TO-LET: AN ANDROID APP FOR FINDING FLAT

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project titled **" To-Let: An Android App For Finding Flat "**, submitted by **Sartaz Islam, ID No: 153-15-6547** and **Md. Mahfujur Rahman, ID No: 151-15-5023** 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 and contents. The presentation has been held on **12th September, 2019.**

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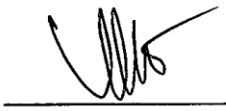

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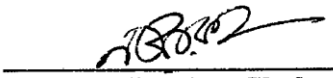

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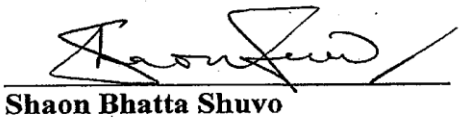

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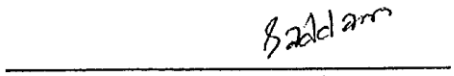

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We hereby declare that, this project has been done by us under the supervision of **Ms. Nazmun Nessa Moon, Assistant professor, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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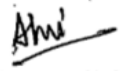

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Finally, we must acknowledge with due respect the constant support and patients of our parents.

ABSTRACT

The main purpose of this project is to save people's valuable time. Time is very important in our life. Everyone wants to save their valuable time. They don't want to waste their valuable time for searching houses. They always want everything easily. For earning money or other purposes people move from one place to another and waste their valuable time finding flats or rooms or hostel to live in a new area and for this situation their work is being hampered. Anyone can be new in a new area, a student, a businessman, an employee etc. and they need seat, flat, room or hostel to reside. This project presents an application named "To-let: An Android app for giving and taking rent" can help owner to give ads of their flat and to find flats for renters. This app can save the valuable time of people. In this app anyone can creat an account to their desired character for the purpose of giving rent or taking rent.

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CHAPTER 1
Introduction

1.1 Introduction

Temporary use of a house for a period of time with a fee is called house rental. It helps people to live in a comfort house because of their inability to built a house or other reason. They need other house to live in a comfort zone. So that they must need to contract a house owner. This is the toughest work to search a house owner manually. For this we made an application that will help people to search house online. This is a easy process to find a flat/room/hostel/seat. Don't need to go physically for search house. The online application will save time both of house owner and client.

1.2 Motivation

Time is very important in our life. Everyone wants to save their valuable time. They don't want to waste their valuable time for searching house. They always want everything easily. Our application will help to save time and decrease harassment. The owner of flat/house/hostel will be relaxed. They don't need to take extra pain to give and take rent. The owner can publish photos and several videos of his/her flat/house/hostel. And who will take rent house/flat/hostel he/she could see the advertisement. They will make communication with house owner. By this process both of them will be benefited and grateful.

1.3 Objectives

- To save people's time
- To find rooms easily
- To make scope of earning money for owner
- To increase interactions among people

1.4 Expected Outcome

Finally, the application is working very well. The entire system is organized by firebase. We are very positive for this unique work. Hopefully it will reach all over the country. People will be connected with this application. They will know about the use of the system. People will be benefited from this system. Hopefully people will accept it positively.

1.5 Report Layout

In chapter 1 we have discussed about the introduction, motivation, objectives and expected outcome of our project. In chapter 2 backgrounds of our project has been discussed. We have highlighted the other related works and made comparison with our app and the scope of the problem and challenges of the project. Chapter 3 is all about the requirements like business process modeling, the requirement collection and analysis, the use case model of the project and their description, the logical data model and the design requirements. How we have designed the project, Front-end design, back-end design, interaction design and UX and the implementation requirements have been discussed in chapter 4. Chapter 5 contains the implementation of database, front-end designs, interactions, test implementation and the test results of the project. In chapte 6 we discussed about the conclusion and the scope for further developments which pretty much derive about the project.

CHAPTER 2
Background

2.1 Introduction

The application is applying a gorgeous design on a system and making the system fascinating enough to increase the people's involvement without any extrinsic force. The thought behind this came from the concept of social communication. It is mainly popular for being used in the social media widely to trigger people's engagement.

2.2 Relative Work

To-let isn't a new idea. But there is no good work about it. Many people tried to upgrade this system but didn't complete the work. There are many application about this found in google play store. But all of those aren't qualitative.

By TODIM method of an application to the multi criteria rental evaluation of residential properties LFAM Gomes from European Journal of Operational Research in 2009 [1]. In the city of Volta Redonda, Brazil. Elsevier This article represents an evaluation study of a residential properties carried out together with a real estate agents. The aimed of the study to define a reference value for the rents of these properties using the TODIM method of Multi criteria Decision.

2.3 Comparative Studies

We have used in our To-let app real time firebase and easy user interaction design. This app is basically for local areas. We have used more categories than previously developed other To-let apps. We have put the scope of giving lots of photo of rooms. We have also added the RAJUK Approval Authentication facility in our app. User will also be able to check the facilities of the rentable rooms and flats.

2.4 Scope of the problem

This project traverses a lot of areas ranging from business concept to computing field, and required to perform several researches to be able to achieve the project objectives. Field study of this application was more tough. At the very first time we have faced a lot of problems. some of those are shortage of data, shortage of accuracy, shortage of man power, shortage of investor. But now we have overcome this problems.

