TO-LET: A MOBILE BASED HOME RENT APPLICATION

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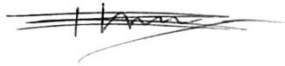

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APPROVAL

This Project is titled "**TO-LET: A Mobile Based Home Rent Application**", submitted by **Md. Radoan Ahmed**, **Id No: 191-15-12411, Afia Anjum Tithi, Id No: 191-15-12081 and Afrin Sultana Litu, Id No: 191-15-12296** to the Department of Computer Science and Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style contents. The presentation has been held on 26 January 2023.

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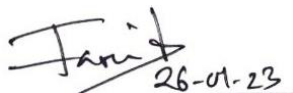**Assistant Professor**
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DECLARATION

We hereby declare that this project "TO-LET: A Mobile Based Home Rent Application" has been done by us under the supervision of Dr. SheakRashed Haider Noori, Professor & Associate Head Department of CSE, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree in Computer Science and Engineering.

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ABSTRACT

In the present time, the world totally depends on Information Technology. It takes the world into our hands. As a result, our country is not outside of it. For this, we are running to the competition. Our government already has taken so many steps to take the country forward in Information Technology. Due to this, we are able to enjoy the benefits like e-ticket, e-commerce, e-food, e-learning, and many more. But renting a home is very difficult. Because in our country there are very few apps which really work on it. Most of the app is for property business. For that people cannot use them to rent a home for sublets, family, or bachelors. Our app will help them easily find their desired home and rent the home. Then they do not need to go outside to find a to-let, they can easily find it using our app. In our app, we add some features that will help them a lot to find their home easily. Like we add a messaging option to find the location of the home and reach the destination easily. To make this app we will use "Android Studio" and the language we use here is java. We divided ourwhole project into four parts. First, we find our related project and filter out this app with our idea, second, we design our app, third we build our app and last, we test our app and get the result of our app by putting it in real life.

TABLE OF CONTENTS

CONTENTS	PAGE

CHAPTER

CHAPTER 1: INTRODUCTION

CHAPTER 2: BACKGROUND

CHAPTER 3: REQUIREMENT SPECIFICATION

CHAPTER 4: DESIGN SPECIFICATION

CHAPTER 5: IMPLEMENTATION AND TESTING

CHAPTER 6: ENVIRONMENT, SUSTAINABILITY, AND IMPACT ON SOCIETY

CHAPTER 7: CONCLUSION AND FURTHER PLANNING

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1 Introduction

In Bangladesh, the people who live in the city area badly need to rent a home. To find a home they need to go far away and see every house. So, we want to develop an android application that contains all the info and the location of the home. In our app, they do not need to go outside to find a to-let. In our app, all the locations of the to-let can be seen easily. Users can see the home picture and get the location or place of this app using the map in this app. They can easily chat with the homeowner and call him online and offline to see the house or to get more info about the house. Also, they can get directionsto the house from their current location using the map that will help them to go easily to the home location.

1.2 Motivation of Work

Day by day technology is growing up. So, the world becomes in our hands. Technology saves our valuable time by providing many services. Like mobile applications, web applications even so on. We want to also create a mobile application for Home Rent. Here should have been stored all information about home rent locations and images so that people can easily find a home. The main purpose of this application is to find the location of the house which will rent and make people's life easy in finding a home for rent.

1.3 Objectives

Bangladesh is an improving country. Day by day we are becoming dependent on information and technology's a result we are enjoying some services like Uber, E-ticket System-learning-commerce, E-transport even so on. In January 2022 there were 52.58 million internet users and 49.55 million social media users in Bangladesh [1]. All these users use many kinds of apps. Butthere are a few apps in Bangladesh that are used for rental property but these cannotbe used for rentalhomes like bachelors or sublets. Also, this does not have any feature of online messaging and calling. For this reason, we

implement this application which will only use for the purpose of rentinghomes like sublet, bachelor, or family, and also have features like online messaging, calling, and mapping. We believe that our app will help a lot of people to find their homes easily and save time.

1.4 Expected Outcomes

From this app, people can easily find their homes. In Bangladesh, mainly in Dhaka city people need to rent homes. Using our app people can easily find their desired home location and information and also rent the home easily. I hope this application should be useful for people.

1.5 Business Policy

After our project is over, we will publish it in the play store. Here we use some ads and some conditions like when they are going to rent the app, they will need to pay it through our app.

1.6 How It Works

Our app will work as a locator to find a home for rent. Here people need to first signup then he or she can easily enter our app by the login. Here all rental home info will show in three different classes like: family, bachelor, and sublet. When one clicks on the picture of the home, they can see the property details and property owner's name and also find the option for online messaging, calling, and mapping. Using the mapping option user can easily find the root to go there. Also, here we have an offline calling option and the user does not need to type the number it automatically gets the number of the property owner that was given by the owner in our app and calls the owner. Here user can post their home as owners.

CHAPTER 2

BACKGROUND

2.1 Introduction

In our daily life, we use various types of mobile applications like WhatsApp, Messenger, Bikash App, etc. This app helps to ease our life. In our life, if we fall any problem, we try to solve them using a mobile app. Like for chatting easily, we use messenger, WhatsApp, etc. We use uber, and Patau to easily get transport. But in Bangladesh for renting homes there are very few apps we find. Our app will solve this problem. It helps to find a home that will rent. Also, save time and money. Our app will get info about this rental home, and also give the option to chat and call with the homeowner. Also, given the option to send money.

2.2 Related Work

When we decided that we would create an android application for Home Rent we studied a lot of development projects to make it a reality. We try to study a lot of apps which is made in this field in Bangladesh and which will work in Bangladesh. We find some app which is work in this field. Though this app works in this field our app is some different features like maps, online messages, and calls. In the given table we will give the app name and features of this app.

Table 2.1: Related App and feature

App Name	Feature of The App
Baribodol.com	Post Home, Find Home, Offline Call
Bproperty	Post Home, Find Home, Mapping
BD To-let	Post Home, Find Home, Offline Call
To-Let Board	Post Home, Find Home, Offline call
The Tolet	Post Home, Find Home, Offline call

2.3 Comparative Analysis

All the apps that we studied for making our app are working in the same field but our app has some different and new features. Like "Baribodol.com", "BD To-let"," To-let Board", and "The To-let" has post home, find a home and offline call but in our app, we add a mapping, online messaging, and call which are not present in this app. Another "BD To-let" has a mapping option but it has noonline messaging and calling feature.So our have will get the full new feature.

2.4 Reason for Implementation of Android Project

Although the web-based project is very old, nowadays people have gained more popularity from the web to Android project. Because web applications need to browse. On the other hand, there is no need to browse the Android application, just by clicking we can get the information we need and it is possible for people of all classes and professions, there are many people who are illiterate, and they can easily use the Android application. Also, a web app is slower than an android app and doesn't work offline [2]. In December 2021 the percentage of mobile app users is 54% and the web app percentage is 46% [3]. So, it's easily understood that mobile app user is more than web app user. We have made this decision so that it is understandable to people of all classes and professions and they do not have to rush to use it.

2.5 Challenges Work

It is natural that every work will have some limitations and adversities. However, we have to overcome this obstacle and move forward. Simply put, we have in this application the services that are quite necessary for the running of human life. The main challenge in this project that we face is to make some features like mapping, call, and messaging. To implement this feature, we have to face a lot of problems. Then we find the solution to this problem. We have to study longitude and latitude so that we can access them in location. Also need to read a lot of research papers to get a full idea of the mapping application. Also, we need to learn about "API" and learn to create API for calling API in our project.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 Requirement Specification

To create our app, the requirements are needed to mention initially. So below is a list of the tools and languages that we used throughout this project-

- Programming Language: Java
- Database: Firebase Database
- Framework: Android Studio
- Frontend Language: XML
- Design tools: Figma
- API: Jitsimeet

3.2 Project Management Life Cycle

The project management life cycle is very important for completing any project. There are four phases of a project management life cycle- 1. Initial, 2. Planning, 3. Execution, 4. Closer [4]. In our project, we first select our project seeing the importance of this project in real life which is the initial part of the project management life cycle. Then we make the project plan. Where we first break down the project into smaller tasks and prepare a schedule for completing the task. In table 3.1 our full project plan is given. Then in execution, we make our full project demo diagram using Figma. Here we mainly make our full project UI for final implementation in the front. Then we complete our app frontend using XML language and backend using java language.

