Hall Mate - Share-Communicate-QNA-Do Fun

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This Report is Presented in some Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science & Engineering.

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APPROVAL

This Project/internship titled **"Hall mate : An Android App for Sharing Knowledge, notes and Earn with Fun "**, submitted by Name: Syed Mahi Uddin Mahi, ID No: 191-15-2652 and Name: Md.Naimur Rahman Noyon, ID No: 191-15-2472 to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfilment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on *04/02/2023*.

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DECLARATION

We hereby make a declaration that this project has been done by us under the supervision of **Mohammed Jahangir, Senior Lecturer, Department of CSE, Daffodil International University, Dhaka.** We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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ABSTRACT

Now a days most of the people around us are used to using social media. Usually, people get to know each other through media and sometimes they get help from each other. Due to the wide spread of social media, we can get to know different people from the country and abroad but sometimes we don't know about the people living around us. In case of universities we can consider the students staying in the halls of universities. In most cases a student living in the hall is unaware of the seniors, juniors and friends around him. But knowing about them is very important for any help at any time, also for development of communication skill and take experiences. Sometimes students have their previous semesters resources which is not useful for them but useful for another junior students. They can easily sell or give anything inside their hall if they can know who need this. And those people who needs this kind of help can collect notes, resources or any kind of things that is needed from these people who living in same halls. Our aim was basically to create a platform where one can get to know each other as well as help one another. We create a mobile application for both Android and IOS which provide a social media in a shorter range with a hall of university and user can sell or share anything. The user features are created as an afterthought to make things more convenient. The UI of our application is very simple and user friendly. This is actually a combination of a social media and an e-commerce site within a short range.

Keywords – Hallmate, Android, IOS, User, Application, Online, UI, App

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INTRODUCTION

1.1 Introduction

In essence, Hall Mate is a mobile application project for both Android and IOS that combines social media and e-commerce sites for use in university residence halls. For the students of a certain university hall, there is a section of social media in this program where they may connect with one another and receive assistance of any type by posting or texting. Additionally, there is a section where anyone can list any kind of goods for sale, gift-giving, or exchange.

So, basically in this app student of a particular university can create an account if they live in university hall with the basic information like Id, semester, department and room no etc. After creating an account, they can log in and can see the suggestions of others who are living in this university hall. They can search people by name and also can find people from the suggestion section. The suggested people will be suggest based on the room no and floor level and they can see some important information like semester, department and room no etc. Users can connect with each other by sending and receiving connection request after that they can see their posts.

Additionally, there is a section where users can list items for exchange, sale, or sharing. Anyone who creates an account for the same hall has access to these posts and can negotiate with him. This area is designed to foster a communal spirit of sharing in a hall. Anything that a person finds useless for himself but valuable to others might be shared or sold.

1.2 Motivation of this project

University is a great place for building up student's communication skill but most of the time they can't make communication because they don't know about the people living around them. University hall is a place where students of all semester and department live together so there is a big chance to make communication very easier. But in most of the case a student can't make it properly because they don't have perfect idea about the peoples living around them.
So here is a motive of our project which is to make a connection between all students live in a particular university by which they can easily get knowledge about the people living around.

Besides if a student need help in their study case or anything else, they can't find any instant solution. Sometimes a student needs some notes, resources, books etc. from their seniors but they feel embarrassed. So, here is another motive to make a platform where students of an university hall can get a instance solution of a problem and also collect notes, resources and books or anything they need form other students of this hall.

1.3 Objectives

The purpose of this program is to create a tight-knit community within a university residence hall where everyone is connected to and familiar with one another and can promptly offer or accept assistance.

The principal aims of the project are as follows:

- To create a social platform based on a university hall for a more niche audience.
- To make it simpler for a student to locate their seniors, juniors, and fellow classmates who live in their university residence hall.
- To provide clean and simple user-friendly UI.
- To make easier for students to sell or gift anything to their hallmates.
- To provide a platform where students can find instant solution of their problem.
- To make a platform for students from where they can find their study related notes, resources, books etc.
- To make friendly environment in a university hall.
- Connected students with their hallmates after university life.

1.4 Features

These are the features for a client:

- User can easily register with basic information like university name, semester, department name, hall name etc.
- User can easily find someone by searching.
- Users can be connected with each other by sending and receiving connection request and get regular updates.
- User can post anything related his work, university and hall.
- User can post his problem and other active user can help instantly.
- Users can post items with sell, gift and exchange offer.
- Users can find resources like notes, books, previous semesters questions etc.
- User can categorize other based on particular field.

1.5 Report Layout

- Chapter 1: Introduction
- Chapter 2: The background and Advantages-Disadvantages
- Chapter 3: Requirement Specification
- Chapter 4: Design Specification
- Chapter 5: Implementation & Testing
- Chapter 6: Impact
- Chapter 7: Conclusion and Future Work

CHAPTER 02

BACKGROUND

With the help of Android Studio, we constructed the project. The project made use of the flutter framework. To create applications for Android, iOS, and the web, Flutter is a framework with the dart language. For both the Android and iOS platforms, we created our app. With its 18 services, Firebase is an online database platform that can be used to create projects for Android, iOS, the web, and Unity. We used Firebase as the project database.

2.1 Existing System

Due to the fact that no one has been able to create an effective social media and e-commerce website for a niche market based on a university hall. In addition to numerous e-commerce websites like Daraz, Bikroy.Com, Amazon, and Facebook, there are numerous social media platforms like Instagram and Facebook. Our vision for a university hall is distinctive because of the combination of these two types of concepts.

2.2 Purpose of the System

The purpose of this project is to create a supportive community among all university hall students. The idea behind social media sites is to connect users with their dorm neighbors so that anyone can seek assistance depending on their knowledge. It will have a positive effect on their communication abilities. The idea of an e-commerce site gives students the chance to exchange, sell, or give away study-related resources.
Combining these two ideas results in a compelling and distinctive project.

2.3 Comparative Analysis

Linkedin: The connection feature of our application is comparatively similar to linkedin's Connect feature, where one user can send connection requesnd after accepting they will be added to the connection list.

Bikroy.com: A well known application people post used or new items for selling, and also can buy items. In our sharing page user can post items in three different variations and also can get items.

We have a connectivity function that is almost identical to Linkedin's connection feature, but the perspectives are completely different. We focused on neighboring hallmates relationships for a better networking experience and easier getting to know one another. Bikroy.Com is a well-known website where users may list and purchase items. We have a few similar features, but the idea behind our concept is entirely unique. Only students living in university residence halls are the intended users, and they can use this site to share, trade, or sell the items they need on a daily basis. Due to the availability of buying and selling options, economic transactions are conceivable

2.4 Advantages

- Create Network: Through this project, a communication network for university hall students will be created. They are able to speak to one another. After leaving school, there is opportunity to stay involved in the community, which will benefit the younger students.
- This app will save from item waste because residential students can give away or sell their unused stuff or exchange them for something new.
- Since they may discover notes from previously passed students here as well, it can save their money from having to print out notes.
- There is a point system that rewards contributions with additional points in the user's profile. This can inspire students to share more products and books as gifts for juniors.

2.5 Disadvantages

- Lack of physical evaluation, since this application is still in its very early stages, there hasn't been any physical change.
- Without sufficient surveillance, personal data may be misinterpreted.
- One user can use others personal information as example (mail, phone number, social media) for other purposes.
- Some users would try to sell unethical goods.

CHAPTER 03

REQUIREMENT SPECIFICATION

3.1 SDLC Waterfall Model

We followed waterfall model for our project's development life cycle, The Waterfall model is a sequential development process, with each phase of the project dependent on the successful completion of the previous phase. This model is well-suited for projects with well-defined and stable requirements, making it ideal for our HallMate project.

1. Requirements Gathering and Analysis: Understanding the user requirements and creating a clear project scope and specification document.
2. Design: Creating a high-level design of the system architecture, user interface, and database design.
3. Implementation: Writing the code and building the application.
4. Testing: Conducting thorough testing of the application to identify and fix any bugs.
5. Deployment: Installing and deploying the application on the target platform (Google Play Store).
6. Maintenance: Monitoring and maintaining the application to ensure that it functions properly and to make any necessary updates.
7. Retirement: Removing the application from the target platform (Google Play Store) when it is no longer needed.

3.2 Business Process Modeling

Business process modeling (BPM) is a technique used in business process management and systems engineering to examine, improve, and automate the current process. A business process is a set of tasks or activities carried out by a number of stakeholders in order to accomplish a specific organizational objective.

3.2.1 Business Process Model:

One of the easiest and most efficient methods for translating a vision for a business need into software solutions is the agile software development methodology. That's why we are using this methodology as our business process model.

- Processes and tools are discussed in individual and team interactions.
- Working software is preferred to in well documented for next update scope.
- Making this app useful then start getting more users.
- Changing plan for adjusting.

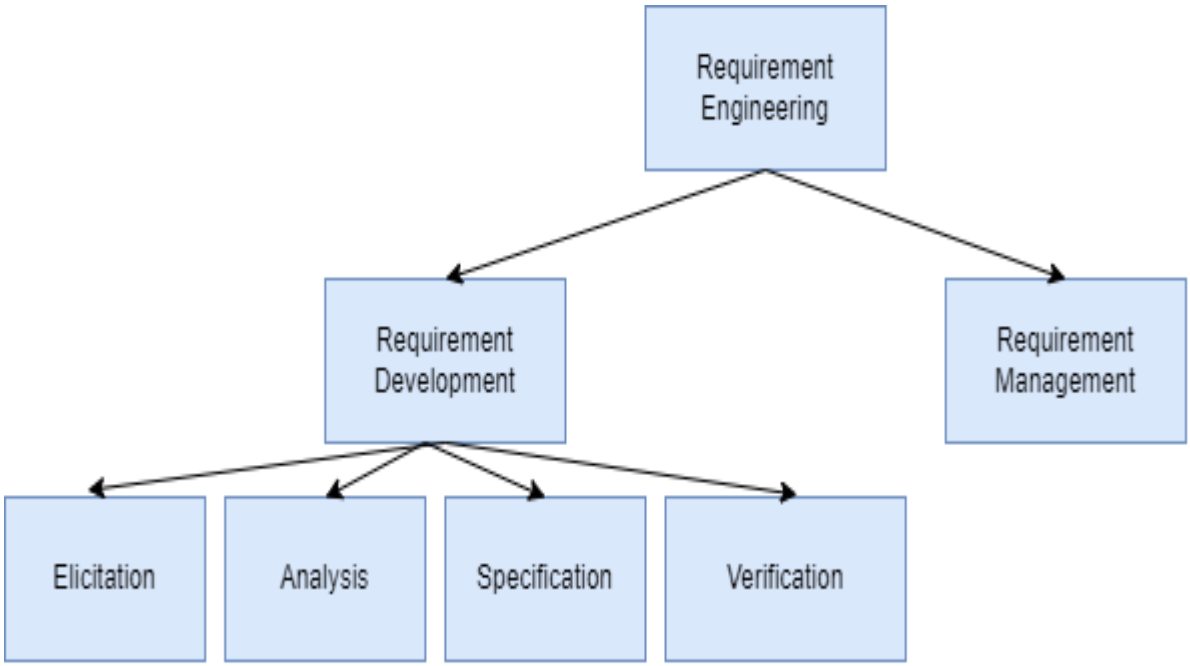

Fig 3.2.1: Business Process Diagram

3.3 Requirement Collection and Analysis

Analysis is an essential part of every project. A project cannot be successfully completed without adequate analysis and planning. While the project is being designed. Our app is an Android and Ios based platform for making a community and make sharing network through them.

3.3.1 Functional Requirement

To comprehend how the system works, it is helpful to have functional requirements. It guarantees that the system will satisfy user needs.