2.5 Challenges

Challenges are very common feature in an application. We have to go through some challenges. One of them is connection of database. What type of data will be generated that was very difficult. Another is user friendly of application. Finally we overcome the challenges. Database is synchronized and the user interface is very friendly. Hopefully, everyone will handle the application easily.

CHAPTER 3

Requirement Specification

3.1 Business Process Model

This is the graphical representation of any organization's business workflow to identify the developments.

It can be done by flowchart, data-flow diagram etc. Here we can see a renter can show interest to owner's add by calling or booking rooms or flats and owner can upload pictures of room, flat, seat etc. Business process model of To-let app is given below:

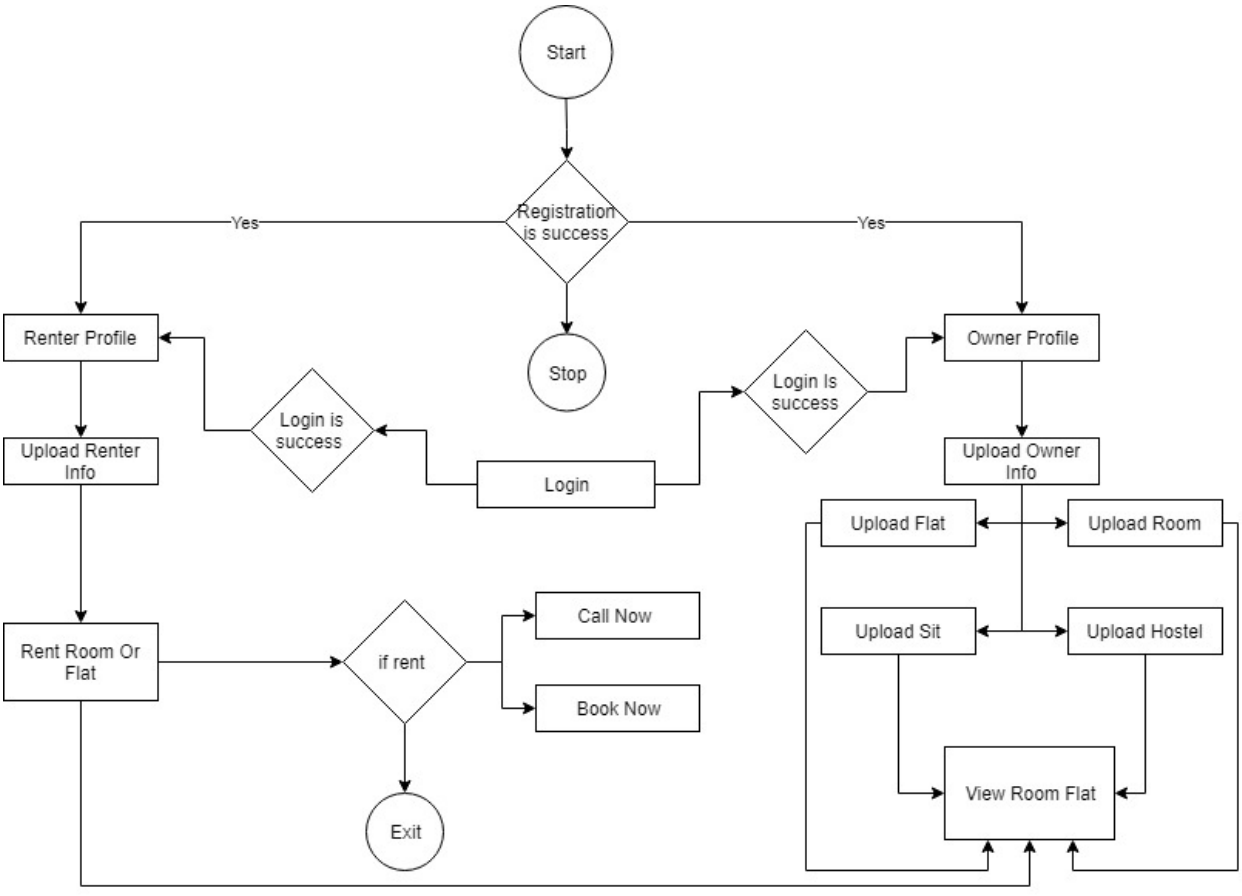

Figure 3.1 Business Process Model for To-Let app

3.2 Requirements Collection and Analysis

To develop a system there can be used software or hardware. Here I have used lots of logics, coding languages, software and an android phone to get my app done. For this I required:

- Cooding languages
  - JAVA
  - XML
  - Firebase studio
- Software IDE
  - Android studio
- Hardware
  - Any android Phone

Analysis

In this busy world time is a valuable entity. And for earning money or other purposes people move from one place to another and waste their valuable time finding flats or rooms or hostel to live in a new area and for this situation their work is being hampered. Anyone can be new in a new area, a student, a businessman, an employee etc. and they need seat, flat, room or hostel to reside. So discovering this problematic situation we have planned to make a easy way to find residence to keep pace with this busy world without hampering the work.