Table 3.1: Project Planning Timetable

Task Name	Time in Day	Begin Date	Finish Date
Plan of Project	37 days	24/10/21	29/11/2021
Design/Diagram	21 days	30/11/21	20/12/2021
Implementation	70 days	21/12/21	10/03/2022
Review	12 days	11/03/22	23/03/2022
Submission	5 days		

3.3 Design Requirements

Design is a way to express the whole project. It can be easily described using a design diagram. In design requirements, there are a lot of things included. Here we first add the use case diagram, sequence diagram, and ER diagram. Then add all the design layout and database layout.

3.4 Use Case Diagram

A use case diagram is a way to overview a relationship between actors and systems. Using the use case diagram, it is easy to represent the goals of system user intersection and the functional requirement of a system [6]. In our use case diagram, we have two actors one is the customer and another is the owner. Here customer and owner can perform some action. First owners and customers can log in to our app and if they are new users then they can sign up. After that customers can see the home post and can select any home and also can message or call the homeowner. The homeowner can post the home, set the location, and remove the post. Use case diagrams are shown in figure 3.1.

Figure 3.1: Use Case diagram

3.5 ER Diagram

ER diagrams are mainly used to analyze data requirements to produce a well design databased. The component of ER diagram is entities, attributes, and relationships [7]. In our project database, we have some entities like registration, post ad, image, and apartment. Registration has some attributes like user id, first name, last name, password, and email id. In the apartment, there are some attributes like bedroom no, kitchen number, bathroom no, location and price. All this is connected with others. Figure 3.2 shows the ER diagram of our project.
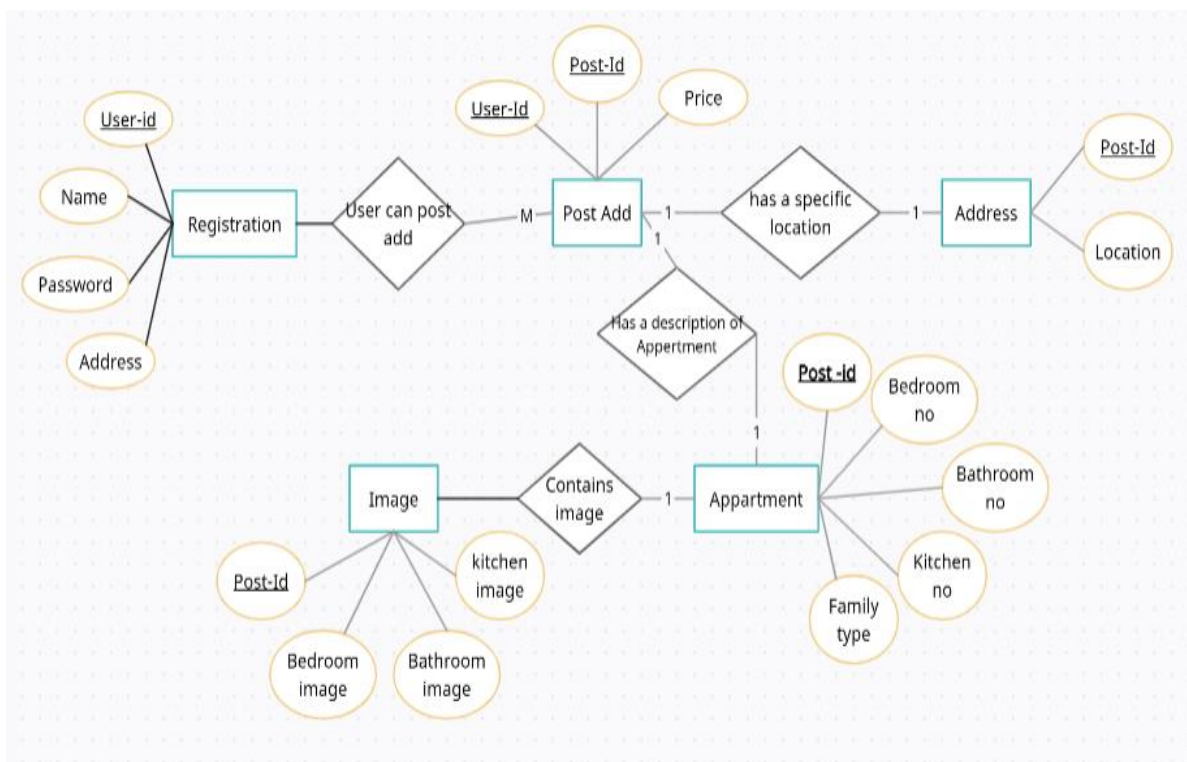
Figure 3.2: ER diagram

3.6 Sequence Diagram

The sequence diagram is a diagram that details how operations are carried out [9]. In our project, we have a login sequence diagram and a user sequence diagram. In the loginsequence diagram, it can see howan operation is carried out for login. And in the user sequence diagram, all the user operations can be seen.

- **Login Sequence diagram:**
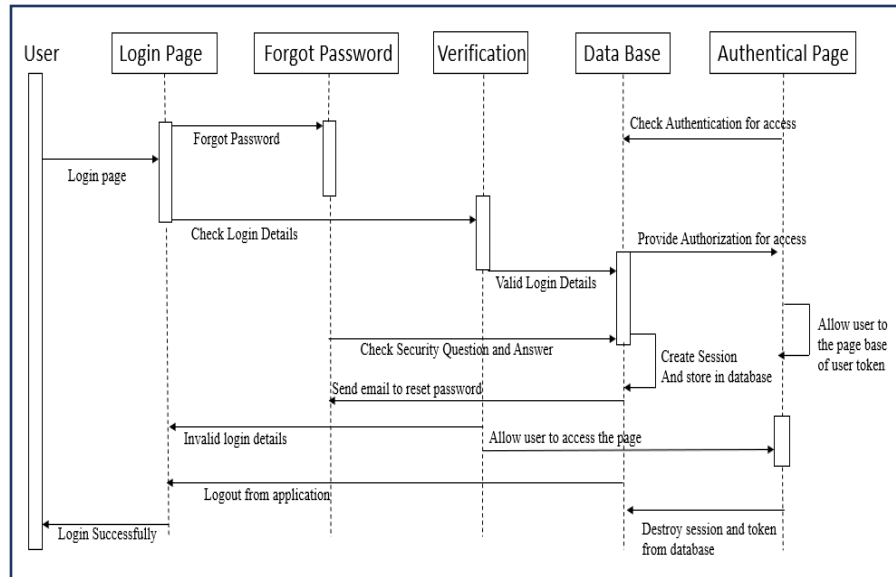
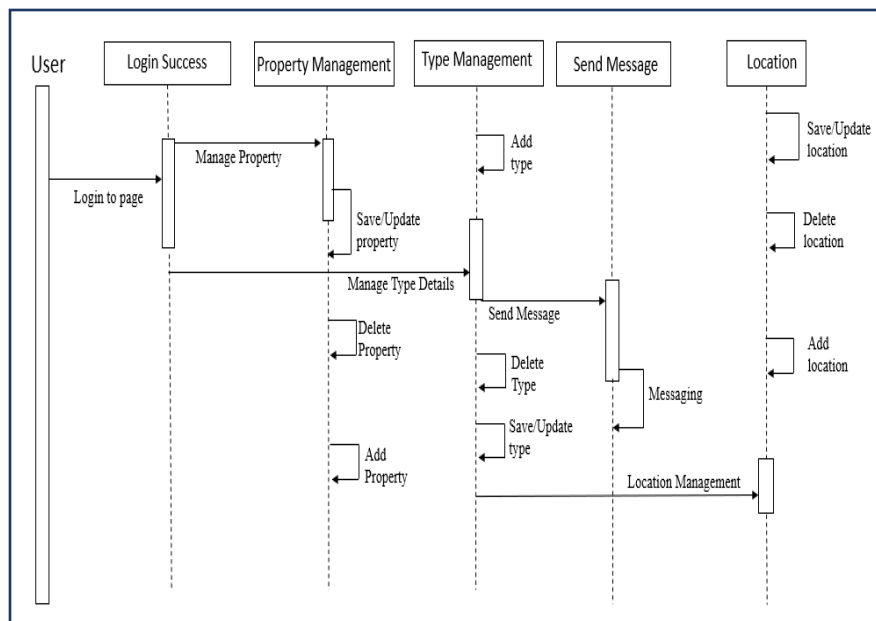Figure 3.3: Login sequence diagram

