

# INF2007 - Mobile Application Development - Project Design

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# Chapter 1

## Project Proposal

### 1.1 Problem Statement

The challenge at hand involves new students at SIT facing a **significant academic leap** from their previous educational experiences. The transition to university life brings forth various obstacles, including *adapting to a different teaching style* and *managing a more demanding workload*. This situation is a common struggle among **freshmen**, impacting their overall learning experience. The goal is to understand and address these challenges effectively by designing supportive educational systems and strategies that aid students in *navigating the complexities of university life*, fostering a *smoother transition*, and enhancing their learning journey.

### 1.2 Implications

Without proactive measures to support students in their transition to university life, there is a risk of **increased academic stress**, *reduced satisfaction with the learning experience*, and potentially *higher dropout rates*. Recognizing and addressing these challenges is crucial for the overall success and well-being of students, emphasizing the need for institutions to invest in *tailored support systems*, *mentorship programs*, and *teaching methodologies* that facilitate a more seamless adaptation to the demands of higher education.

### 1.3 Persona

<b>Name</b>	Alex
<b>Age</b>	19
<b>Gender</b>	Male
<b>Program</b>	Computing Science
<b>Location</b>	Singapore Institute of Technology (SIT), Singapore
<b>Background</b>	Alex is the first in his family to step into the realm of higher education. He is enthusiastic about the opportunities that university life offers but is equally apprehensive about the academic hurdles that may come his way.
<b>Goals</b>	Alex aspires to attain a quality education that opens doors to promising career prospects. Additionally, he seeks to establish new connections, make friends, and engage in extracurricular activities for a well-rounded university experience.
<b>Pain points</b>	Alex is concerned about the rigorous academic workload in college, unsure of how to strike a balance between studies and social life. The prospect of making friends and fitting into the university environment adds to his worries.

<b>Other important information</b>	A diligent worker, Alex is determined to succeed in his academic journey. While slightly reserved, he is keen on overcoming shyness to build meaningful connections with his peers.
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## 1.4 Proposed Solution

Building upon the identified challenges, we propose a multifaceted solution designed to elevate the university experience.

### 1.4.1 A Peer-to-Peer Learning Platform

Inspired by popular platforms like Reddit and Instagram, our application fosters a forum-like environment where students, like Alex, can:

- Ask questions and seek answers directly from peers.
- Upvote and prioritize valuable responses through a refined voting system.
- Browse a curated feed of questions tailored to their interests.
- Follow specific tags and explore a wider range of inquiries through a dedicated "Explore" page.
- Manage their profiles and interactions effectively.

### 1.4.2 Technology Stack

This solution leverages a blend of technologies to ensure optimal functionality:

- **Networking:** Robust interactions and information exchange are facilitated through APIs from Firebase and Google AI.
- **Databases:** Secure and efficient data storage and retrieval are achieved using a combination of SQLite (cache) and Firebase databases.
- **Multimedia:** The platform integrates video and photo functionalities, allowing students to capture and share memorable moments, enriching their learning experience.
- **Optical Character Recognition (OCR):** Streamlining academic endeavors, OCR technology converts printed or handwritten text into digital formats, enhancing organization and accessibility of study materials.

### 1.4.3 Motivation

This project is driven by a commitment to easing the academic transition for new university students. Recognizing the common challenges faced by freshmen, we aim to create a supportive online community where students can learn and grow together. This platform empowers introverted students to voice their questions and fosters a collaborative environment where peers can assist each other during this crucial phase.

# Chapter 2

## User Stories

### 2.1 User Story 1: Assistance in Learning

**Title:** Efficient Assistance for Challenging Concepts

**Description:** As Alex, I seek a platform to efficiently connect with peers or tutors for assistance in understanding challenging study concepts. The ability to post specific questions, receive timely responses, and engage in meaningful discussions is crucial for overcoming academic hurdles.