3.3 Use Case Model

It is used to simplify any model by graphical image and consists of a number of model components. To describe the proposed functionality use case model is most useful. Figure 3.3 shows the graphical depiction of how To-let app:

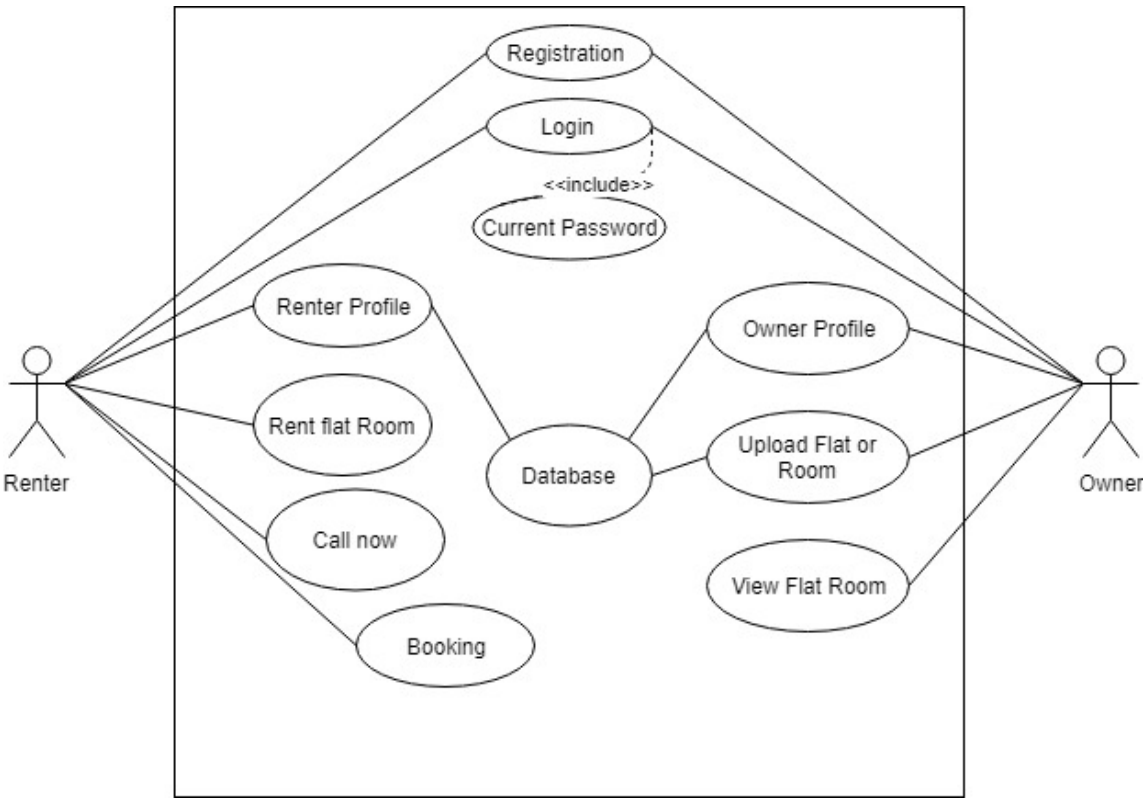

Figure 3.2 Use Case Model for To-Let app

3.4 Logical Data model

It shows that how the entities are related and act with each other. This is also called the ER Diagram. It requires the entities, their attributes and relationships among the entities. For To-let app logical data model is given below in figure 3.4