- **User Sequence diagram:**

Figure 3.4: User sequence diagram

3.7 UML Class Diagram

UML class diagram gives us the full idea of the object-oriented system. In our project, we use a lot of class. Like User class, login class, sign-in class, property details class, and so on. User class mainly get the all info of the user and give the user a lot of option to use our app. The login class mainly authenticatesthe user. Here we have some relationships between classes. Such as composition relationships. In our class diagram, we see user class and login class have a composition relationship. Because without a user login not possible. Like that, we have an interface relationship between "property details" with "own property details" and "other property details". Also, we have some associations. Like one user can post multiple homes and for that "user" class and the "post home" class has an association relationship. Figure 3.5 shows the ER diagram of our project.
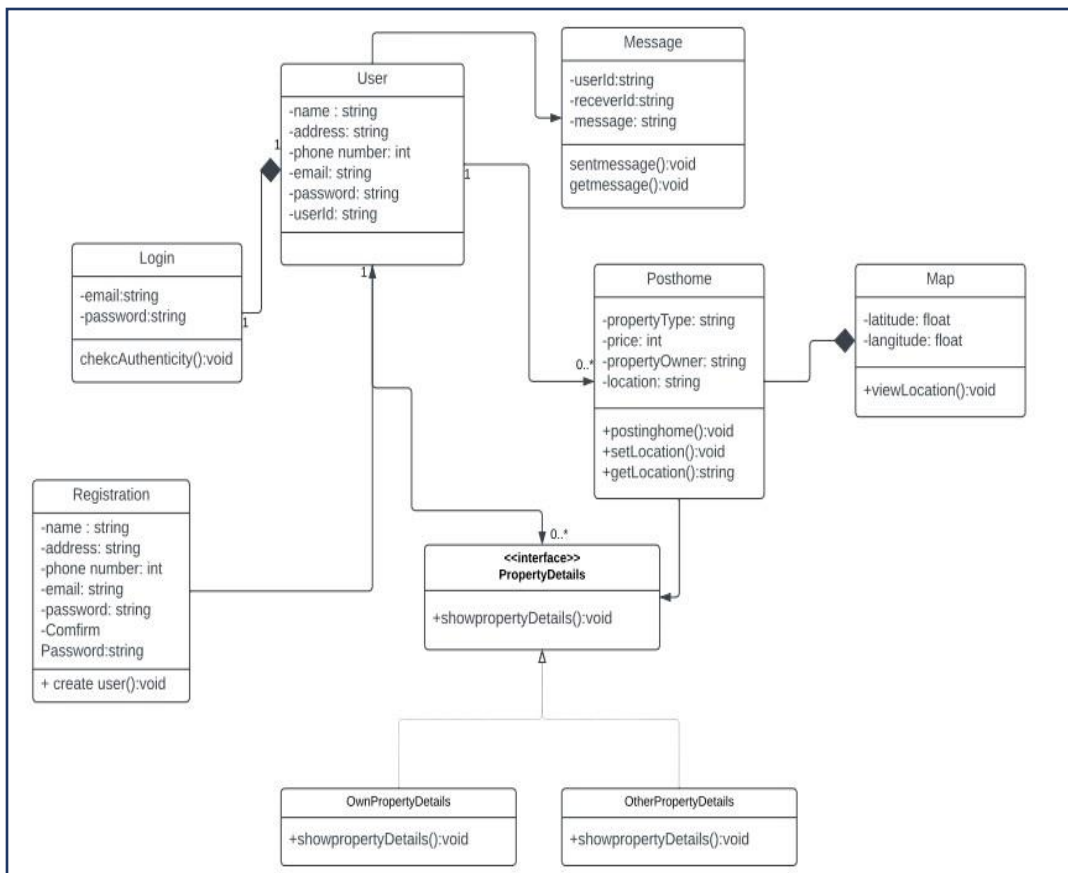
Figure 3.5: UML class diagram

CHAPTER 4

DESIGN SPECIFICATION

4.1 Front-End Design Layout

In our project, we have a splash screen layout, home page layout, profile page layout, map layout, view post layout, messaging layout, and post home layout. All the layout design is made using XML.

4.2 Splash Screen

It is the first page of our project. When anyone opens our page, this splash screen will open for 5 seconds and then the login page will open. Figure 4.1 shows the splash screen of our project.
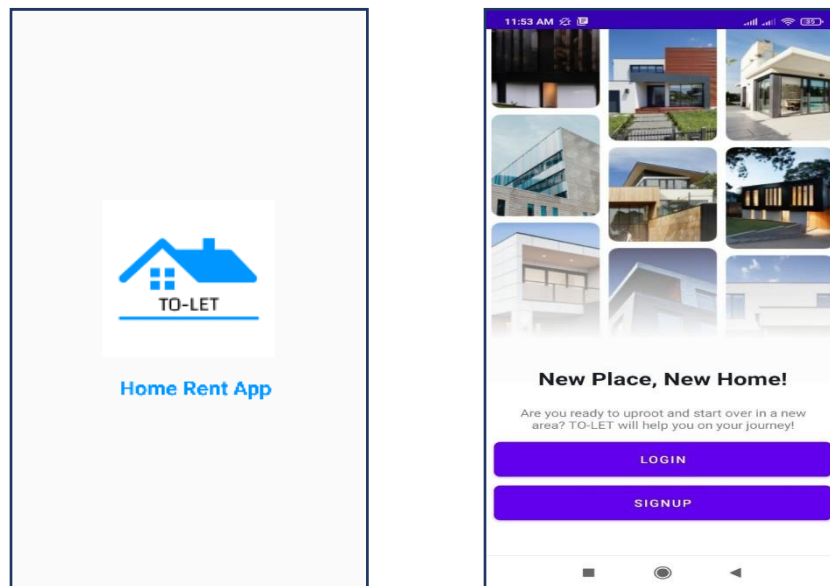