### 2.2 User Story 2: Effective Learning Resources

**Title:** Comprehensive Learning Resources

**Description:** In the pursuit of effective learning, I, as Alex, look for a platform with accessible and comprehensive learning resources. A system recognizing diverse learning styles and offering personalized educational tools ensures a more efficient and rewarding academic experience.

### 2.3 User Story 3: Peer Support Platform

**Title:** Collaborative Peer Support

**Description:** As a student like Alex, I value a peer support platform for academic discussions. A space for engaging in meaningful conversations, sharing insights, and collectively tackling challenging topics fosters a sense of community, providing valuable academic assistance and building connections.

### 2.4 User Story 4: Seamless Collaboration

**Title:** Effortless Topic Following

**Description:** Recognizing the significance of collaboration in successful learning, I, as Alex, envision a platform that effortlessly connects me with peers. A streamlined system allowing me to follow topics created by other users, engage in discussions, and collaboratively explore diverse subjects ensures a collective learning journey and establishes connections with fellow students.

### 2.5 User Story 5: Time Management Tool

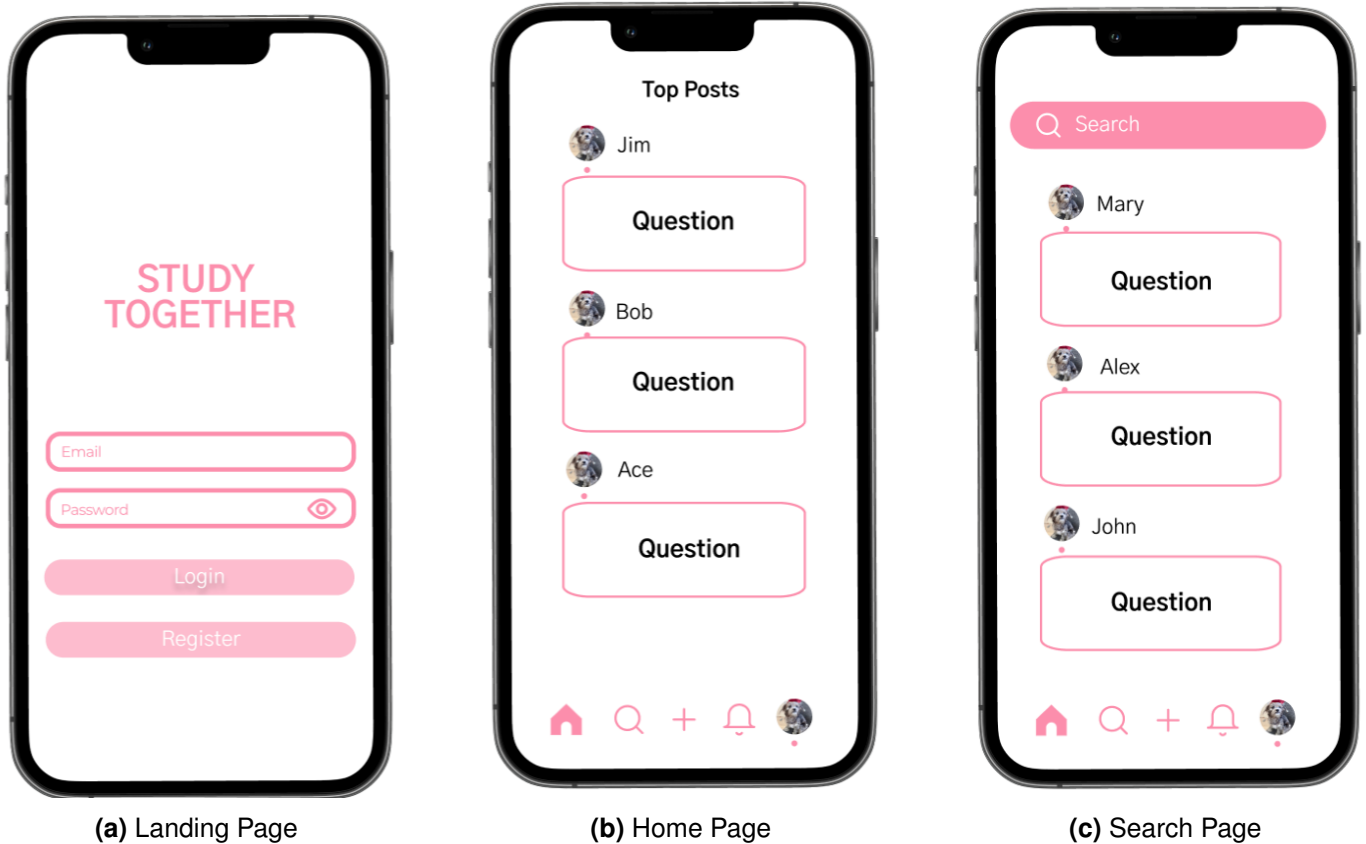
**Title:** Effective Time Management

**Description:** Recognizing the challenges of managing time effectively, I, as Alex, require a dedicated time management tool. This tool, featuring task tracking, study logs, and personalized study plans, significantly contributes to balancing academic responsibilities, extracurricular activities, and personal time.

## Chapter 3

# UI Prototypes

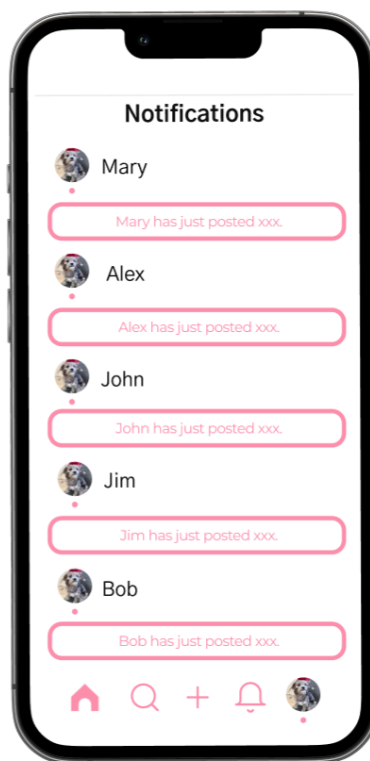
### 3.1 Prototype 1



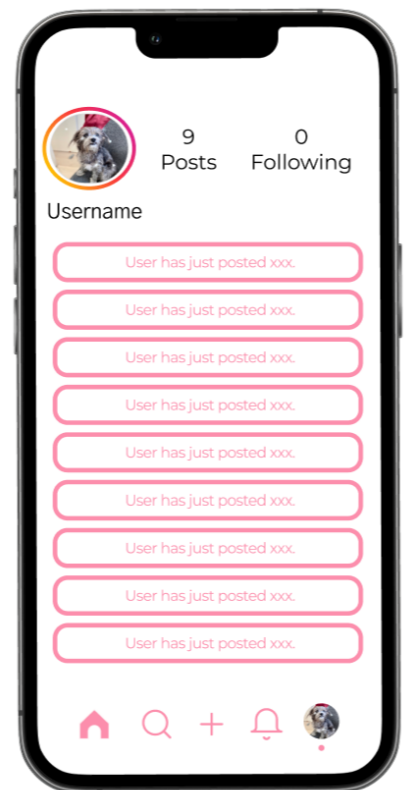
**Figure 3.1:** Key screens of Prototype 1, showcasing various UI elements and interactions for the mobile app.