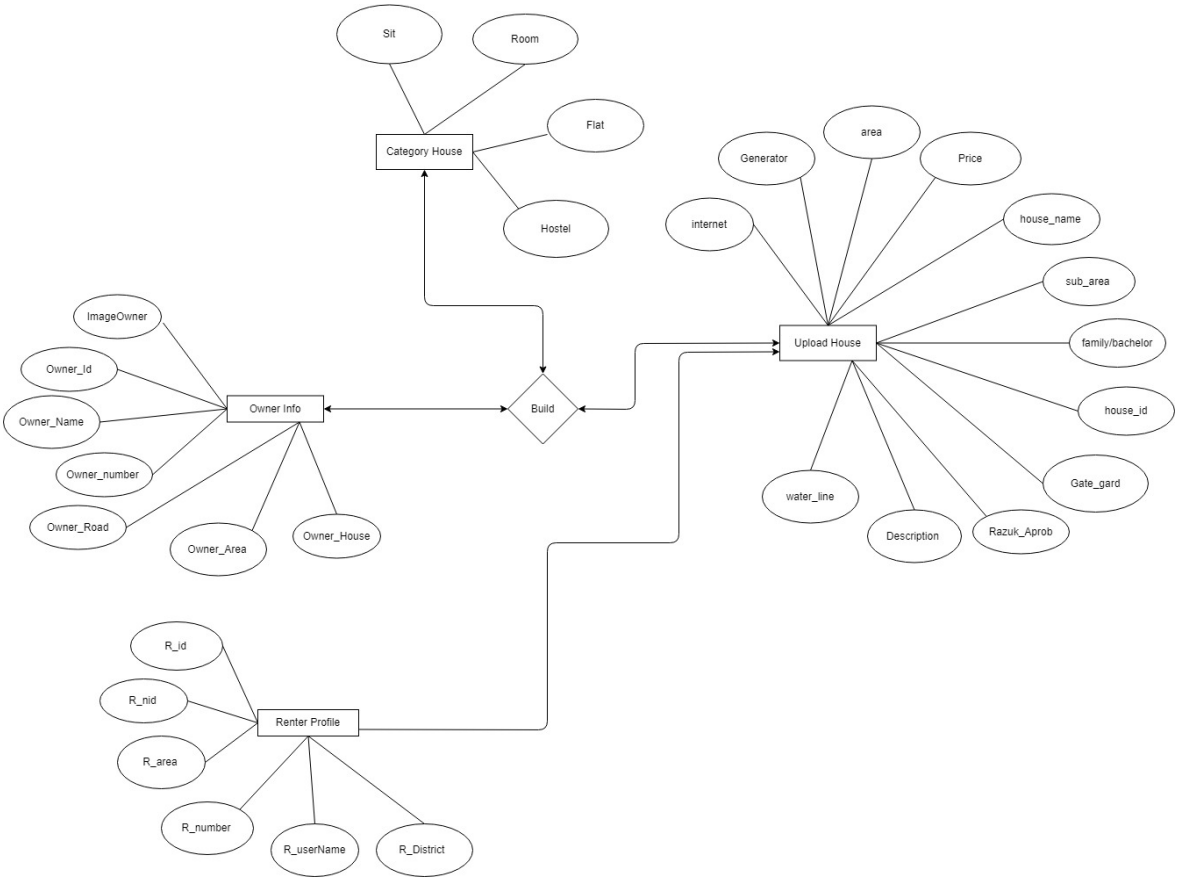

Figure 3.3 Logical Data Model for To-Let app

3.5 Design Requirements

We have kept some factors in mind while developing the app. We have tried to design this app in a way that user can easily handle this app and get the desired or expected outcome using this app. For this we tried to make this app system compatible, efficient and user friendly.

CHAPTER 4

Design Specification

4.1 Front-end Design

Front-end design works for the visual part of an application and with help of this a user can interact with the application. Here for a user the main thing is the front-end design [2]. In the sense of the coder it means the languages put together to set the UX of an app.

To have a good experience for a user a app needs to be user-friendly and understandable. So, I tried to make this app user-friendly so that the user can easily understand and use it.

Here XML has been used to make the user interface. To-let has many pages. So, there were a lot of designing part for different purposes for both the owner and the renter.

Screenshot is given below in figure 4.1.

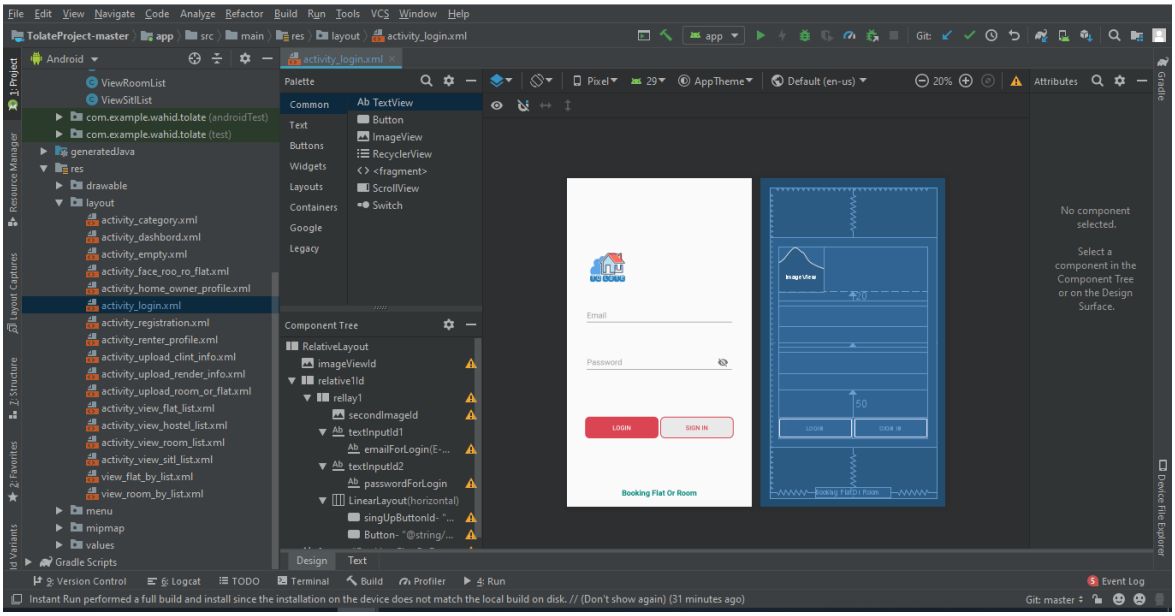

Figure 4.1 To-Let User Interface in Android Studio

I have used XML language For visualization of user interface and the code is given below in figure 4.2