Figure 4.1: Splash screen

4.3 Home Page

On this page, users can see the home info that was posted by the homeowner. This page will open after login Here user can three types of home info first is family home, second is

sublet and last one is bachelor. All these types show different home info depending on the type that the user wants to see. Figure 4.2 shows the home page of our project.
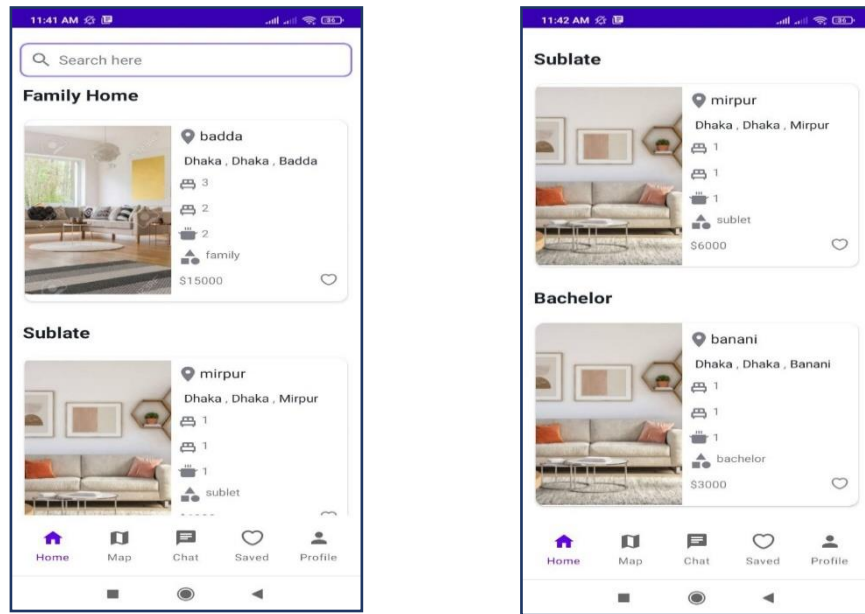

Figure 4.2: Home page

4.4 Register Page

After the splash register page will appear if the user has no account in our app. Here user needs to put his/her name, email address, phone number, and password. After giving this all-information user need to click the create account button. Figure 4.3 shows the login and splash screen.
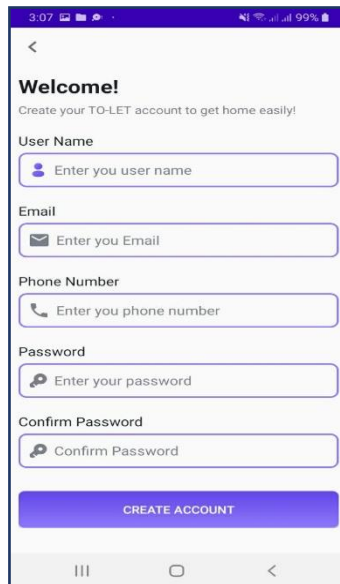

Figure 4.3: Register page

4.5 Login Page

When registration is complete then he or she can easily enter our app by a simple login. Here user just needs to give his name and password. After that user needs to click the login button. Figure 4.4 shows the login and splash screen.
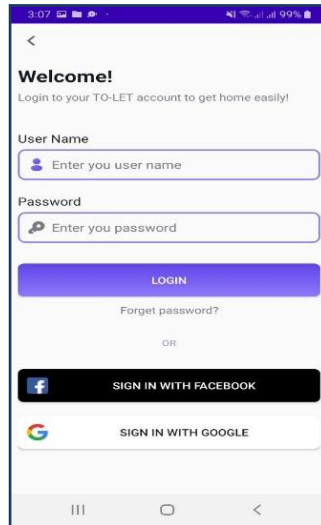

Figure 4.4: Loginpage

4.6 Property Details

Here the whole information about the home is given. Also, here customers can see the homeowner's name and see messaging, calling, and mapping options. Where if users click any of them, they can use this functionality. Figure 4.5 shows the property details of our project.
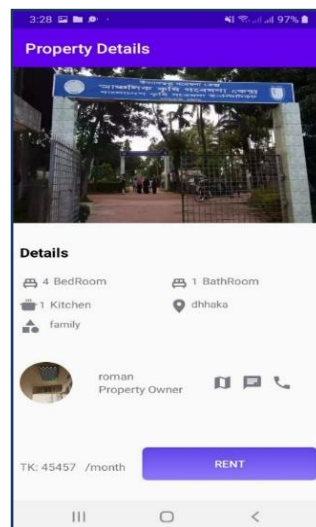

Figure 4.5: Property detail

4.7 Mapping Page

When the user clicks on the mapping option that was given in the app then the user can easily see the post-home location that was given by the homeowner. Figure 4.6 shows the property details and mapping page of our project.
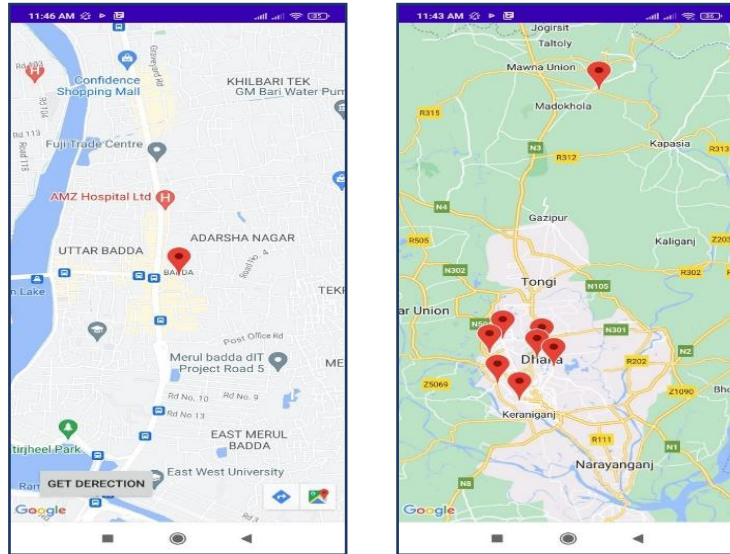

Figure 4.6: Mapping page

4.8 Post Home

Here users can post home. The homeowner needs to select the property type, enter the price range, room, and bedroom number and give the location using the map. Figure 4.7 shows the post home page.
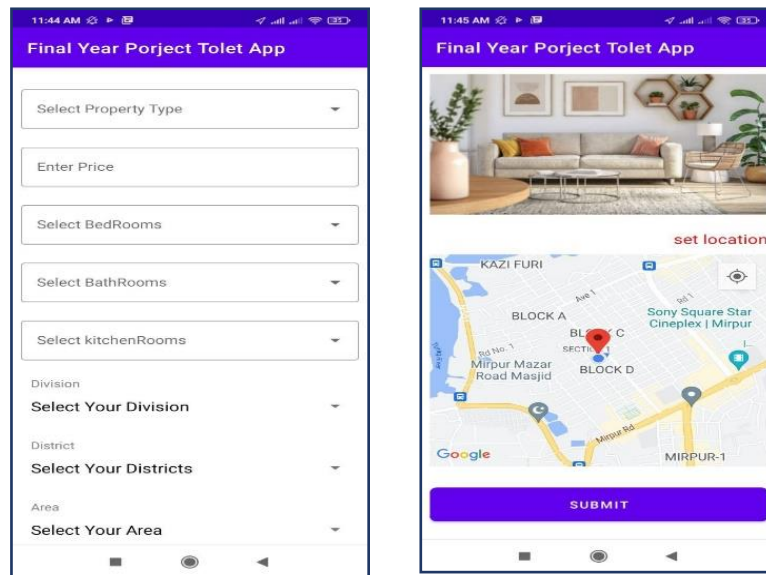