- We are developing an Android application that requires an Android-based handset with full internet support from the user.
- The application should enable user sign-in by email, password, and sign-up via mail, password, and name-only view other functionality.
- The app should provide profile updates and ability to cancel other activities for users.
- The software requires a real-time database for the database panel.
- Admin should have access of user control and other special features.
- The handling of invalid log information is necessary.

3.3.2 Non-Functional Requirement

Non-functional requirements guarantee that the system will fulfill users' expectations by describing how the system operates.

Software Requirement:

- Dart
- Android Virtual Devices (AVD)
- Android Studio
- Firebase
- Adobe Illustrator
- Windows Operating System.

User Requirement:

- Mobile phone (Android)
- Internet Connection

3.4 Use Case Modeling and Design

A use case is a technique used in system analysis for identifying, defining, and organizing system requirements.
The use case consists of a variety of potential communication patterns between individuals and systems in a specific location that are linked to a certain objective. It is made up of a variety of components that collectively have a greater impact than the sum of their individual impacts. All system operations that are pertinent to consumers should be covered by the usage case.
In other words, a use case is a group of hypothetical events that might take place in order to achieve a specific objective.
(a) The boundary dividing the subject area from the rest of the world.
(b) Those who take part in the system and are given roles based on those responsibilities are known as actors.
(c) Participants, which are frequently users of the system who are categorized in accordance with their roles.
(d) Describes the use scenarios, including details on the precise roles played by participants inside and outside the system.
(e) The connections, exchanges, and use cases that exist between and among the participants.
Use Case diagram of this project showing below:

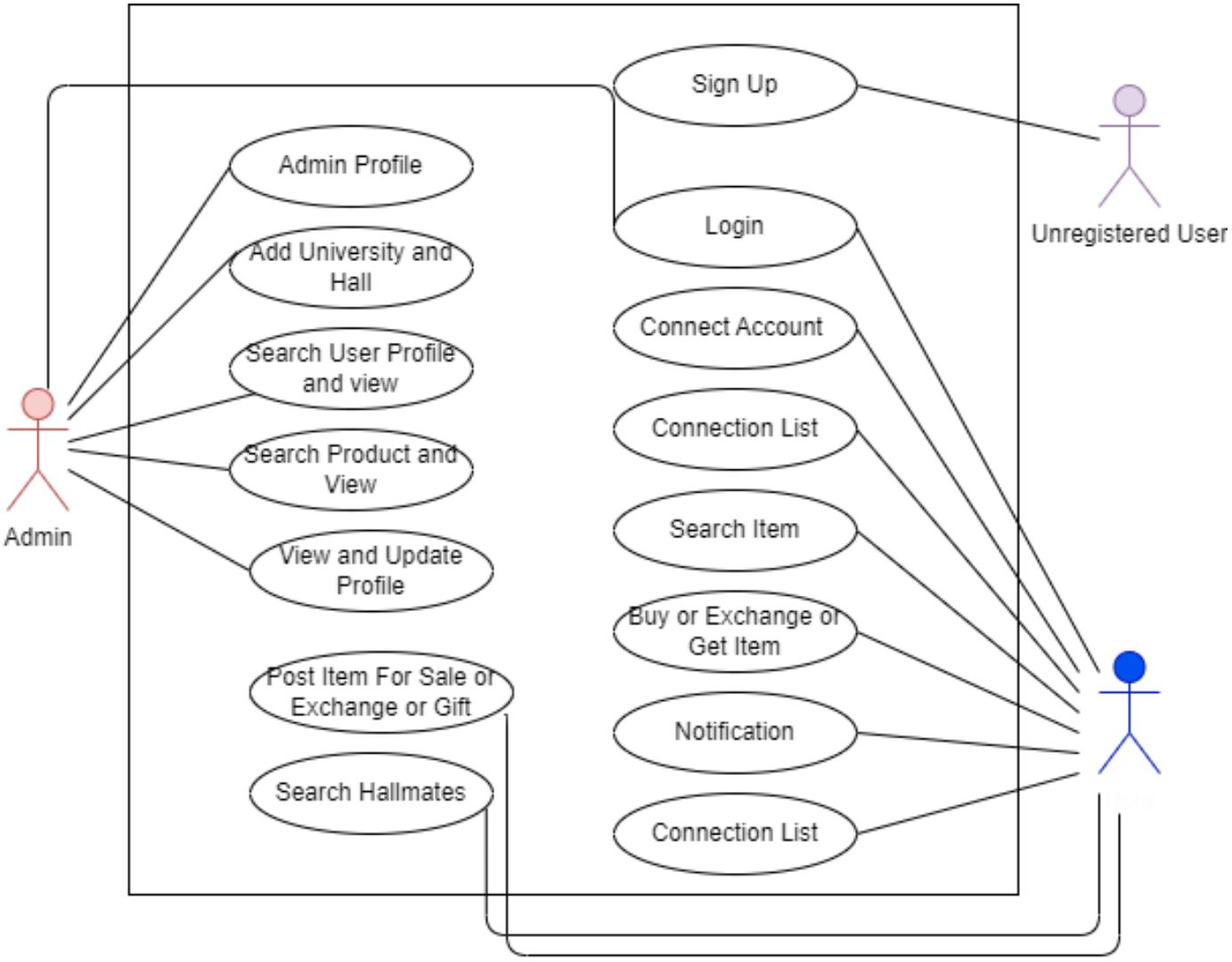

Fig 3.4.1: Use Case diagram of Hallmate

3.5 ER Diagram

An entity relationship diagram, or ERD for short, is a diagram that shows the entity sets in a database. In other words, ER diagrams aid in describing a database's logical layout. Designing ER diagrams requires understanding three key concepts: entities, attributes, and relationships. In ER Diagrams, several symbols are used to represent entities, characteristics, and relationships. Rectangles are used to depict entities, ovals are used to define attributes, and diamond-shaped forms are used to illustrate relationships. The ER Diagram displays the entity framework's infrastructure. The project's entity relationship diagram is displayed in figure 3.4.1 below,

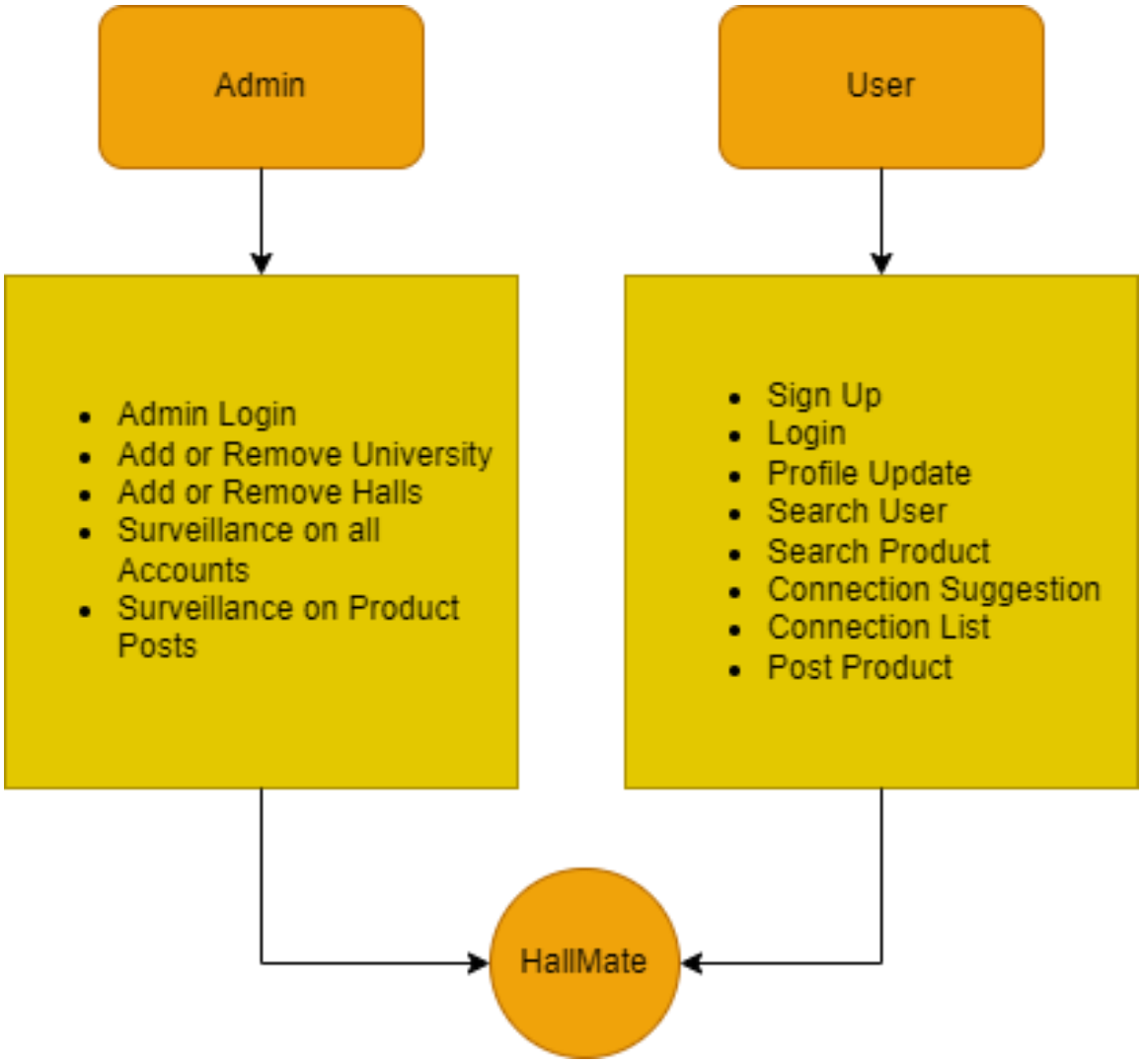

Fig 3.5.1: ER Diagram of Hallmate Project

3.6 Flowchart Diagram:

A graph that illustrates a procedure or demonstrates preparation is an example of a flowchart. A diagrammatic description of a flowchart could also be used to explain how to understand a step-by-step assignment. On the steps, the flowchart appears as a collection of boxes that are connected together by bolts to form an organized whole.

Login:

A common computer usage method for accessing a working framework or application, typically on an inaccessible workstation, is to log on. Most of the time, in order to log in, a user must have both a user ID and a password. Figure 3.5.1, below, displays the login page flowchart.