(a) Upload Page



(b) Notification Page



(c) Profile Page

**Figure 3.2:** Key screens of Prototype 1, showcasing various UI elements and interactions for the mobile app.

## Chapter 4

# Backlogs

### 4.1 Product Backlog

Product Backlog

ID	User Story	Priority	Status
1	Efficient Assistance for Challenging Concepts: Users can post questions and receive timely responses, facilitating efficient learning support.	High	☑
2	Comprehensive Learning Resources: The platform provides accessible and personalized learning resources, catering to diverse learning styles.	High	☑
3	Sign-in Functionality: Users should be able to sign in to the platform securely.	High	☑
4	Account Creation Feature: A user-friendly process for creating new accounts.	Medium	☑
5	Password Reset Capability: Users should have the option to reset their passwords.	Low	☑
6	User Profile Management: Users can edit and manage their profiles, enhancing personalization.	Medium	☑
7	Notification System: Implement a notification system to alert users about responses, updates, and relevant information.	Medium	☑
8	User Following: Users can follow other users for a personalized feed of questions.	Medium	☑
9	Explore Page: A curated page showcasing a collection of questions for users to explore.	Low	☑
10	OCR Integration: Implement Optical Character Recognition (OCR) for efficient conversion of printed or handwritten text into digital content.	Low	☑
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**Table 4.1 – continued from previous page**

ID	User Story	Priority	Status
11	SQLite Data Cache: Implement Data Caching to prevent overloading of Online Database	Medium	<input checked="" type="checkbox"/>
12	Search: Efficient Searching for Users/Questions/tags	Medium	<input checked="" type="checkbox"/>
13	Questions and Answer Display	High	<input checked="" type="checkbox"/>
14	Color Scheme and theming	Low	<input checked="" type="checkbox"/>
15	Real-time Chat	Medium	<input checked="" type="checkbox"/>
16	AI-generated Answer Feature: Implement a feature to generate answers using AI.	Medium	<input checked="" type="checkbox"/>
17	Wolfram Alpha Service Feature: Implement a retrofit service to query wolfram alpha short answers API.	Medium	<input checked="" type="checkbox"/>
18	Footer Layout setup	Low	<input checked="" type="checkbox"/>

## 4.2 Sprint Backlog

### Sprint Backlog - Sprint 1

ID	Task	Estimate (hours)	Status
1	Firebase setup and integration.	4	<input checked="" type="checkbox"/>
3	Implement sign-in functionality	8	<input checked="" type="checkbox"/>
4	Design user registration form	5	<input checked="" type="checkbox"/>
5	Set up password reset functionality	3	<input checked="" type="checkbox"/>
6	User Profile Management: Implement user profile editing and management features	10	<input checked="" type="checkbox"/>
19	Footer Layout setup	4	<input checked="" type="checkbox"/>



### Sprint Backlog - Sprint 2

ID	Task	Estimate (hours)	Status
7	Notification System: Develop a system to alert users about responses and updates	8	✓
14.1	Post Answer Page	6	✓
14.2	View Single Question Page	5	✓
9	User Following: Users can follow other users for a personalized feed of questions	9	✓
12	SQLite Data Cache: Implement Data Caching to prevent overloading of Online Database	8	✓
13	Search: Efficient Searching for Users/Questions/tags	10	✓
16	Real-time Chat	8	✓
17	Wolfram Alpha Service Feature: Implement a retrofit service to query wolfram alpha short answers API	10	✓