Figure 4.7: Post home

4.9 Message Page

Here user can message the homeowner.Here homeowners and customers can message each other. Using this feature, it will be very easy to communicate with each other and get more info easily. Figure 4.8 shows the message page.
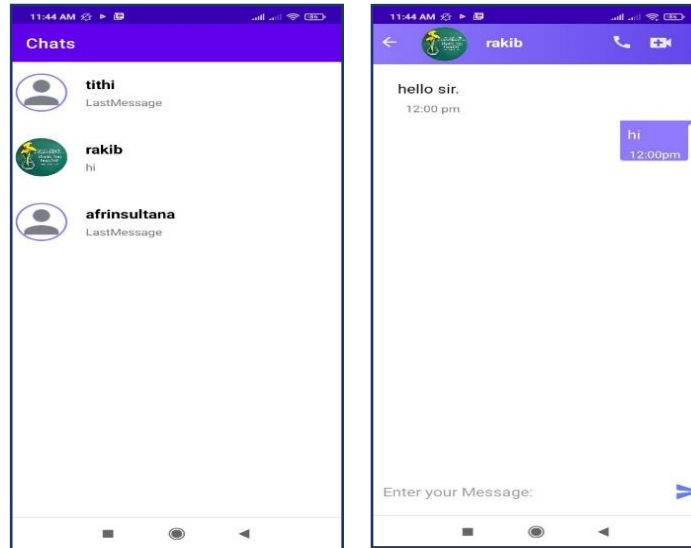

Figure 4.8: Message page

4.10 Profile Page

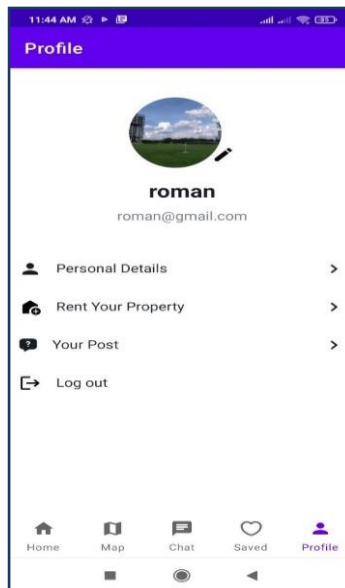Here users can see his/her profile information and also can edit their information. Figure 4.9 shows the message page

Figure 4.9: Profile page

4.11 Save Post Page

Here users can save the home post that he or she like. After saving any post he or she can easily find the post in the save page. That will easy their work to see the home post and talk with the home owner. Figure 4.10 shows the message page
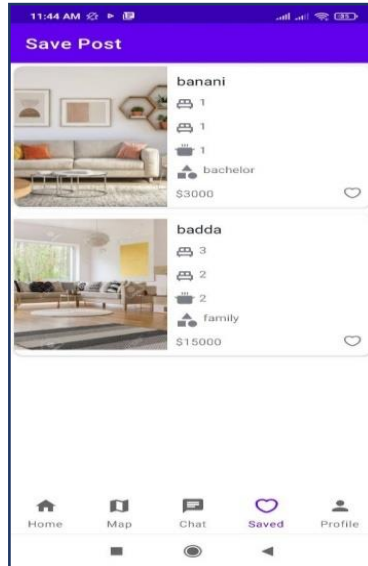

Figure 4.10: Save postpage

4.12 Owner Post Page

Here owner can see the post that he posts in our app also owner can delete the post. Figure 4.11 shows the message page
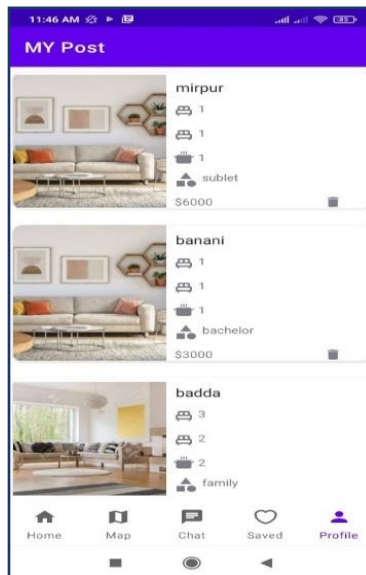

Figure 4.11: Owner postpage

4.13 Forget Password Page

Here user can get a password if he or she forgets his or her password. For getting access to his account he or she needs to put in an email address. After giving the email address mail will send to the email address and a link will be given. By clicking the email user can change the password and can get access to his account. Figure 4.12 shows the forget password page.
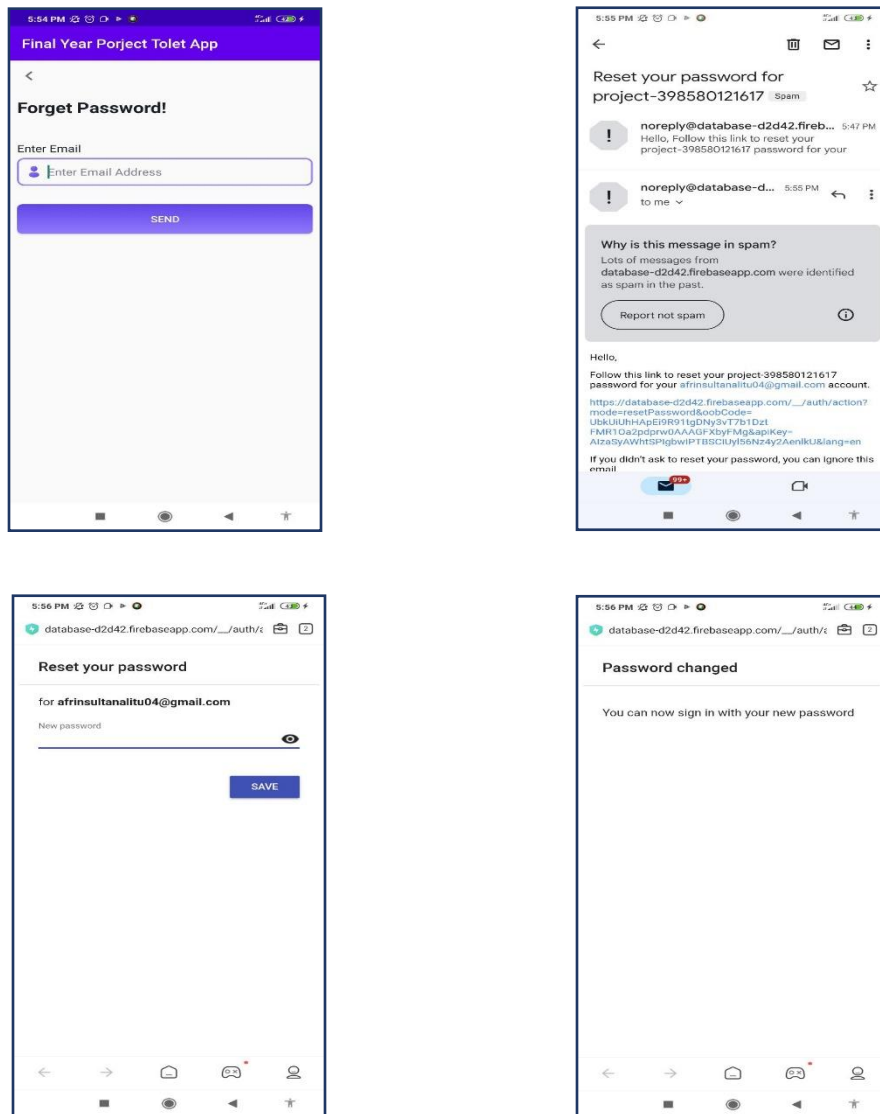