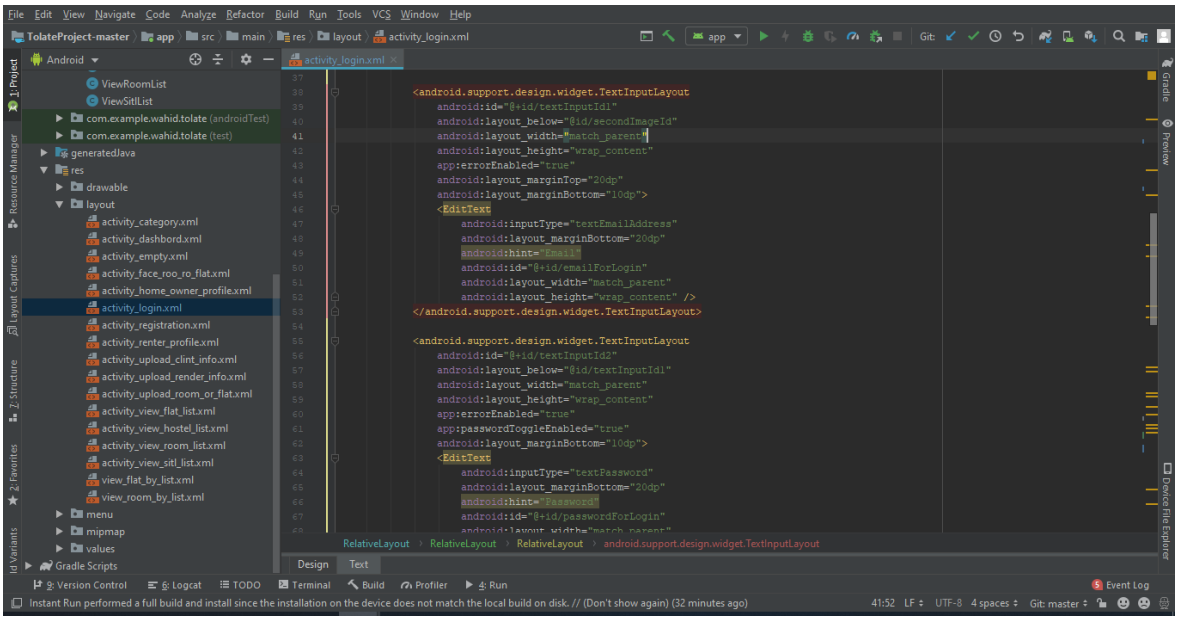

Figure 4.2 User Interface Starting page XML Code

To make this design work I had to use JAVA code and the screenshot is given is figure 4.3

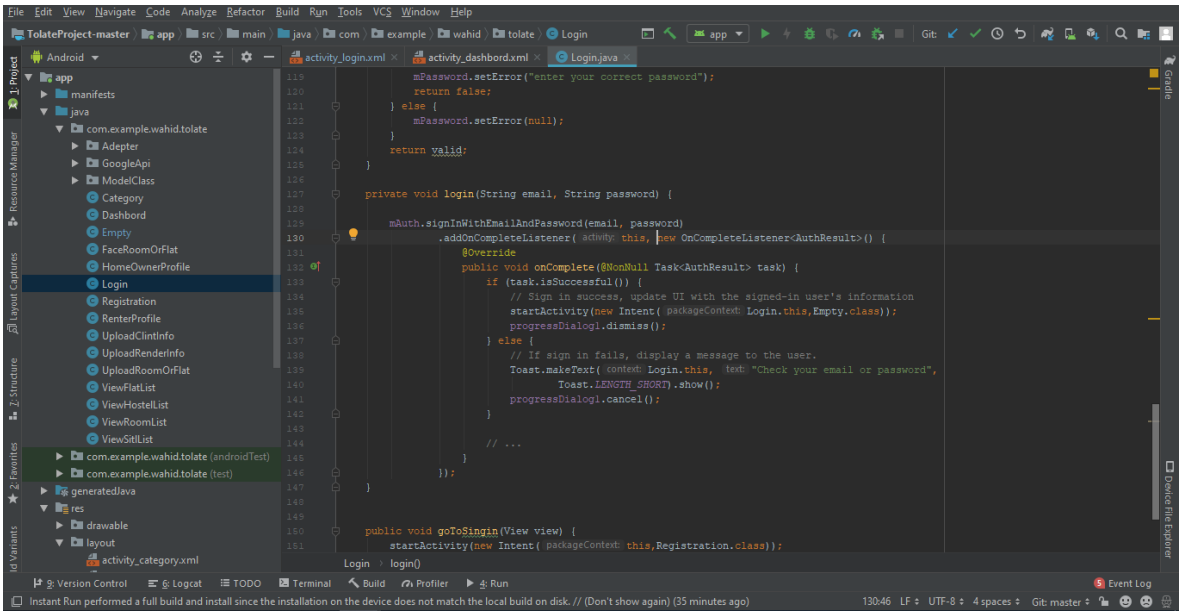

Figure 4.3 User Interface Starting Page JAVA Code

After signing in some data will be asked by the application and the desing of the page is like below in figure 4.4