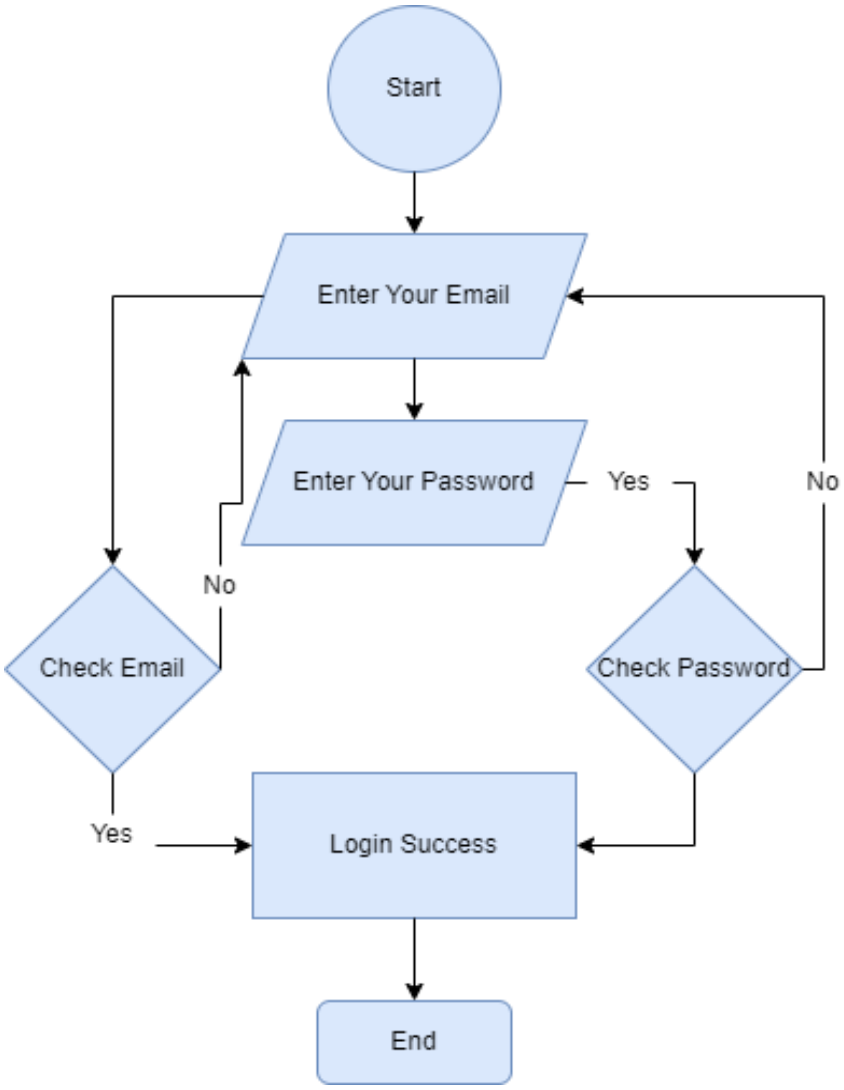

Fig 3.6.1: Log Flow Chart of Hallmate

User Sign Up:

To create an account user must have to Sign up at first, and here user has to provide his/her name, email address which must be in correct email formation, enter password and re enter password again confirmation. After that Sign-Up will be successful and user will be redirect to the home page. The following figure 3.5.2 shows the flowchart of user Sign-Up,

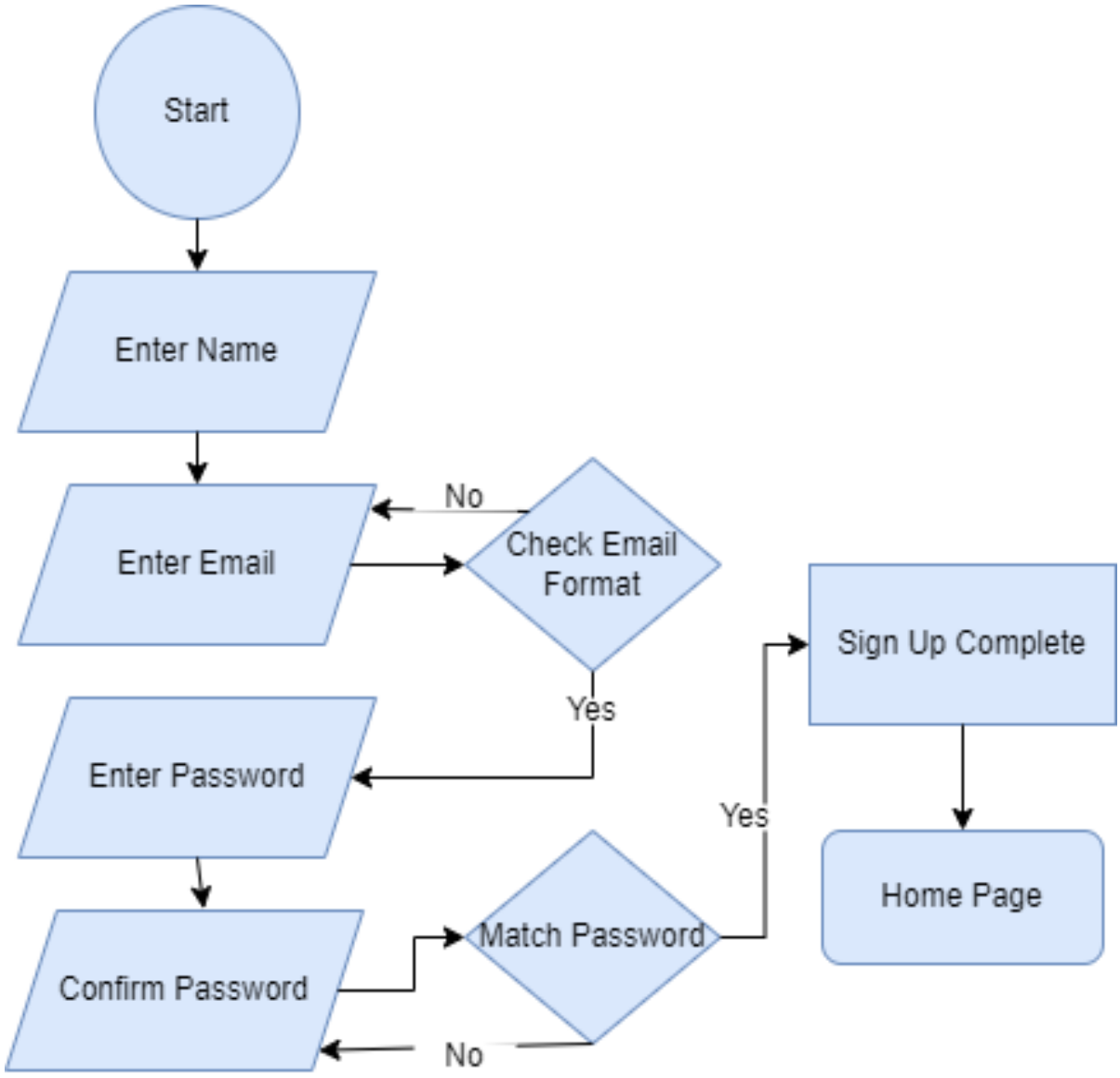

Fig 3.6.2: user Sign-Up Flow Chart diagram

3.7 Design Requirement

- Login page
- Sign-Up Page
- Sharing Page
- Network Page
- Side Drawer
- Appbar
- Bottom Navigation Bar

3.8 Database Design

Google Firebase database used for data storing and maintaining in Hallmate app. Firebase is Google's Backend-as-a-Service (BAAS) tool for creating mobile applications. Firebase provides thorough documentation and cross-platform SDKs to help you build and distribute Android apps. A quick, dependable database with user authentication and use monitoring is Firebase. We made use of this platform to add or remove product data. Additionally, we may view our user information and, if necessary, delete users from the database. Firebase also provide user authentication system and here we can make user accounts to admin account also.

Chapter 4

Design Specification

4.1 Design Specification

Hallmate is a mobile based platform where residential students can share things with others and make connectivity with neighbor students.

The following are the types that we incorporate into the database

- User
- Products

4.1.1 User

There are two types of user account, One is admin account who can add or remove University and Hall name list. And admin have all other access also for surveillance of the platform. And through the user or Student account they can add information in their profile and also can update profile data.

4.1.2 Products

Users can post item or product in three different category exchange, sell or gift and each product have some information as like price or exchange interest or as gift, one mandatory and two optional images of item. Item category for sorting items in the dashboard.

4.2 Back-end Design

For the back-end design, we make use of the logic data model. Although it carefully explains the data, it could frequently provide less thought to how it will be used in the data set. A logical data model has the following qualities:

- Includes how objects interact with one another as well as everything that is present.
- Each entity's strengths are described in detail.
- The lineups make relations simple to comprehend.

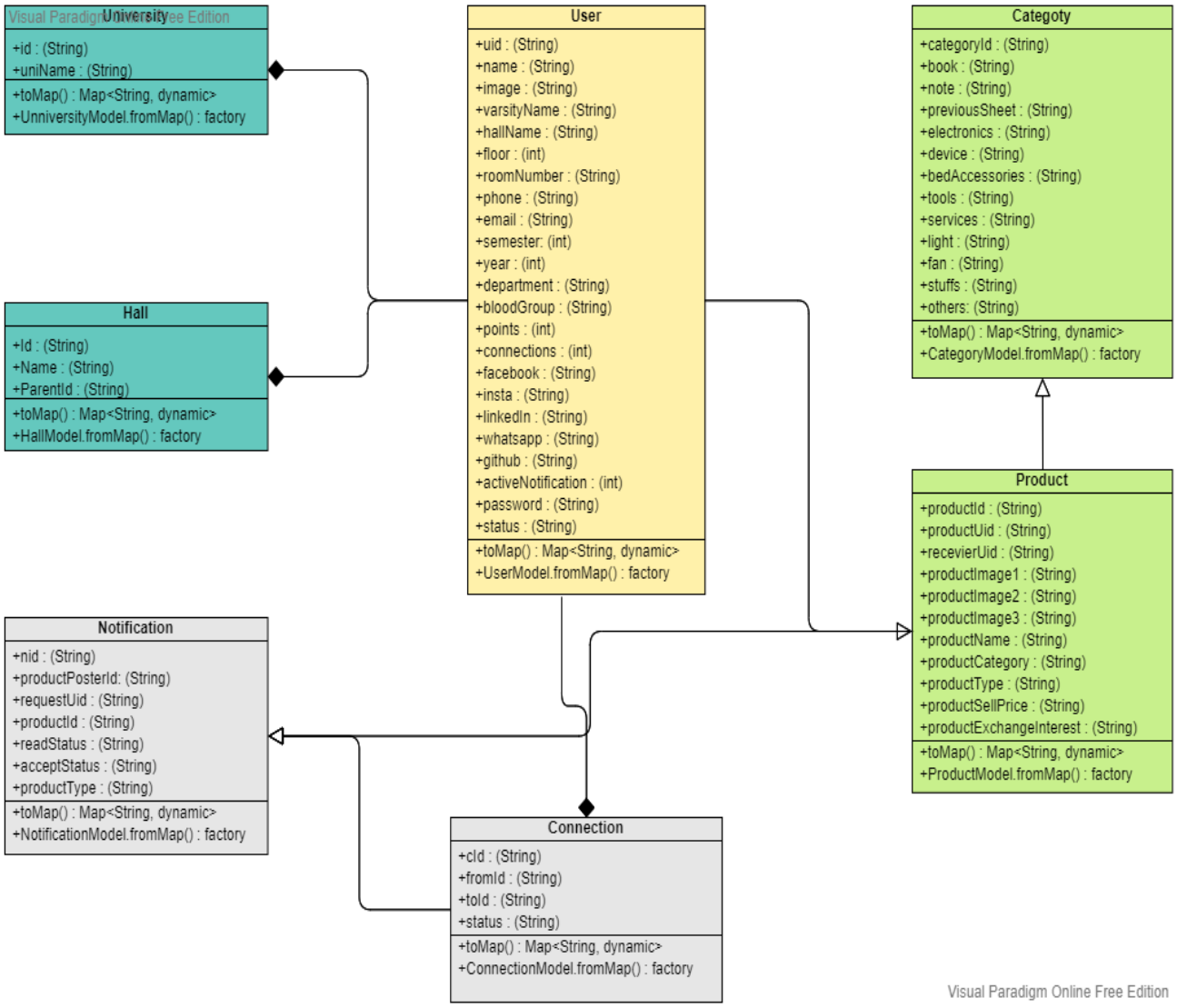

Fig 4.2.1: Class Diagram of HallMate

Chapter 5

IMPLEMENTATION & TESTING

5.1 Implementation

There are some sample screenshots of our project to show implementation

Login

The figure 5.1.1 shows that user can login here by providing email address and password, and if someone new in this app then they can click on Signup for creating an account,