Figure 4.12: Forget password page

4.14 Audio and Video Call Page

Here users can call each other. In our app audio and video, both types of calls are available. For that users can easily see their desired home without going so far. And it will save him time and also make life easier. Figure 4.13 shows the audio and video call page.
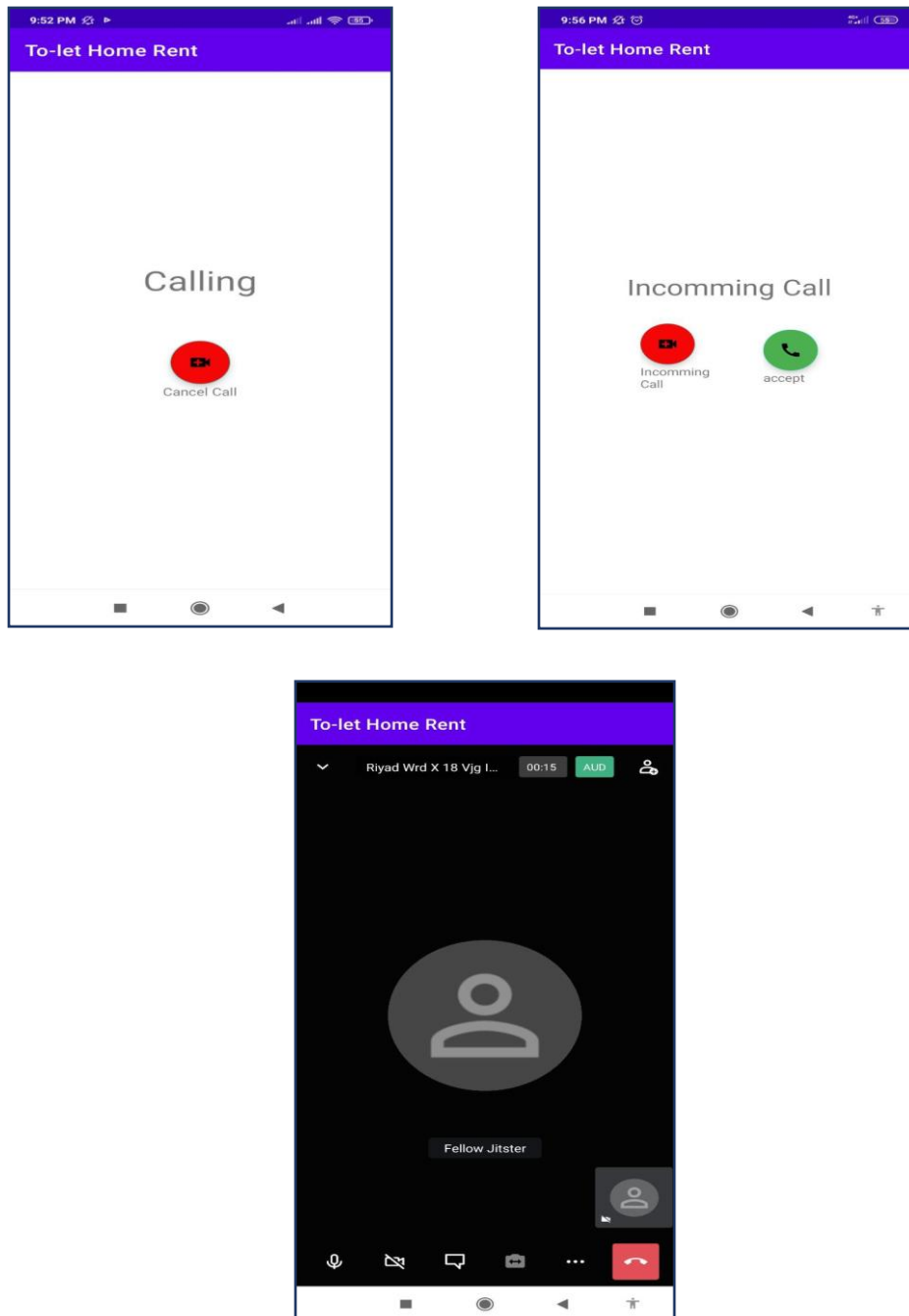
4.15 Personal Details Page

On this page, user details can show. Users can see his or her personal details like their name phone number and email address onthis page. The user call also sees his profile picture from here. And if he wants he can change this picture later. Figure 4.14 shows the personal details page.
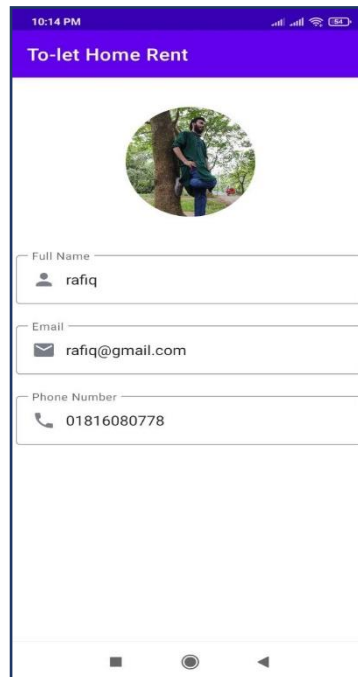

Figure 4.14: Personal details page

4.16 Profile Picture Change Page

Users can easily change their pictures with one click. He just needs to select a picture and confirm it as his profile picture. Here user first needs to click on the change picture icon and then it will take him to the gallery or camera as the user wants then the user just needs to confirm the picture to make it a profile picture. Figure 4.15 shows the profile picture change page.
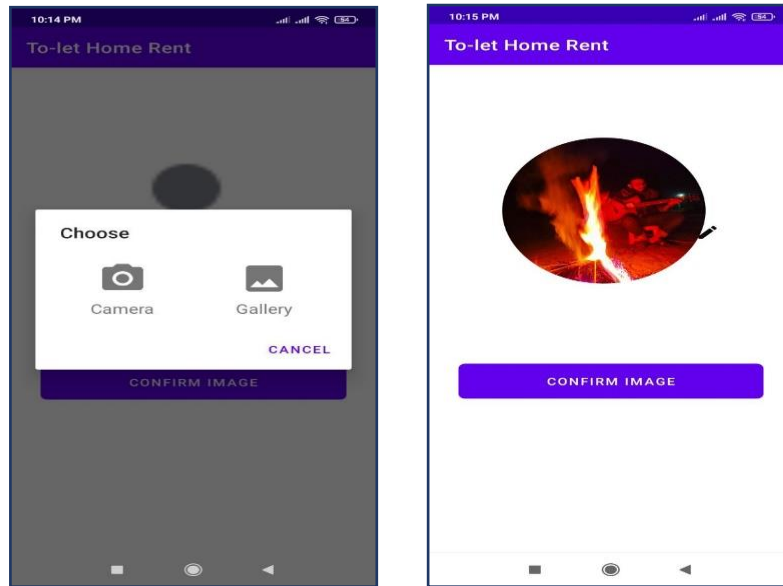
Figure 4.15: Profile picture change page

4.17 Delete Home Post Page

User can delete his post. He just need to go your post and then click the delete button to delete a specific post. Figure 4.16 shows the profile picture change page.
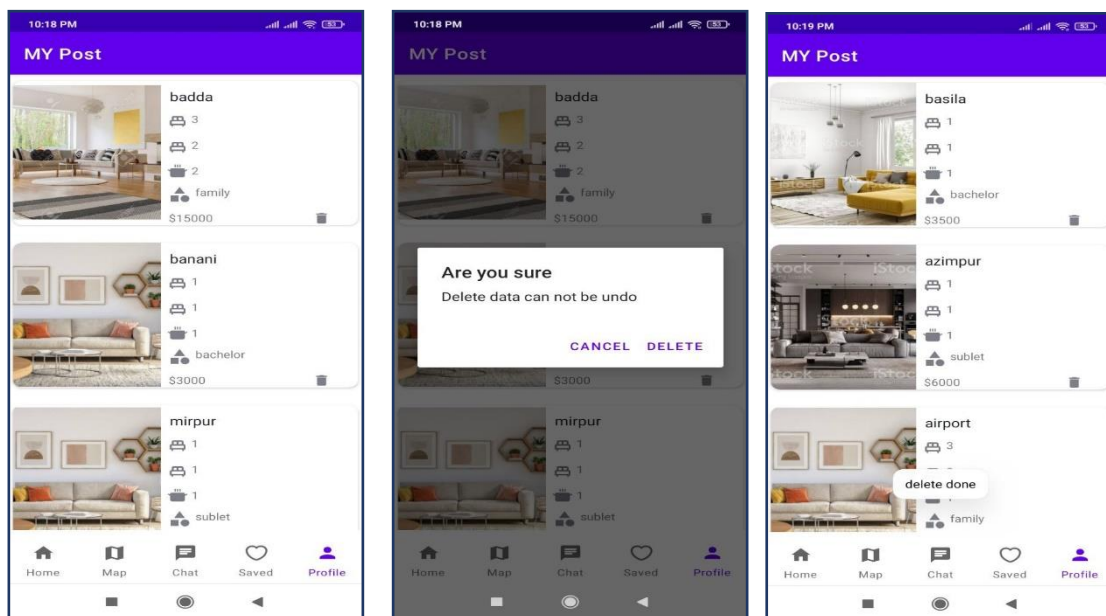