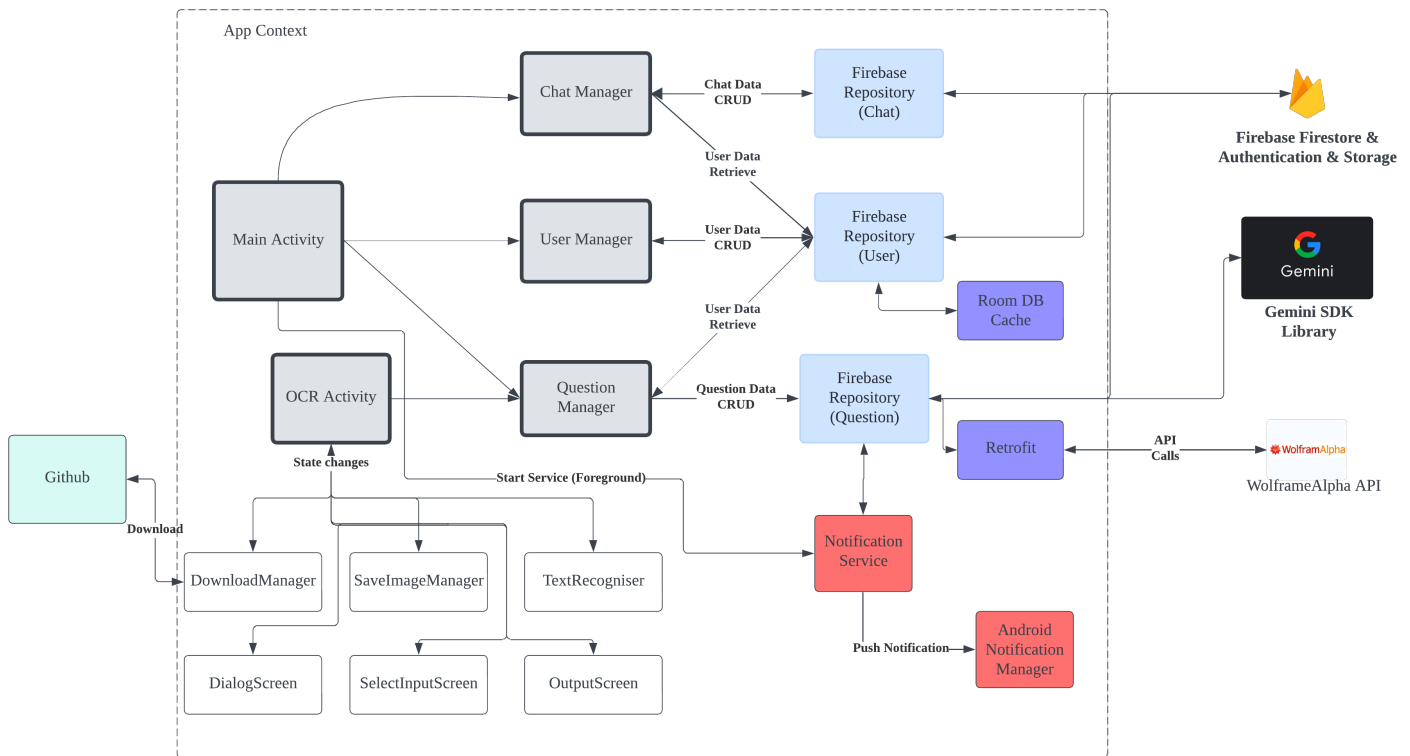
### Sprint Backlog - Sprint 3

ID	Task	Estimate (hours)	Status
10	Explore Page: Develop a curated page showcasing a collection of questions for users to explore	6	✓
11	OCR Integration: Implement Optical Character Recognition (OCR) for efficient text conversion	10	✓
15	Color Scheme and theming	8	✓
17	AI-generated Answer Feature: Implement a feature to generate answers using AI.	12	✓

**Updated Date: March 29, 2024**

## Chapter 5

# Software Architecture



**Figure 5.1:** Initial Software Architecture

The software architecture of our Android application, "Study Together," is depicted in the diagram. Our application makes extensive use of Firebase SDK for Authentication and Database services. Additionally, it employs a SQLite database to create and manage a local cache derived from Firebase Database, thereby enhancing overall performance. Data caching occurs immediately after user login, with user data stored in the Room database to eliminate the need for repeated logins. Upon user logout, the database is cleared.

At the heart of our application lies the QuestionManager Package, which serves as the cornerstone for managing questions and answers. This module seamlessly integrates with Google's Gemini AI API and WolframAlpha API to provide users with potential answers to their queries. Furthermore, it offers functionalities for users to upload and vote on recommended answers. Additionally, our application features an OcrManager component equipped with an Optical Character Recognition (OCR) library. This component enables the extraction of text or questions from images captured by the device's camera, streamlining the process of uploading questions for users.