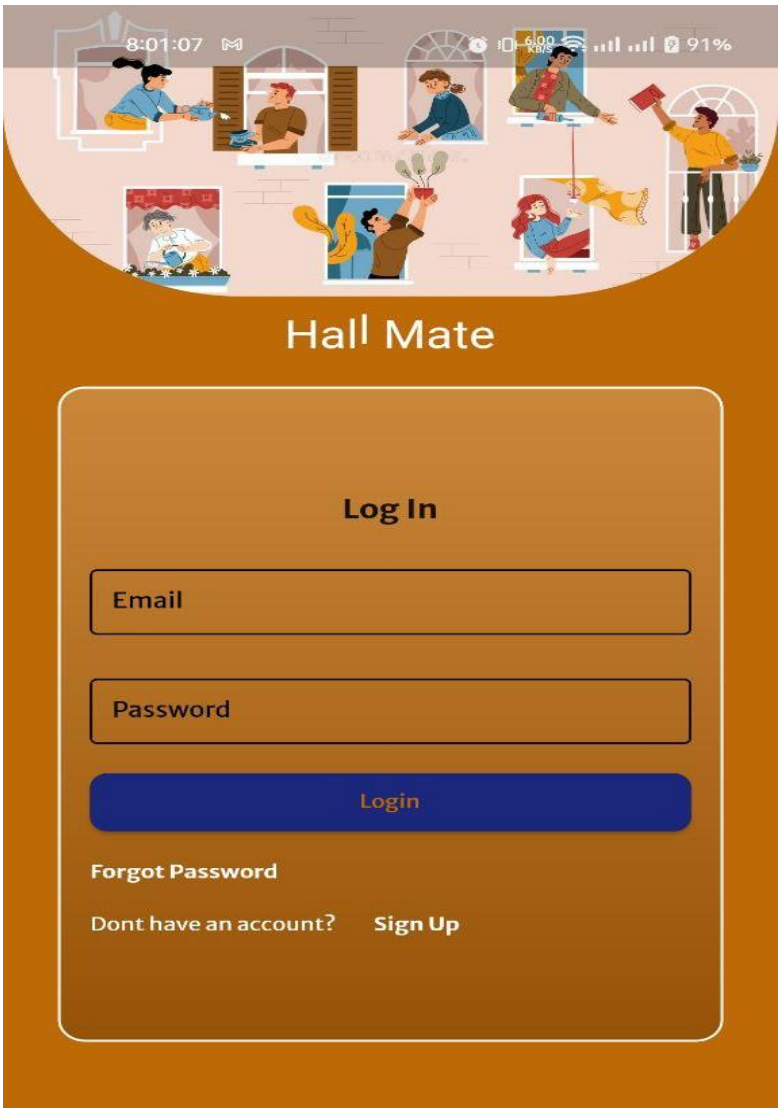

Fig 5.1.1: Login Page

User Sign-Up Page

The following figure shows that, a new user can create an account by providing name, email and password, if they already have an account then can go to the login page,

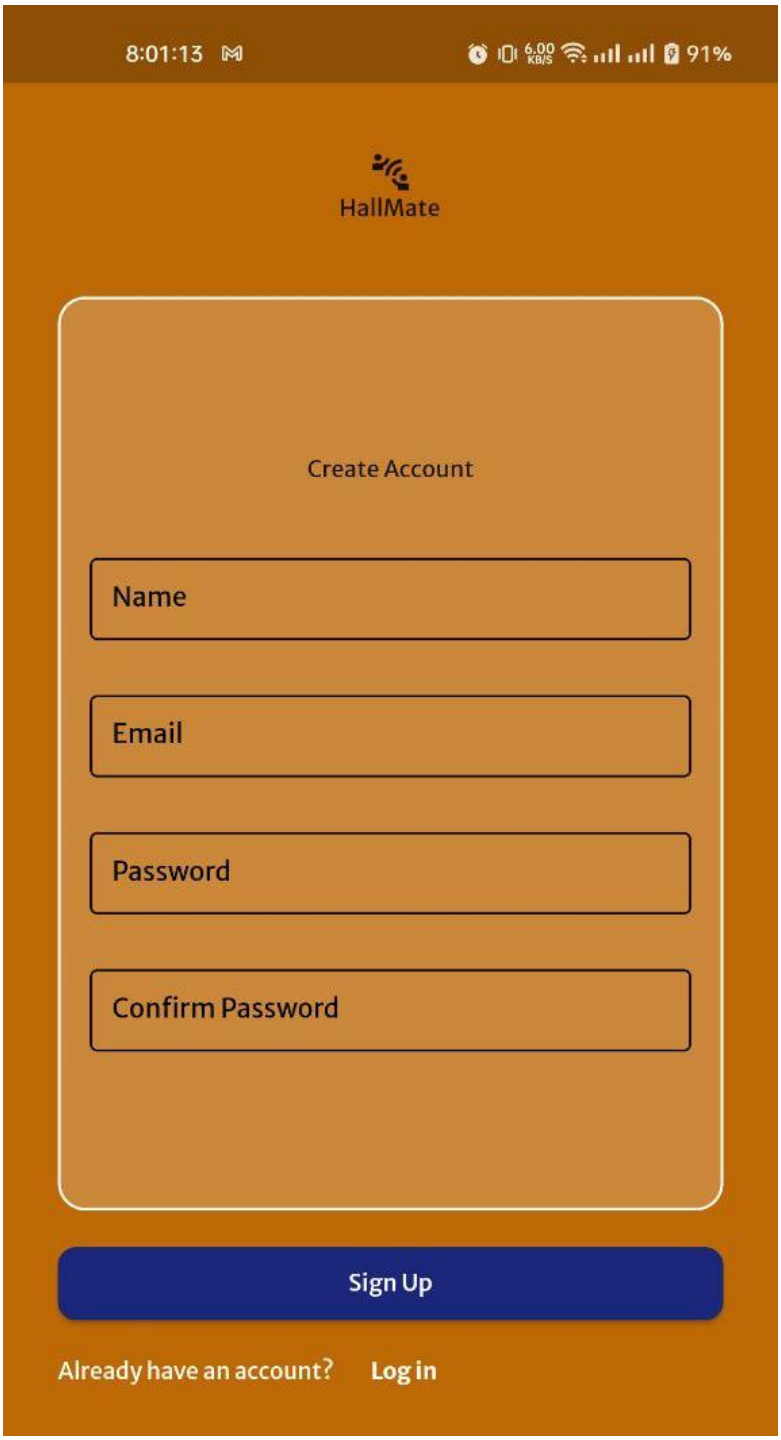

Fig 5.1.2: User Sign-Up Page

Sharing Page

After successfully logging in user can see items in this page, they can search or sort by category, and user can get, buy or exchange items from here.

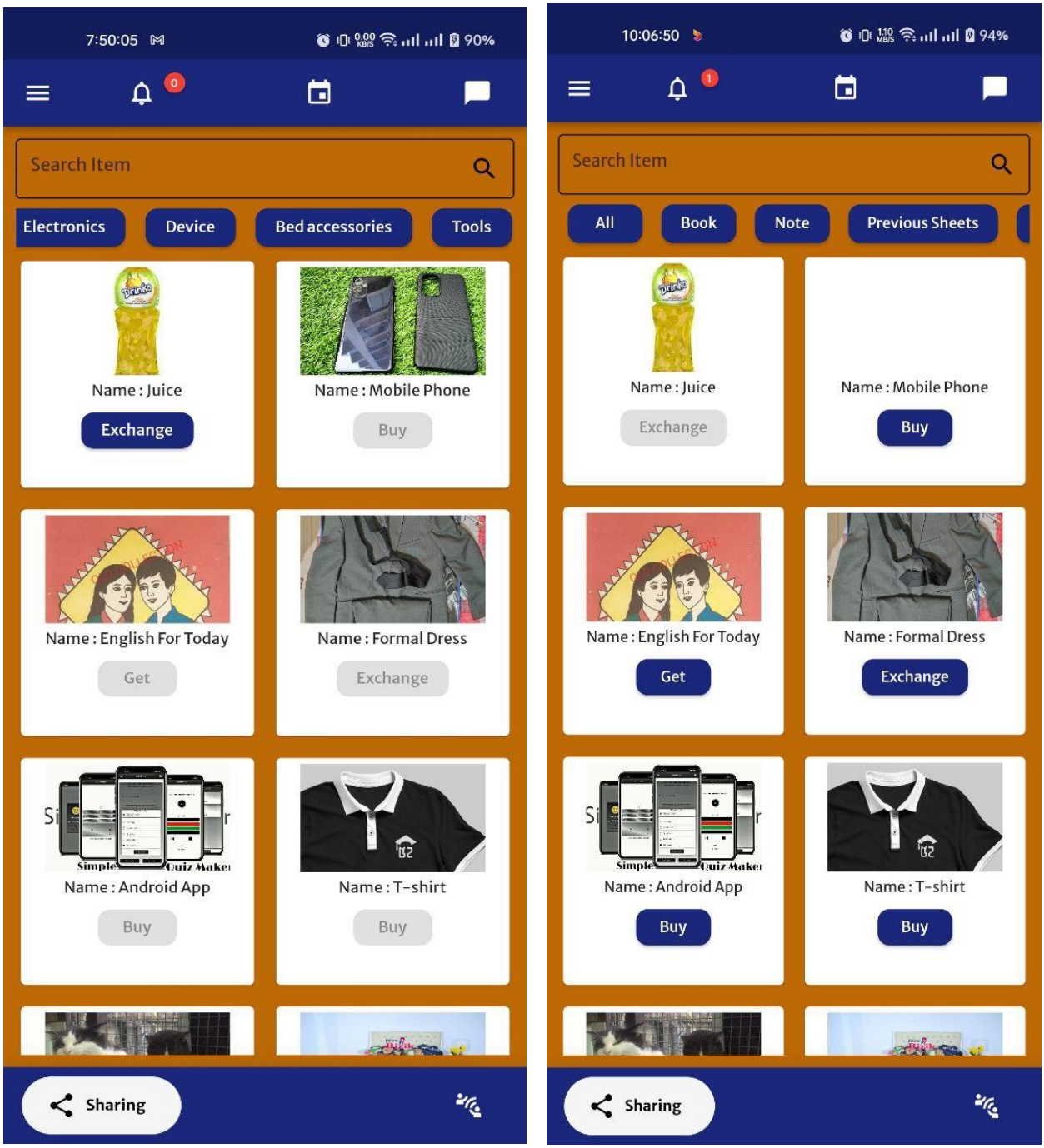

Fig 5.1.3: Sharing Page

Post Item:

This figure shows, from the drawer user can post item and also the logout option is here