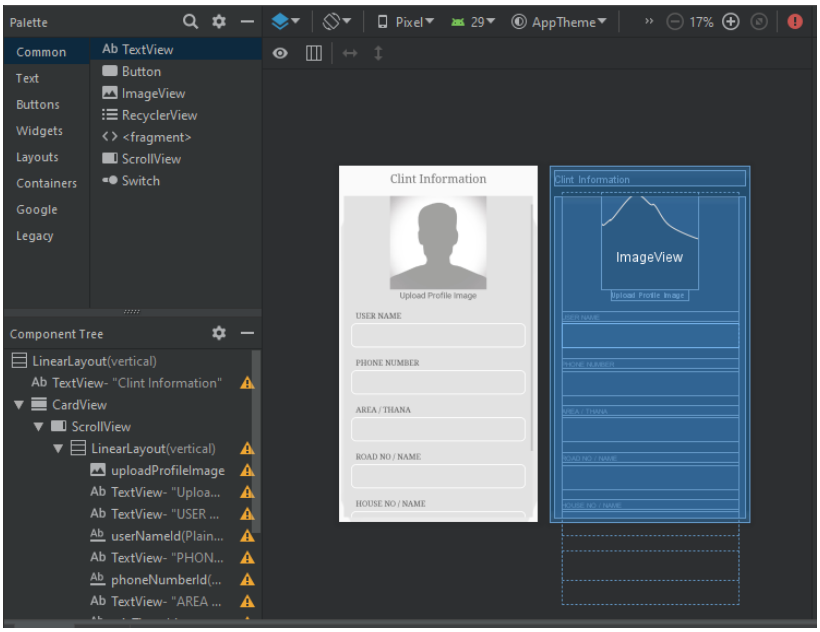

Figure 4.4 Information Page Design in Android Studio

To make this design visual XMLlanguage has been used and the coding part for this XML is given below in figure 4.5

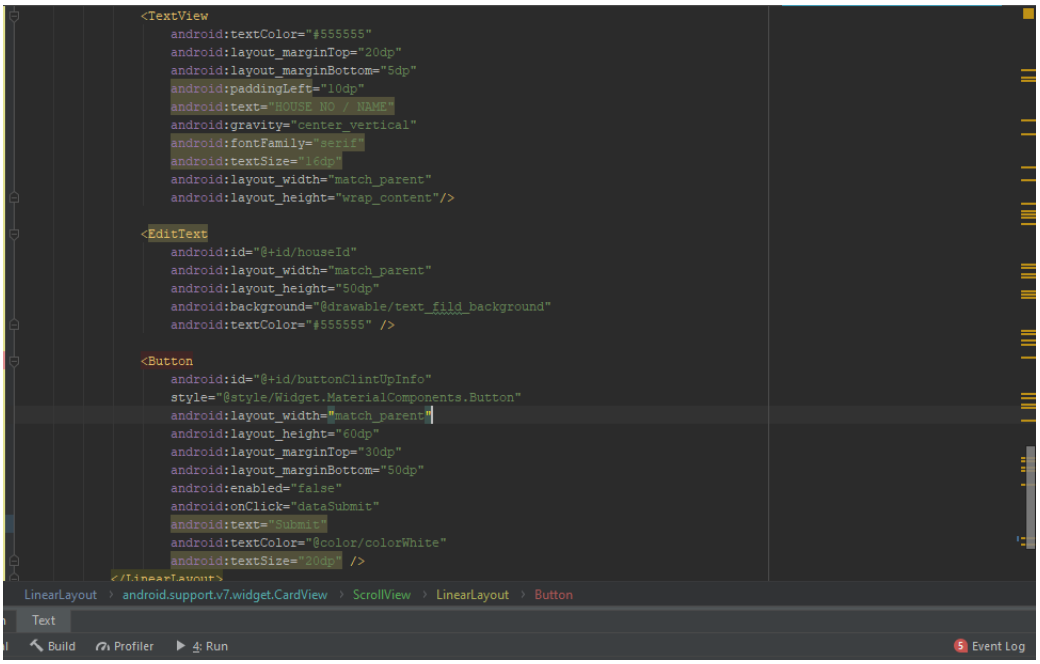

Figure 4.5 XML Code for Information Page in Android Studio

And the Java code to make the above XML language work is given below in figure 4.6

