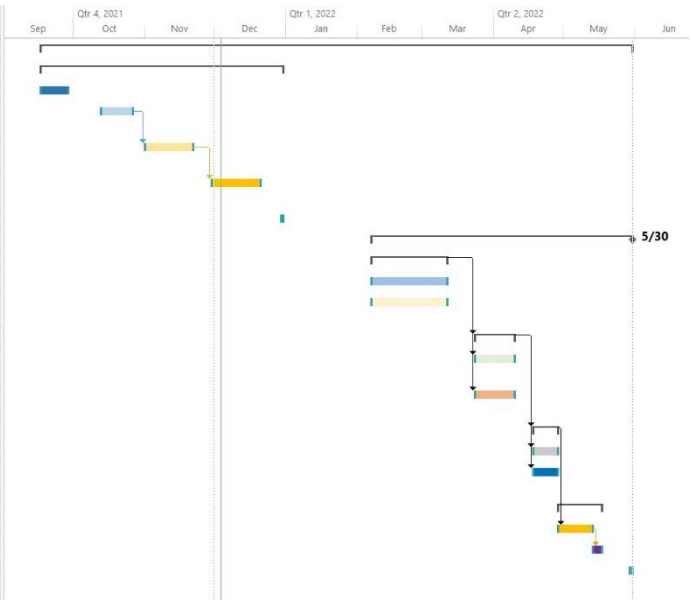
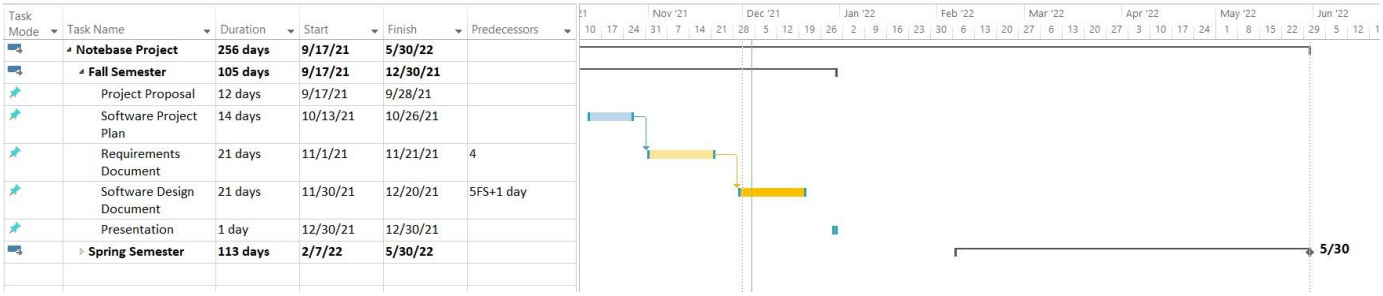


Figure 11: Project Timeline

Appendix A: Glossary

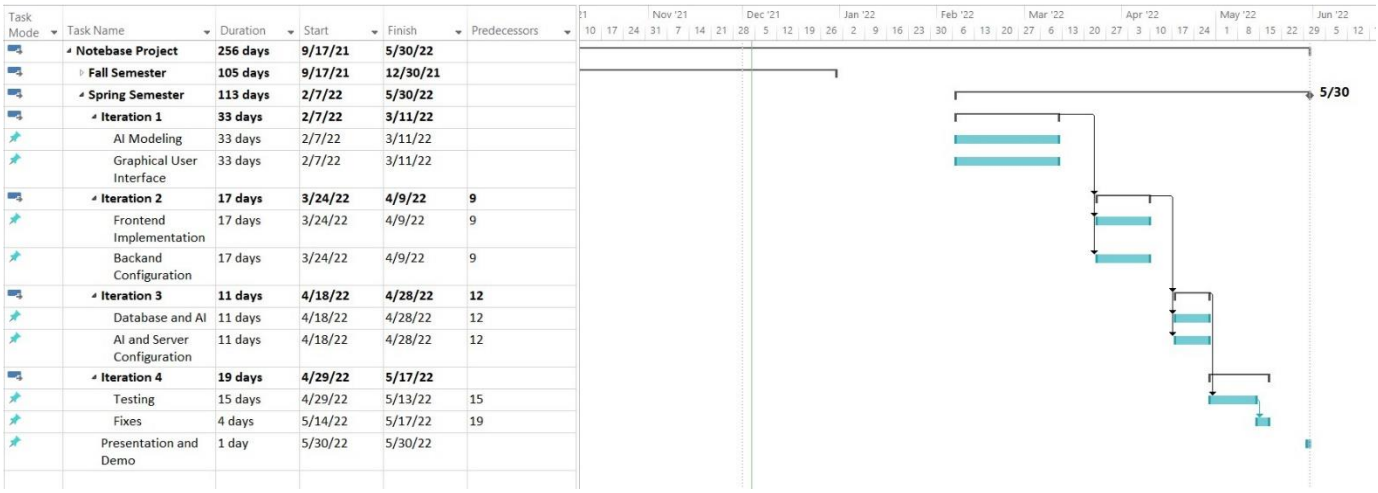
Student	A user that is logged in as a student and authorized by the system.
Visitor	A person who is not logged in or registered to the Notebase platform.

Appendix B: Project Timeline Chart



Task Mode	Task Name	Duration	Start	Finish	Predecessors
	Notebase Project	**256 days**	**9/17/21**	**5/30/22**	
	Fall Semester	**105 days**	**9/17/21**	**12/30/21**	
	Project Proposal	12 days	9/17/21	9/28/21	
	Software Project Plan	14 days	10/13/21	10/26/21	
	Requirements Document	21 days	11/1/21	11/21/21	4
	Software Design Document	21 days	11/30/21	12/20/21	5FS+1 day
	Presentation	1 day	12/30/21	12/30/21	
	Spring Semester	**113 days**	**2/7/22**	**5/30/22**	

Figure 11.1: Project Timeline (Fall)



Task Mode	Task Name	Duration	Start	Finish	Predecessors
	Notebase Project	**256 days**	**9/17/21**	**5/30/22**	
	Fall Semester	**105 days**	**9/17/21**	**12/30/21**	
	Spring Semester	**113 days**	**2/7/22**	**5/30/22**	
	Iteration 1	**33 days**	**2/7/22**	**3/11/22**	
	AI Modeling	33 days	2/7/22	3/11/22	
	Graphical User Interface	33 days	2/7/22	3/11/22	
	Iteration 2	**17 days**	**3/24/22**	**4/9/22**	**9**
	Frontend Implementation	17 days	3/24/22	4/9/22	9
	Backand Configuration	17 days	3/24/22	4/9/22	9
	Iteration 3	**11 days**	**4/18/22**	**4/28/22**	**12**
	Database and AI	11 days	4/18/22	4/28/22	12
	AI and Server Configuration	11 days	4/18/22	4/28/22	12
	Iteration 4	**19 days**	**4/29/22**	**5/17/22**	
	Testing	15 days	4/29/22	5/13/22	15
	Fixes	4 days	5/14/22	5/17/22	19
	Presentation and Demo	1 day	5/30/22	5/30/22	

Figure 11.2: Project Timeline (Spring)