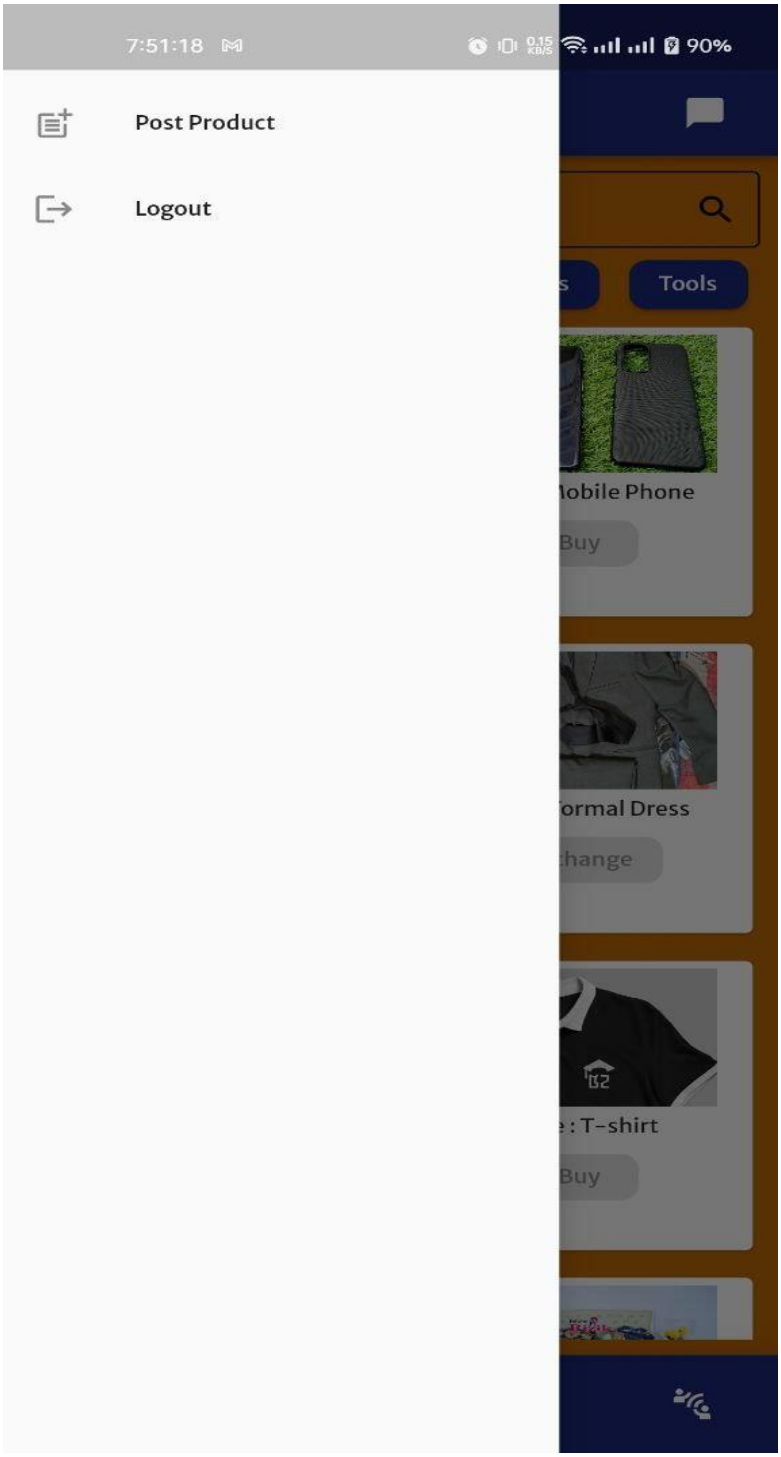

Fig 5.1.4: Drawer Options

Post Item Page

In this page, Product can be posted in three different variants, for selling or exchanging or post as a gift, if user select sell category price would be includes and of they chose exchange type they have to add the Exchange Interest, And also can create a product post as gift.

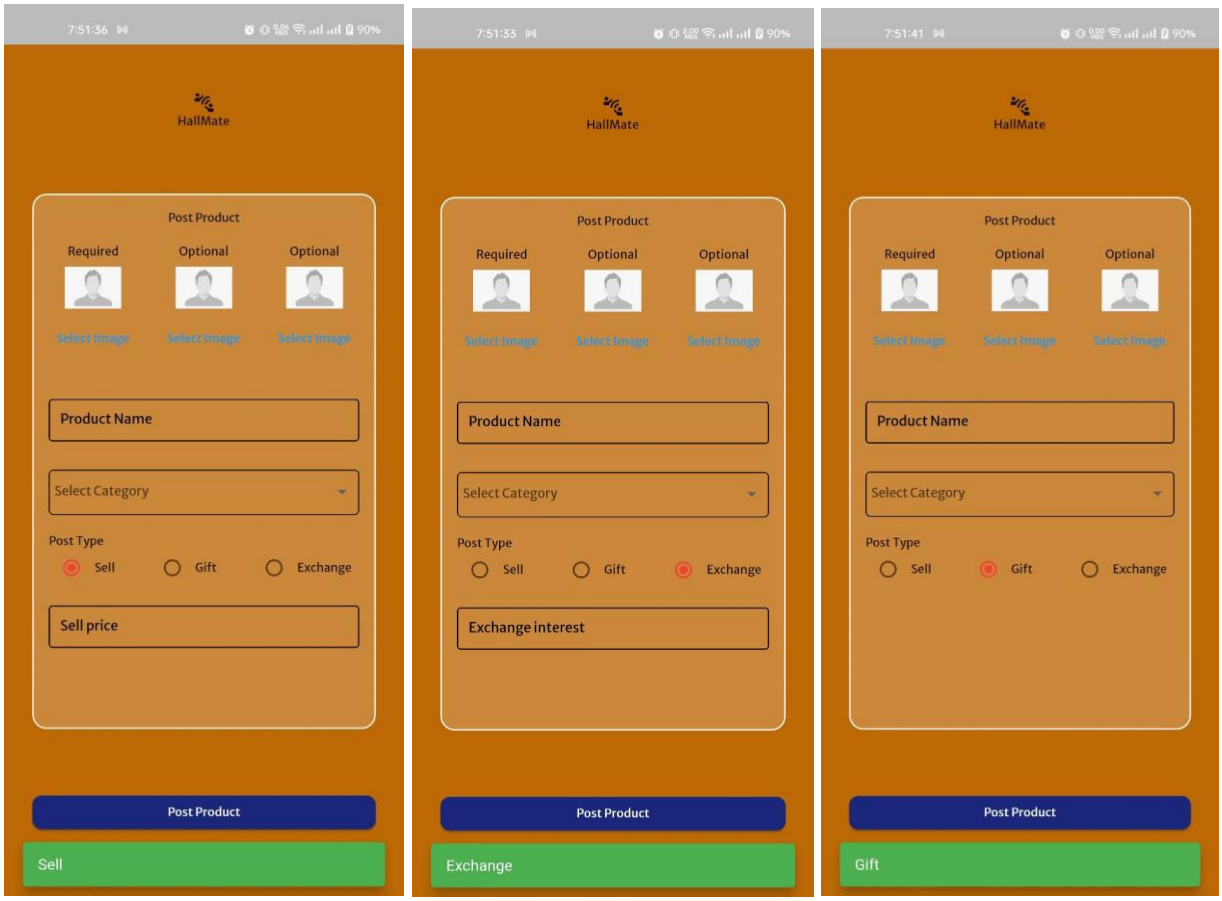

Fig 5.1.5: Item Post Page

Product Buy/Get or Exchange Page

After click on any product from the item list in sharing page, User will see all information and multiple pictures of product in a detail page and they can get as gift, buy or Exchange with other things.

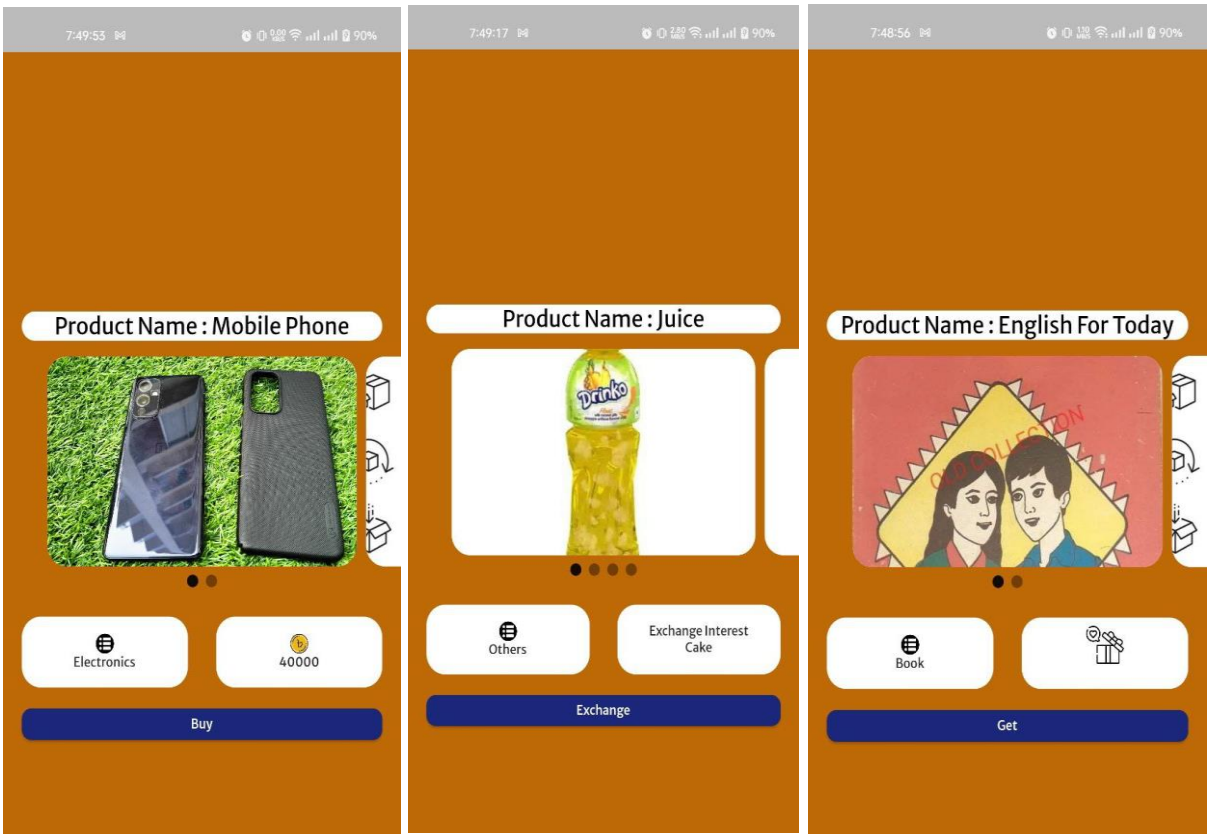

Fig 5.1.6: Item Get Page

User Profile Update page

This figure shows, user can update their profile, updating profile is necessary for getting connection suggestion about nearest users and sharing other social media links.