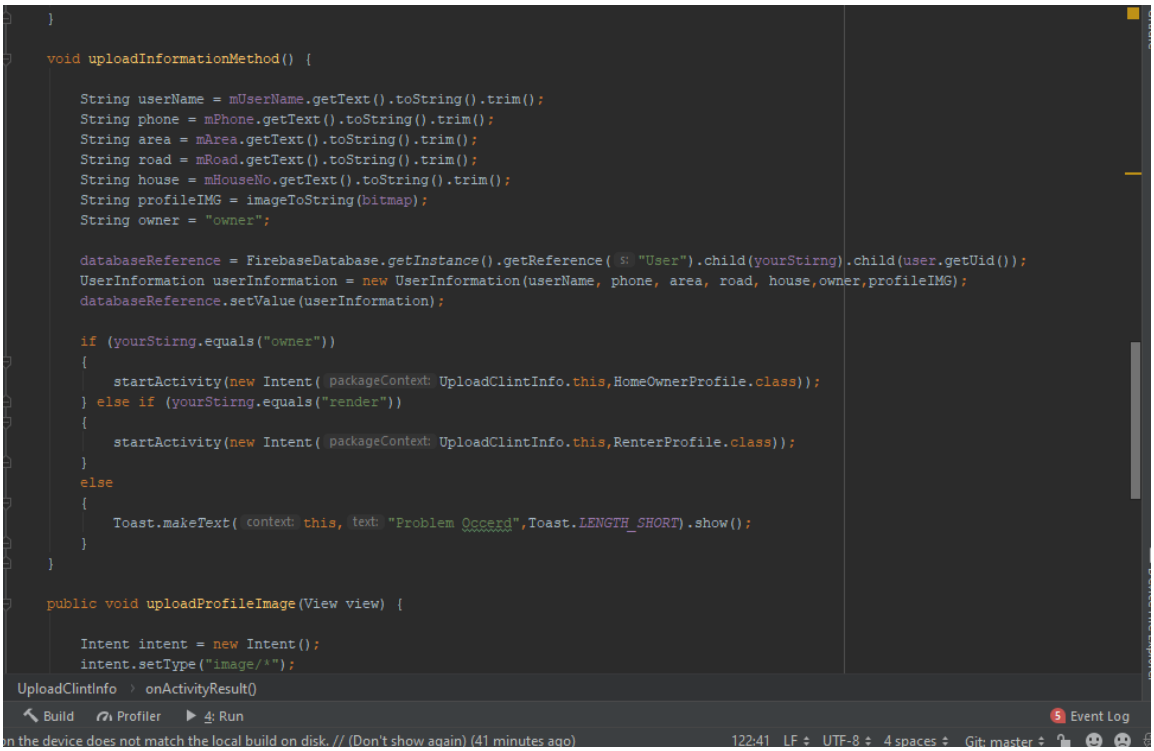

Figure 4.6 JAVA Code for Information Page in Android Studio

But this is not the end of the project design. There are still so many codes for designing this application.

4.2 Back-end design

Main work of this app is occurred by back-end design .It is the most important part of this app. All logic of this app is here. Saving or displaying logic of back-end part data is given part to part. To develop and maintain the back-end section I have used Firebase database in my app [3] which is given in figure 4.7.

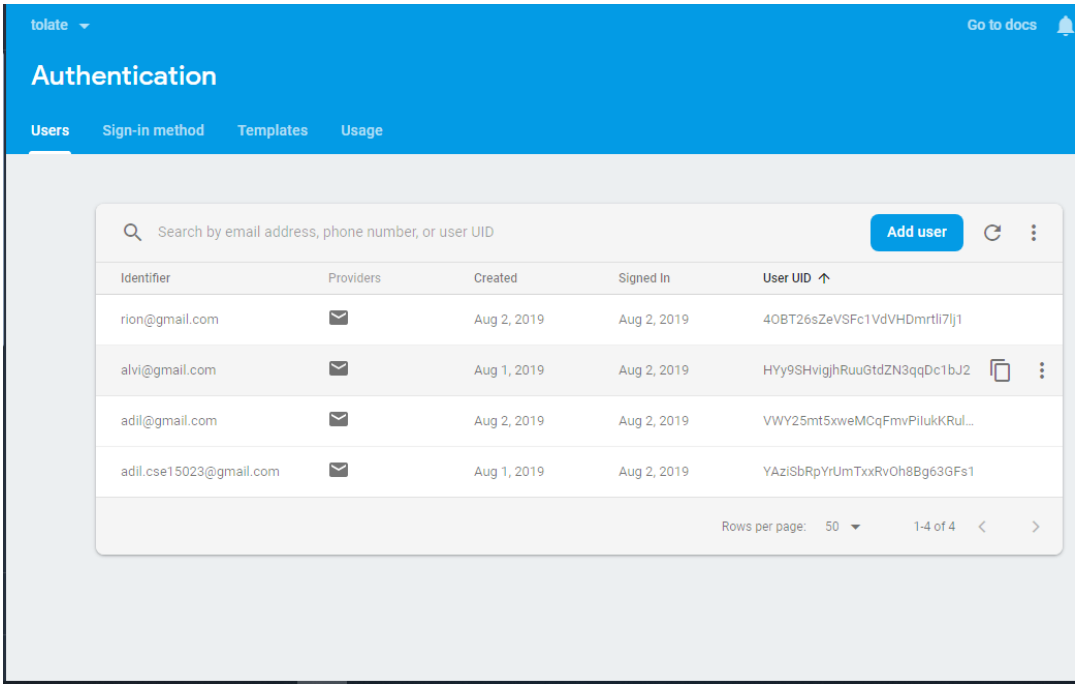

Figure 4.7 Firebase Authentication Page

The vital part is database where we have used two entities, owner and renter, shown in figure 4.8.