Figure 4.16: Delete home post page

CHAPTER 5

IMPLEMENTATIONAND TESTING

5.1 Implementation of Database

We use the Firebase database to store data and information for our projects. Firebase Database is a popular database and it is widely used in Android applications. Because the firebase real-time database is a cloud-hosted NoSQL database [8]. That lets us more and sync data and information between our users in real time. In our project, we go used authentication for registration by Gmail and password, and their time Database was used for other information aboutthe application.

5.2 Database Implementation Description

Here we going to discuss how the system works. In our To-let home rent app, there have many features like User information, home information, Location, Messaging, Calling, and so on. So, their information should be stored. Here we use this database to store and get the data in our app. In the firebase database, every data is stored in NoSQL form so here we cannot store data as a table format here we store data as a Jason object.

5.3 Firebase Authentication Page

In our app for secure unauthorize access, we need to authorize the user. Firebase database gives this option to us. In our project, we use firebase authentication to authorize our user. Figure5.1 shows the authentication page of our project.
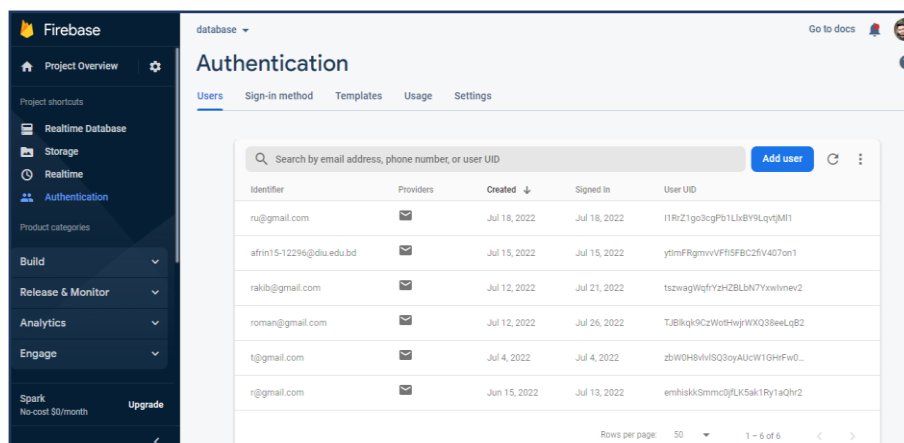

Figure 5.1: Firebase authentication

5.4 Real-time Database Page

In the firebase database, we store all the data that we have. We make some instances and all instances have sub instances where all info is saved. In firebase database we find a reference class which appears in the first when we create the firebase connection with our app. Then we create child under this reference. And into this child class we another create child class and give value. In our project we create six child of this reference class. This child hold individual child and we used to collect all the info and store call the info that we need.
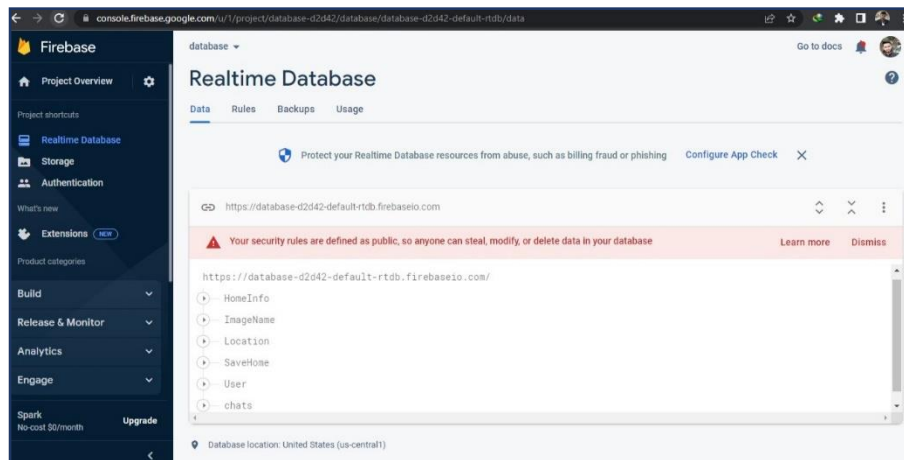

Figure 5.2: Real-time databasepage

- **HomeInfo Child**: In our project "HomeInfo" child store all the info of home that home owner post. Like home type, location, image, price and so on. We can easily then get and store all the info of home using this home info child.
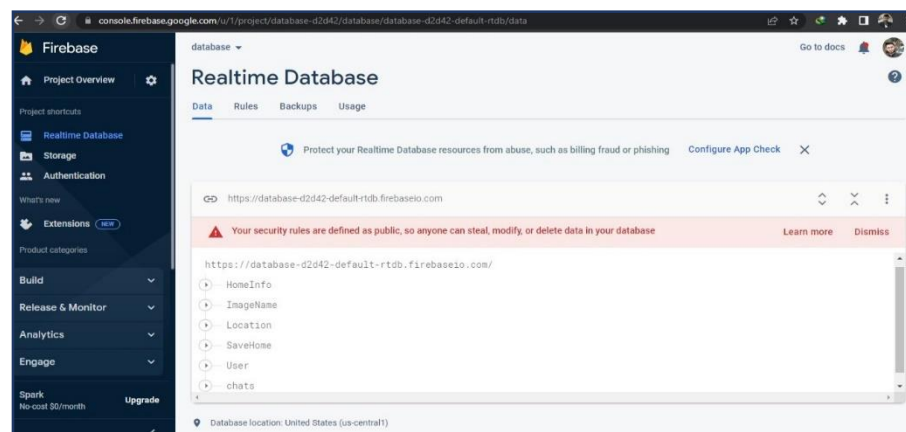

Figure 5.3: Home infochild

- **Location Child**: In our project "Location" child store all the info of location that given by home owner when they post there home. Here we use to store the longitude and latitude of the location. And all this info store into the sub-children of the location. We create these sub-children of this location child using the key of homeInfo child. For that every home post we find different child to store location.
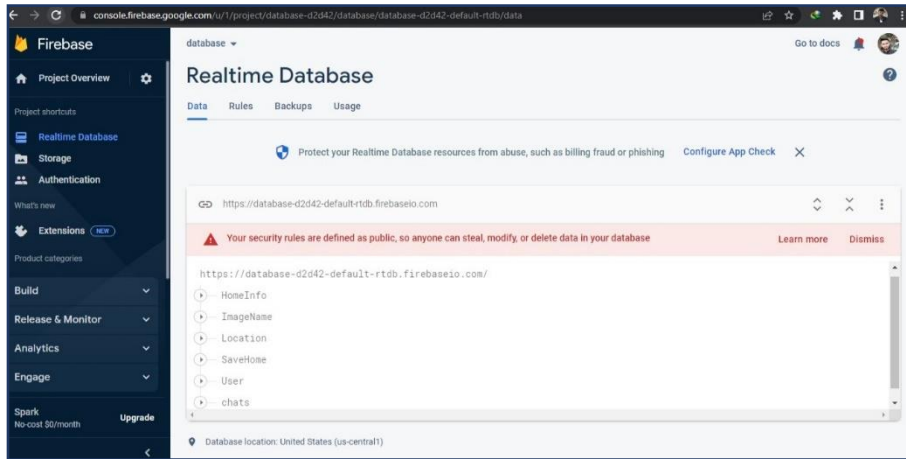