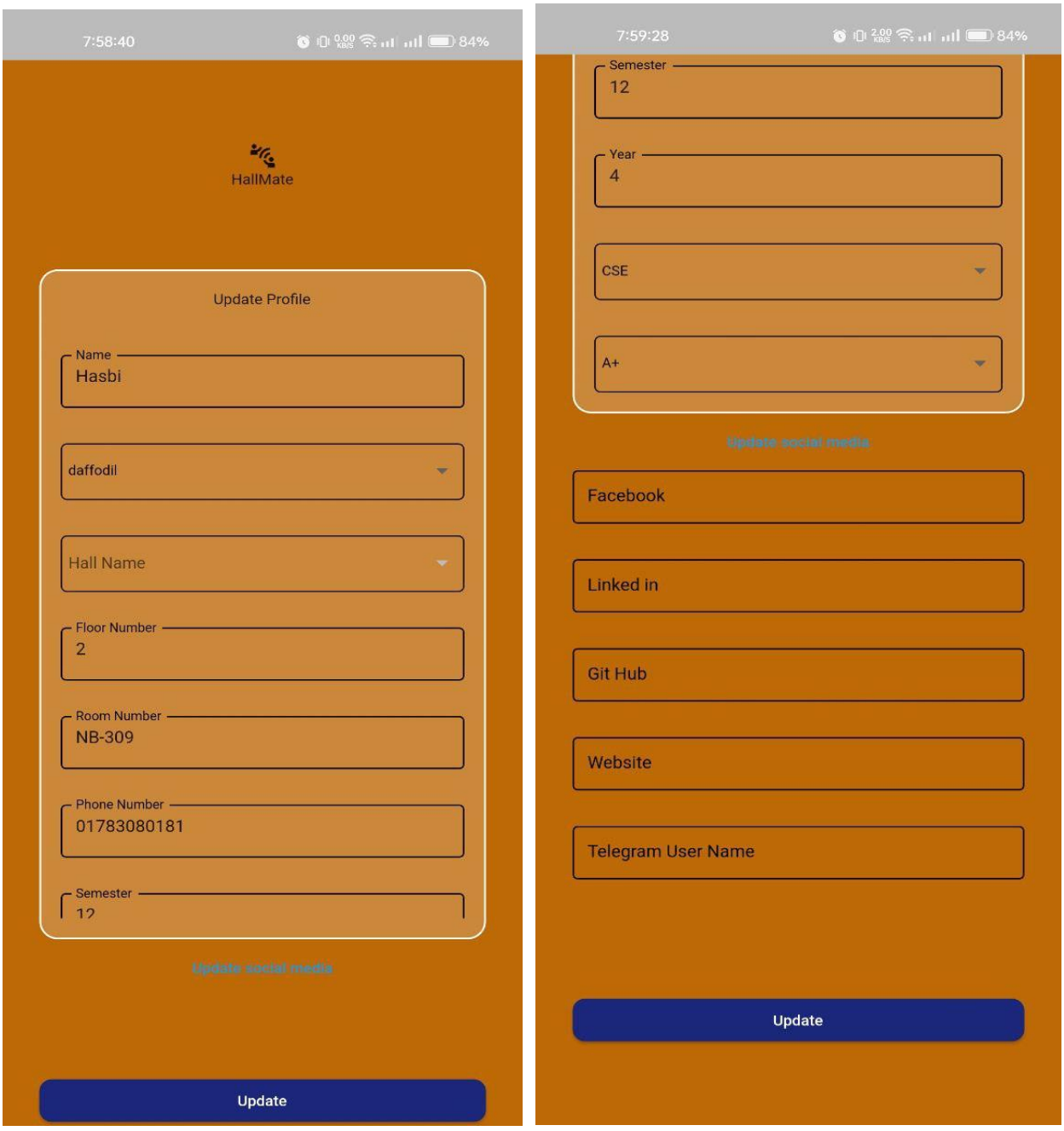

Fig 5.1.7: Profile and Social Link update page

Connection Suggestion Page

The most focused part in this app, in profile section this app will suggest nearest Hallmates for being connected with them.

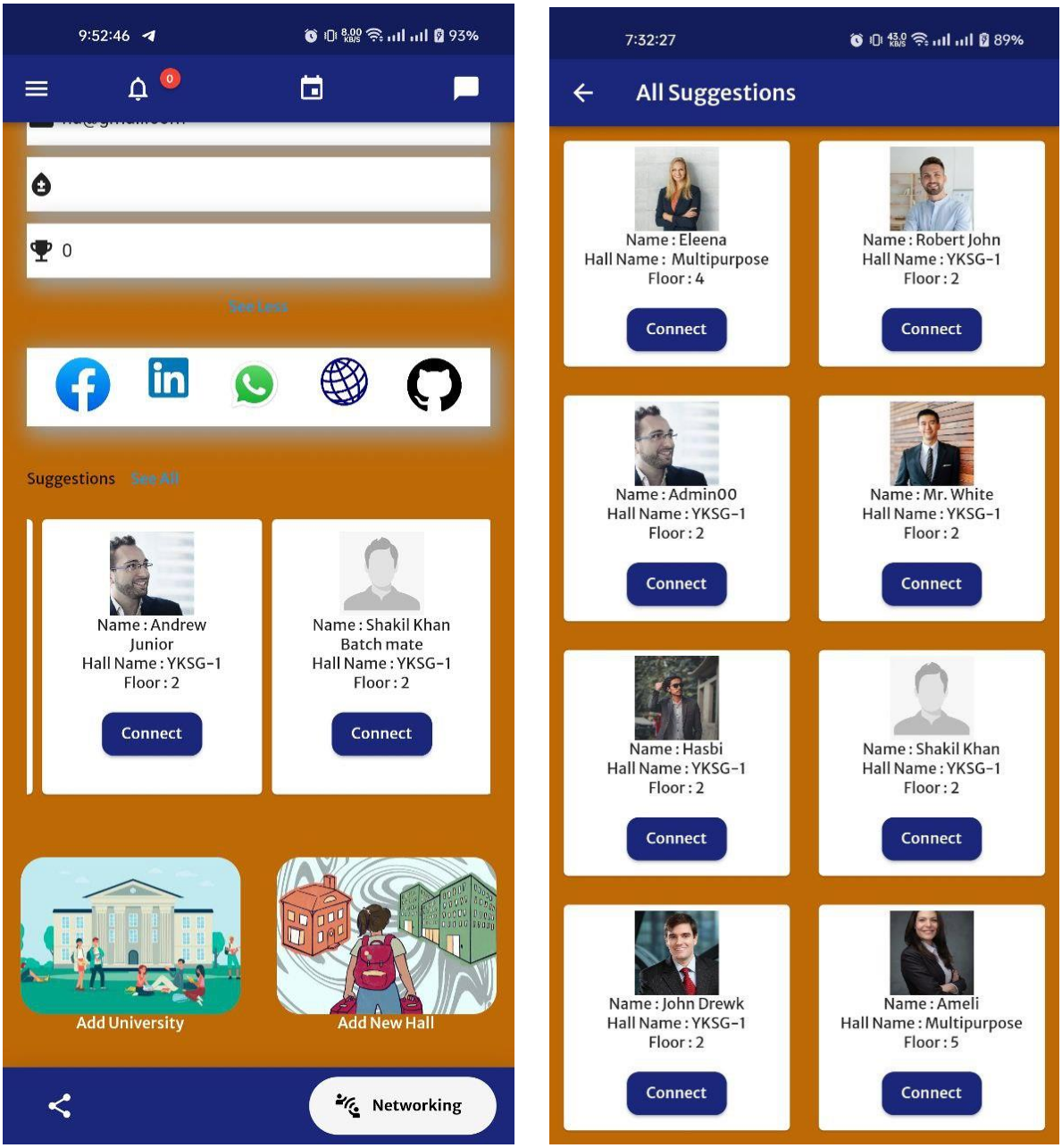

Fig 5.1.8: Connection Suggestion Page

Visit Profile Page

Every user can visit others profile and send connection request or get their other social links, But when an admin will visit user profile they will see one extra option in the bottom, admin can appoint any user as University ambassador. And university ambassadors will have the ability to add new University and Halls.

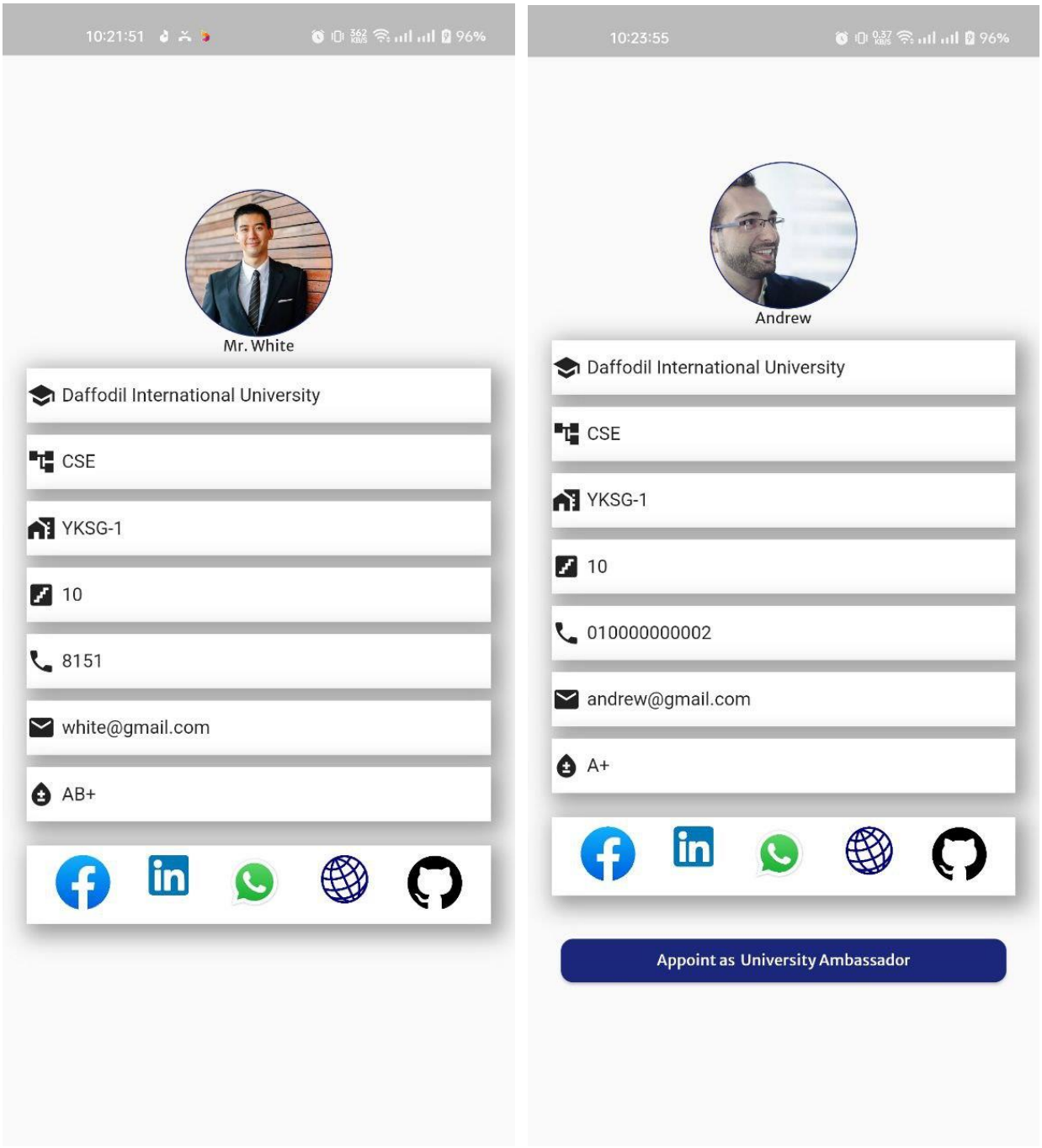

Fig 5.1.9: Profile visit page

Admin Features

From admin accounts, New University and Hall can be added

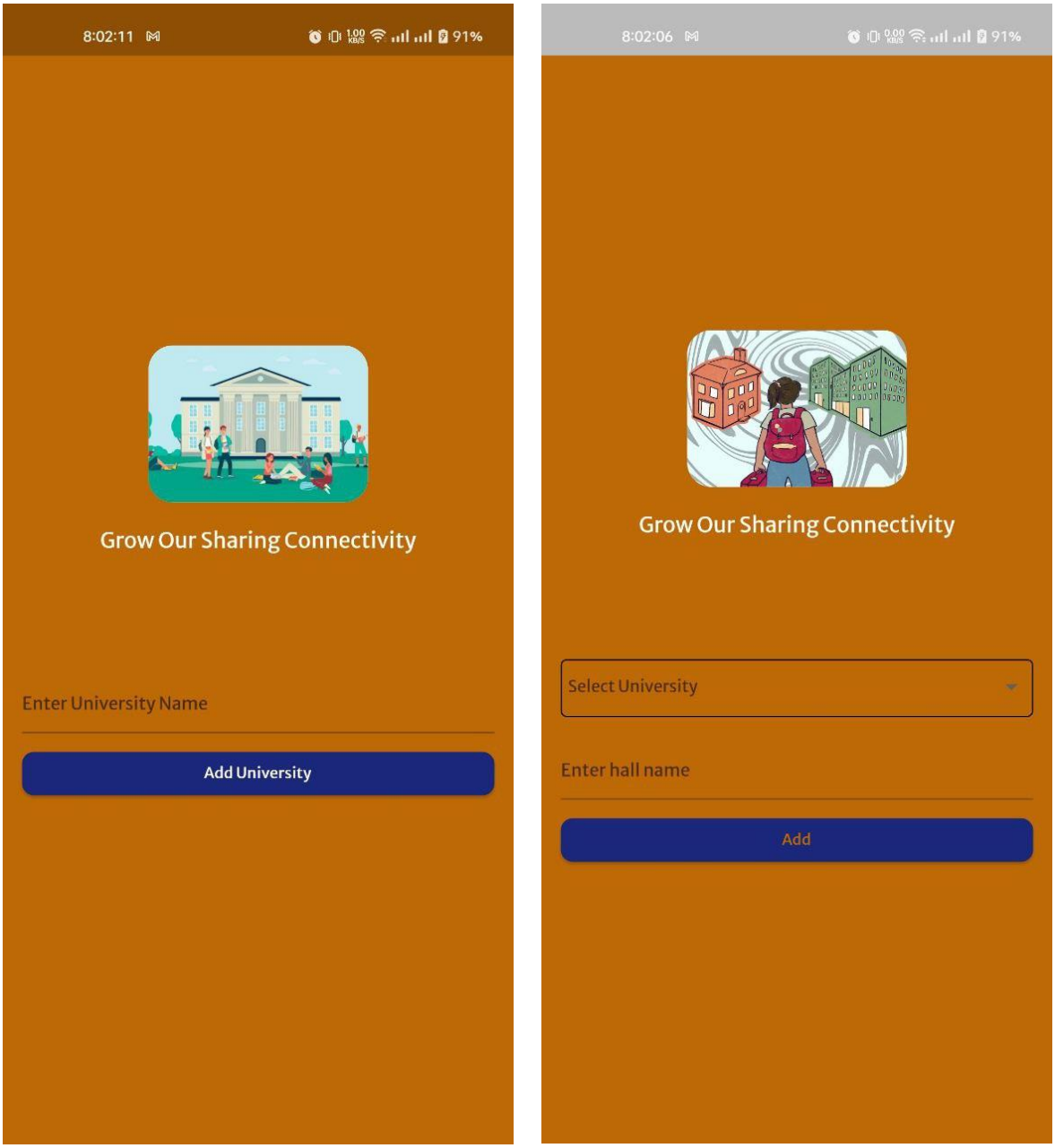

Fig 5.1.10: Admin Feature Pages

5.2 Database Implementation

From both admin and user accounts different kinds of data will be added, here is the figures of firebase database for this project,