Figure 5.4: Locationchild

- **User Child**: In our project "User" child store all the info of User. When user signup in our app. There info will store in this user child. Here we store the user id that user for identify user in home info class to find out individual owner home post.
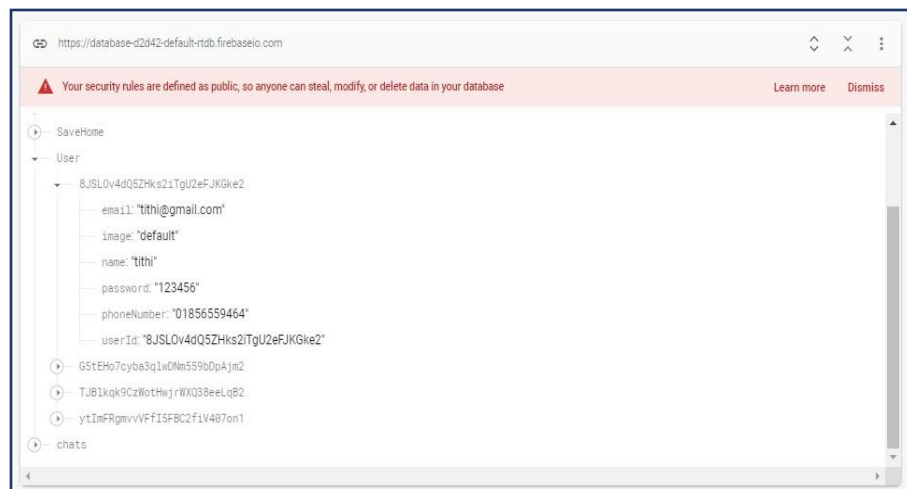

Figure 5.5: Userchild

5.5 Test Case

Our To-let Home Rent App has many features and options. To test our project, we need to check all the features and options of our application to see if all our options are working. We tested the options and compared them with the expected results.

Table 5.1: Test and Result

Test Case	Test Case Description	Test Data	Expected Result	Actual Result	Pass/Fail
1.	Check the response when valid email and password are entered	Email: riyad@gmail.com Password: 123456	Login Should be successful	Login was successful	Pass
2.	Check the response when invalid email and password are entered	Email: r@bdc.com Password:12	Give an invalid email message	Given an invalid email message	Pass
3.	Check the post-home response when all info is given for post home	Bathroom:1,BedRoom:2, Location: mirpur1, kitchenroom:1, Amount:8000, Type: Family.	Post Home should be successful	Post Home was successful	Pass
4.	Check the search home when locations are entered	Location: Mirpur-1	Home info should be given	Home info was seen successfully	Pass

5.6 Result

The final result we get is that our app works perfectly. All the function of our app works as required. The login and register function, post-home function, location function, and searching function are tests in the testing and as a result, all the functions work well and perfectly.

CHAPTER 6

ENVIRONMENT,SUSTAINABILITY, AND IMPACTONSOCIETY

6.1 Sustainability Plan

Sustainability for To-let Home Rent App is a judgment about whether the programs currently constructed will meet the demands of all users. In the future when the user will find enjoyment in using this application that time, they will find they have the required information when they need it. They will be easily used this to get home. We will make a team to maintain its database. So that in the future when it has a large number of users, it doesn't lose any data of users. We will take it a long way in our journey and make it a popular app in Bangladesh. As a result, the evolution will be held of Information and Technology.
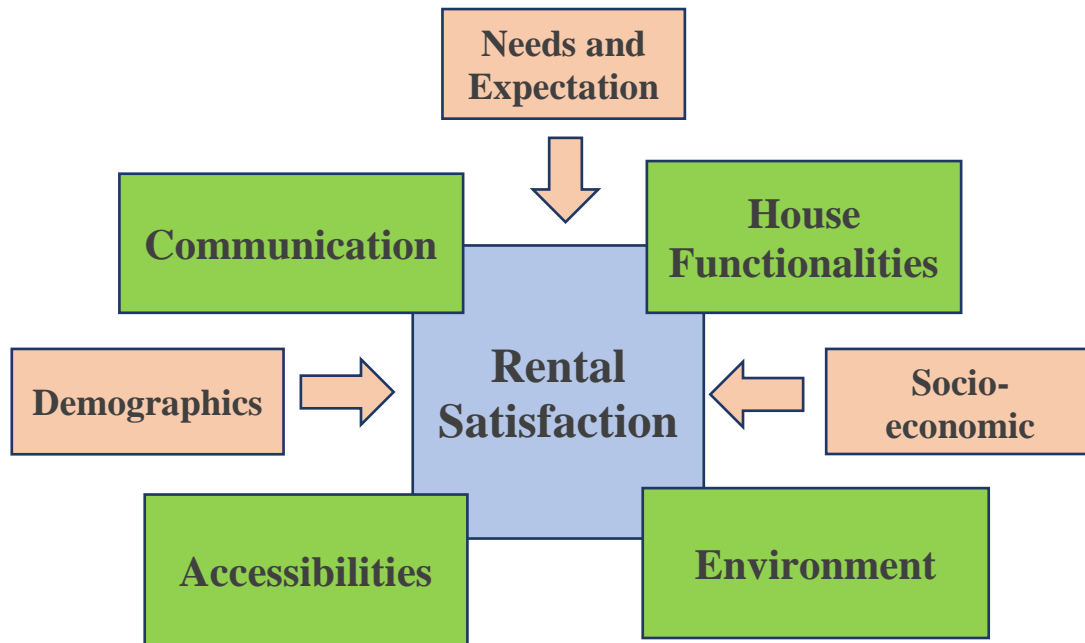

Figure 6.1: Sustainability Plan

6.2 Impact on Environment

This project will make a great effect on the social environment. This system is very easy and user helpful. Anyone can find their required home and information by using this application. It will help everyone to save valuable time. And use this time to develop our world. It is only a home rent app that can be used on the internet. So, there is no negative impact on the environment. It is a safer platform for all types of users. Our project will not have any negative impact on the environment.

6.3 Impact on Society

To-let Home Rent App can be used to find homes for rent. We think it can take a great impact to improve the use of information and technology which is a blessing for all of us in our society. On the other hand, it makes us depends on information and technology and as a result, we can be saved valuable time, and that time we can invest in other work. Also, it will make our life easy. It can see our society the importance of using information technology. So that we can say that, by using this application our society will not face any negative impact.

CHAPTER 7

CONCLUSIONAND FURTHERPLANNING

7.1 Conclusion

The present is the age of information technology. It is assumed that the industrial revolution has taken place in the past. What will happen in the present age is the revolution of information technology. And no country is lagging behind in this race. Every country has undertaken many important plans to enrich information technology. To make the government and people of our country happy with information technology, they are launching internet services and launching digital systems across the country from which people are availing their much-needed facilities. But people are now using the old way to rent theirhomes. Our app can ease this work. Adapting to something new is definitely a challenge. However, we hope that our application will definitely be beneficial for the people in rural areas. However, we will do our best to make it as user-friendly as possible.

7.2 Future Planning

We know that necessity is the mother of invention. We will first upload our app to the play store and then we will add more features if it gets proper attention. The future will be adding payment.

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