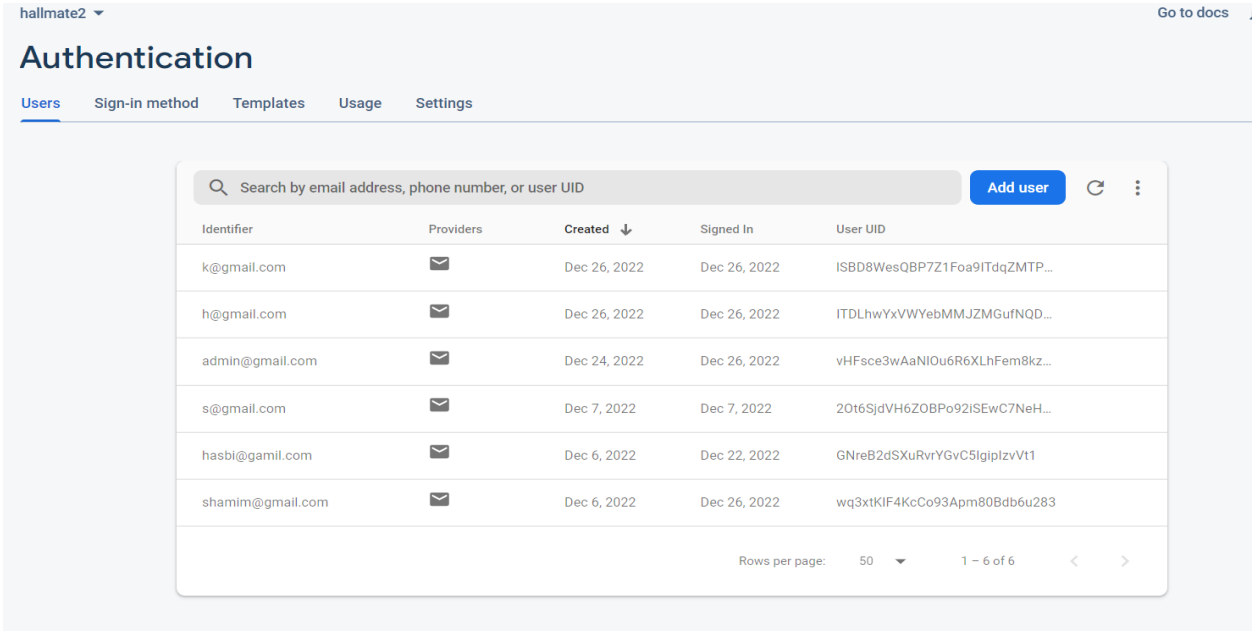

Fig 5.2.1: Authentication

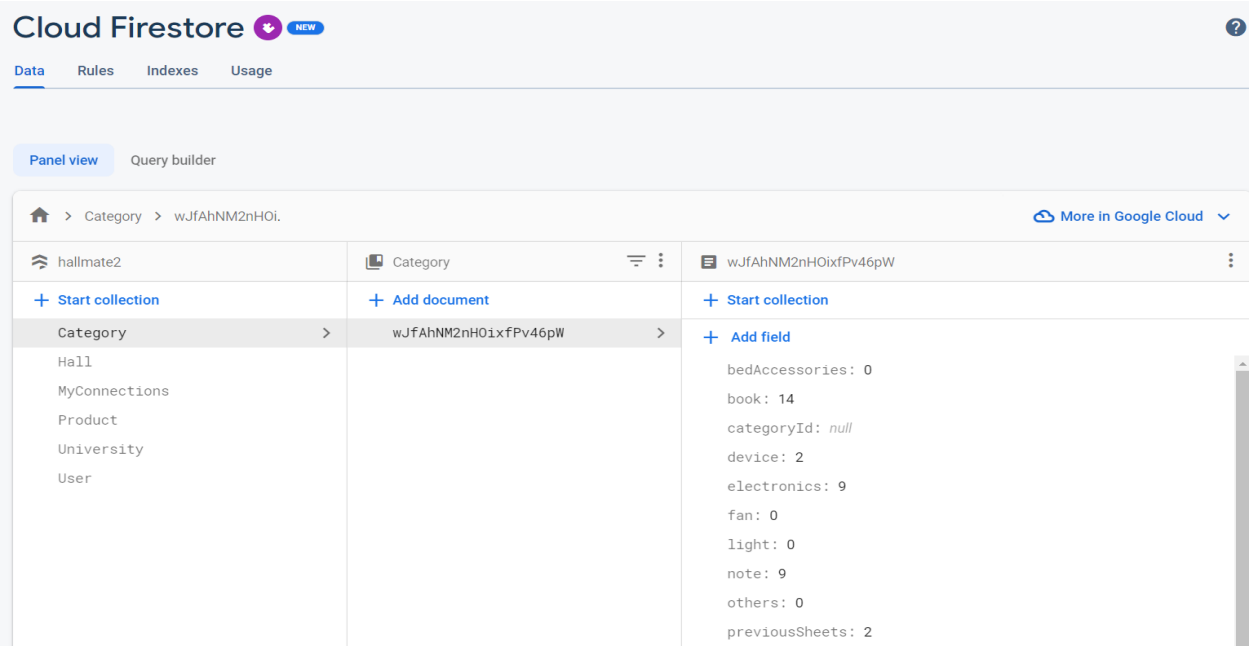

Fig 5.2.2: Category

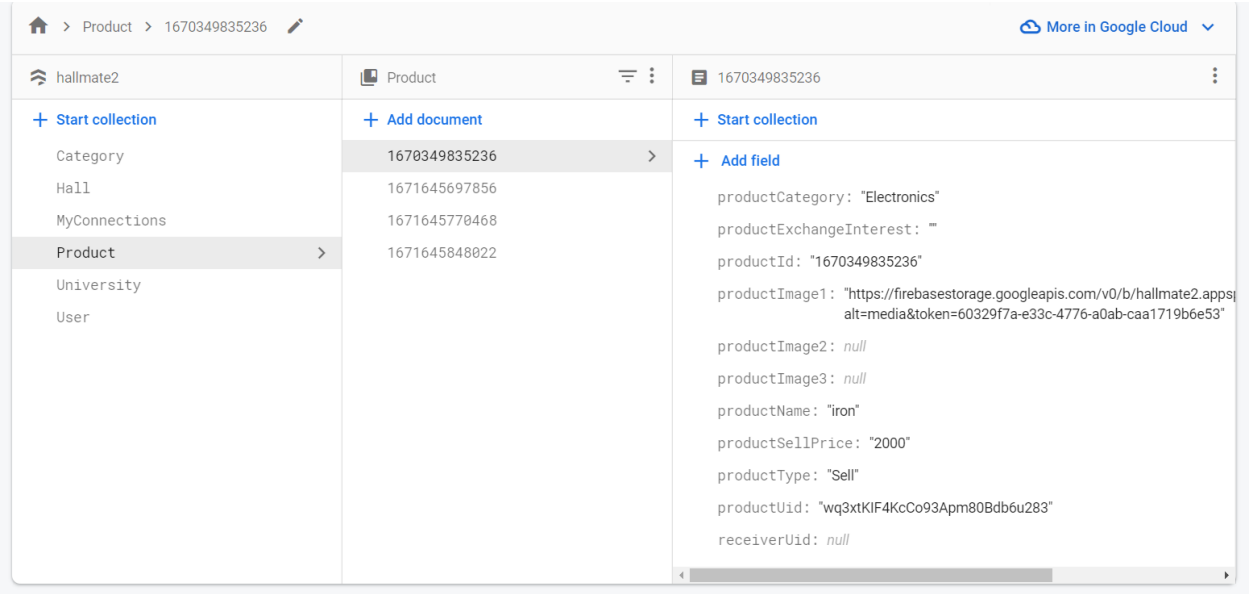

Fig 5.2.3: Products

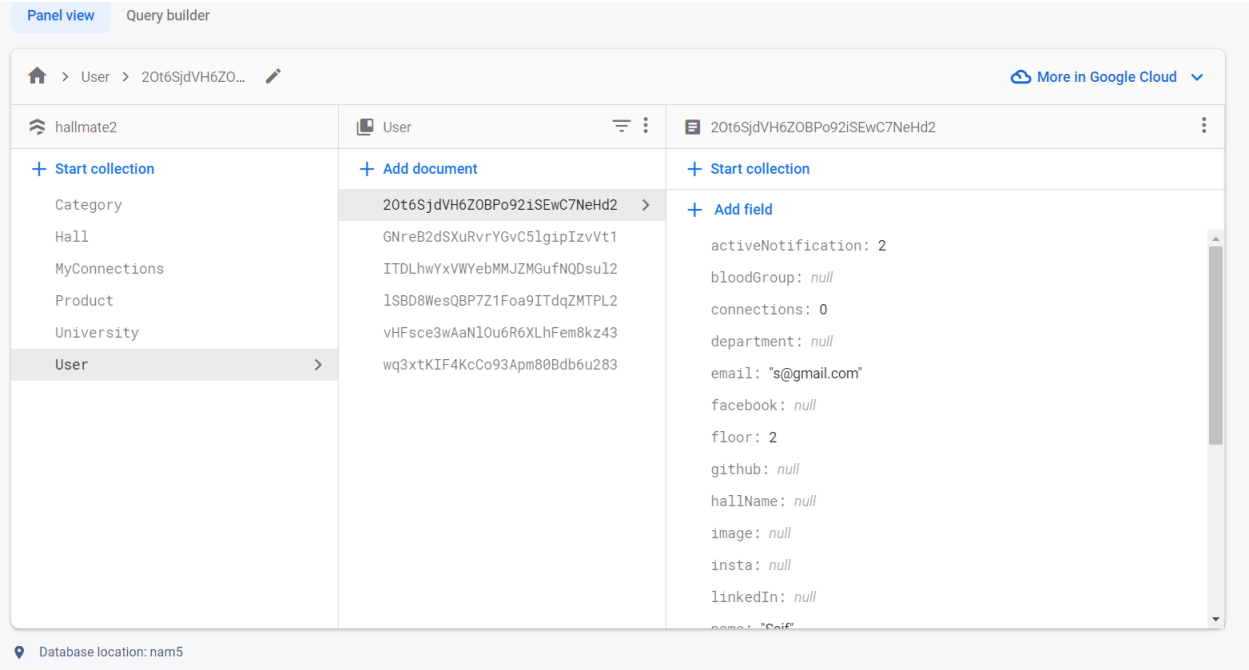

Fig 5.2.4: users

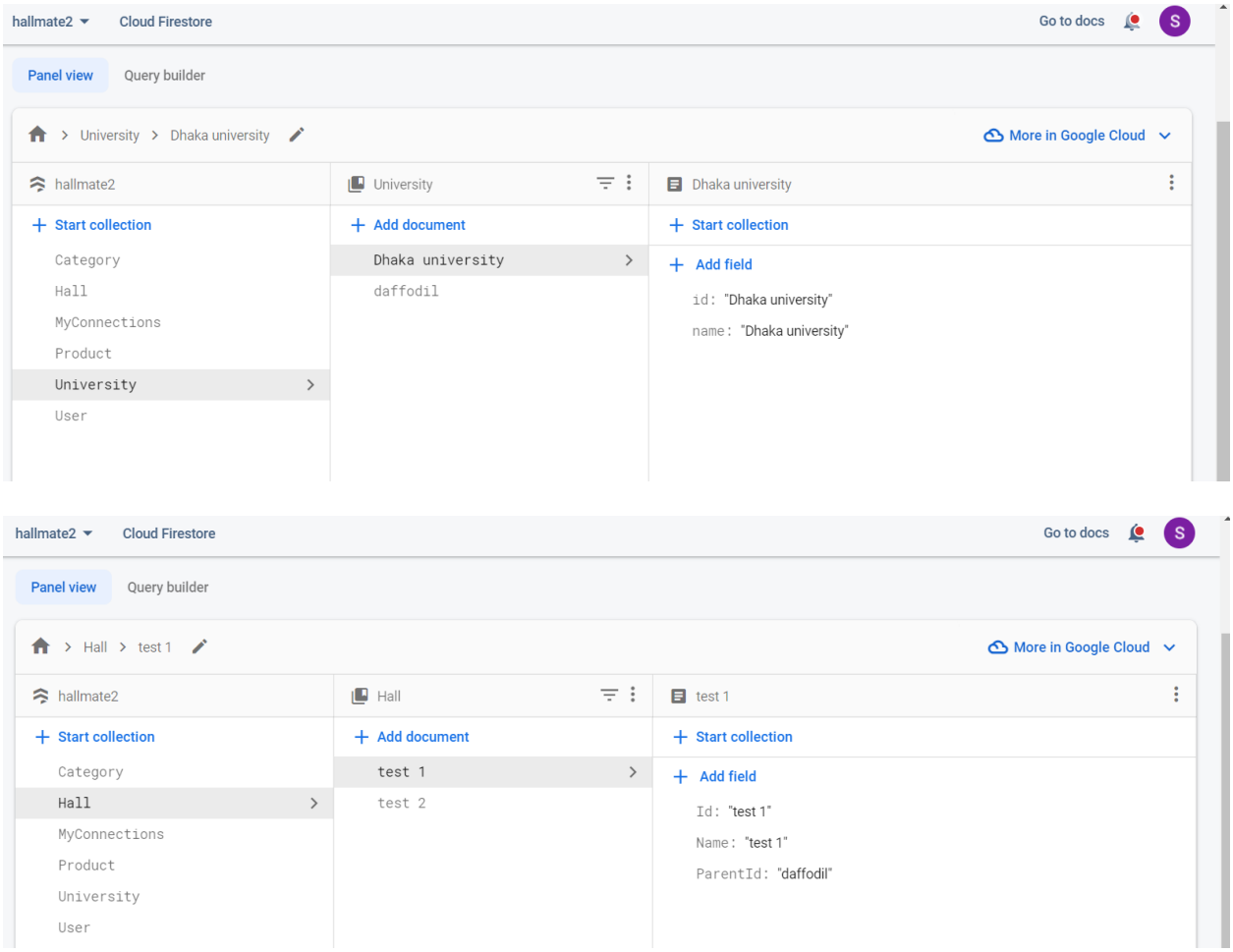

Fig 5.2.5: University and Hall

5.3 Unit Testing

Unit testing is an important aspect of software development and helps to ensure the quality and reliability of the app. It is recommended to perform unit testing early in the development process and to regularly re-test the app as changes are made to ensure that existing functionality remains intact. Our conducted unit testing is mentioning below:

1. User Login and Registration: Test the functionality of the user login and registration features, ensuring that users can successfully create an account, log in and log out of the app.
2. Product Sharing: Test the ability of users to share products with other users, including creating a new product, updating and deleting existing products, and viewing shared products.
3. User Connections: Test the ability of users to connect with other users, including sending and accepting connection requests, viewing connected users, and managing connections.
4. Product Search: Test the functionality of the product search feature, ensuring that users can search for products based on different criteria, such as product name, category.
5. User Profile: Test the functionality of the user profile, ensuring that users can view and update their profile information, such as name, hall/university name, social info, contact info, and profile picture.
6. Notification System: Test the notification system, ensuring that users receive notifications for events such as product sharing, connection requests.
7. Error Handling: Test the app's error handling functionality, ensuring that the app displays appropriate error messages for scenarios such as invalid inputs, network issues, and server errors.

5.4 Integration Testing

Integration testing is a critical step in the software development process, as it ensures that the different parts of the app work together as expected. It is important to thoroughly test the integration of all features to identify and resolve any issues before deploying the app. Here is our integration testing parts,

1. Integration of User Login and Registration: Test the integration of the user login and registration features with other parts of the app, such as the product sharing and user connection features.
2. Integration of Product Sharing: Test the integration of the product sharing feature with the product search, user connection, and notification features.
3. Integration of User Connections: Test the integration of the user connection feature with the product sharing, product search, and notification features.

4. Integration of Product Search: Test the integration of the product search feature with the product sharing and user connection features.
5. Integration of User Profile: Test the integration of the user profile feature with the user login and registration, product sharing, and user connection features.
6. Integration of Notification System: Test the integration of the notification system with the product sharing, user connection features.
7. End-to-End Testing: Conduct end-to-end testing to ensure that the app functions correctly as a whole, covering all aspects of the app including user registration, product sharing, user connections, product search user profile, and notifications.

5.5 Functional Testing

Functional requirements are tested during functional testing to make sure the software is meeting user demands. It is an important time in the software development process that help in verifying that the functionalities as expected.

1. User Login and Registration: Test the functional requirements of the user login and registration features, including the ability of users to create an account, log in, and log out of the app.
2. Product Sharing: Test the functional requirements of the product sharing feature, including the ability of users to create, update, and delete shared products, and to view shared products.
3. User Connections: Test the functional requirements of the user connection feature, including the ability of users to send and accept connection requests, view connected users, and manage connections.
4. Product Search: Test the functional requirements of the product search feature, including the ability of users to search for products based on different criteria, such as product name, category.
5. User Profile: Test the functional requirements of the user profile, including the ability of users to view and update their profile information.
6. Notification System: Test the functional requirements of the notification system, including the ability of users to receive notifications for events such as product sharing, connection requests, and product reviews.

CHAPTER 06

IMPACT ON SOCIETY, ENVIRONMENT & SUSTAINABILITY

6.1 Impact on Society

Students are the future workforce, so it is crucial for them to form strong bonds with one another. They can enhance their communication skills, which will also benefit them in their professional lives. Additionally, students can speak with prior residents of their residence hall.

- Improved communication will foster a vibrant social environment.
- There is a scope for students to build communication with former students.
- The helpful environment will make a helpful mindset which will make a very good impact on society.

6.2 Impact on Environment

With the advancement of the Internet and online purchasing platforms, a new marketing and sales strategy has emerged. There is uncertainty about the systemic effects of this change in retailing in terms of costs and the environment. The logistics networks for product fulfillment and delivery consume a lot of energy and packaging materials, which is a major issue for the newonline shopping business models, despite the fact that the environment benefits greatly from the reduction in stock and returns.

6.3 Ethical Aspect

A platform for communicating with your roommates is referred to as "Hall Mate." The primary objective of this initiative is to build a solid community. Businesses with a helpful approach will inspire everyone.

6.4 Sustainability Plan

Sustainability means attaining our objectives without endangering the capacity of coming generations to do the same. Along with natural resources, we also need economic and social resources.

One facet of sustainability is environmentalism. Most conceptions of sustainability also take social equality and economic growth into account. The balance of the economy, society, and environment is its

CHAPTER 07

CONCLUSION COMPARISON & FUTURE WORK

7.1 Conclusion

The majority of those around us use social media regularly these days. A blend of social media and e-commerce websites tailored to university residence halls, Hall Mate is a mobile application proposal for both Android and IOS. The students of a certain university hall have access to a social media section of this program where they may communicate with one another and receive assistance in any way by posting or messaging. Anyone can list any kind of product for sale, gift, or exchange in another section. The straightforward and quick operation of this app will be advantageous to users. It is simple to reach a large audience thanks to its user-friendly UI.

Every criterion that was gathered during the development process has been met or exceeded by the application. From gathering requirements to delivering the finished product, I worked with a variety of technologies throughout the entire development process and gained a ton of expertise in the process. Working on this project gave me more assurance when it comes to work.

7.2 Future Plan

As it is a combination idea project so there is so many scopes for future work. Initially we have some idea to implement for this project.

- An QNA section where students can ask for answer or suggestion for real life problems, exercise on others questions.
- Turning Hall building into a display by controlling the balcony lights turned of and on through this app, because it will contain every room's user information and can send notification to the specific room for controlling their balcony light and it can make their building into a display.
- An event section for arranged events easily based on batch, department or floor.
- Creating, Interest and join in group study based on study topics.
- Feature for knowing neighbor's mood, then they can arrange get together based on their current moods.
- Develop a Web version of the app.

REFERENCES :

[1] Android Studio, available at << https://developer.android.com>>

[2] Flutter SDK, available at< <https://flutter.dev>>

[3] Dart, available at <<https://dart.dev/>>

[4] Bikroy.com, available at <<https://bikroy.com>>

[5] Linkedin, available at <<https://linkedin.com>>

[6] Stack Overflow, available at <<https://stackoverflow.com>>

[7] Altitude, available at <<https://www.altitudehq.com/>>

[8] Stack Overflow, available at <<https://stackoverflow.com>>

[9] NUS, available at <<https://nus.edu.sg/

HallMate

ORIGINALITY REPORT

10%	7%	0%	7%
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