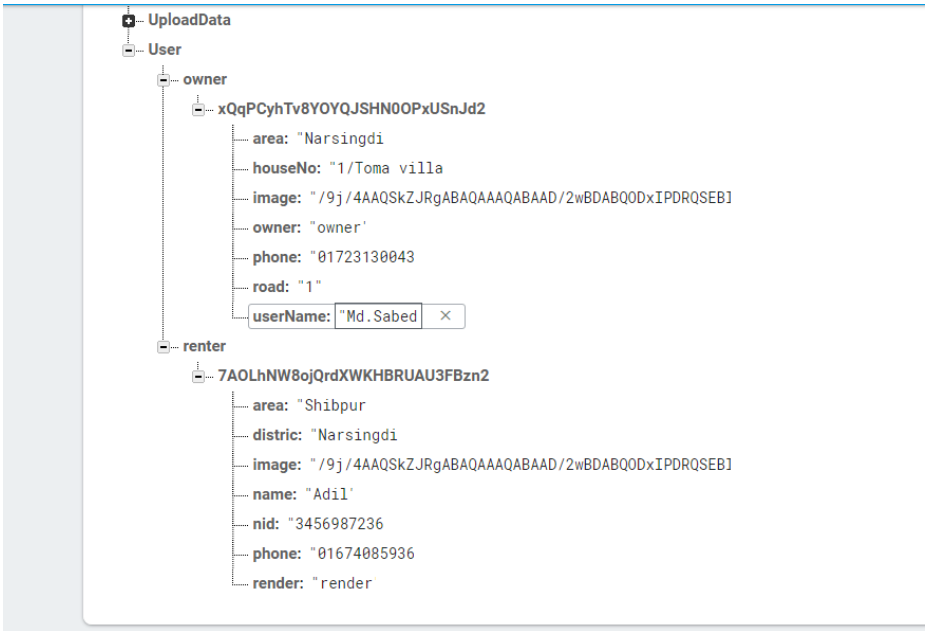

Figure 4.8 Firebase Database Page 1

This is a different database system which includes owner and renter entities that shown in figure 4.9

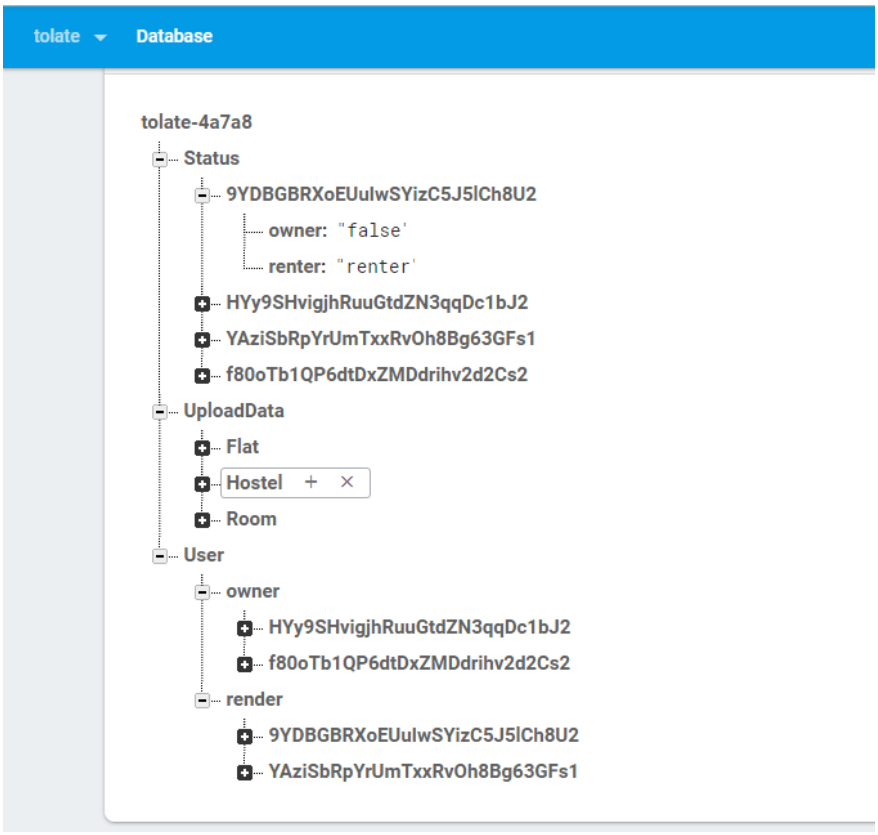

Figure 4.9 Firebase Database Page 2

4.3 Interaction Design And UX

Interaction design focuses on the procedure of interaction between user and technology. To use a app friendly or easily and to understand the interaction desing of the app has to be so cleared and easy to understand by user.

And UX means user experience and this factor is also important as interaction design.

Keeping these factors in mind we have tried to make our application simple and user friendly so that users can use this app easily for their purpose.

4.4 Implementation Requirements

This app is an android app and for developing this app we have used some software such as

Android studio IDE

It is a full package for developing android apps. I have used android studio version 4.2.0.

Android SDK

It is a software development kit that helps to create applications for the android platforms [4].

It has some useful tools such as source code, development tools, an emulator and useful libraries to develop android apps.

Firebase

Firebase frees developers to focus crafting fantastic user experiences [5]. By the means of firebase users can modify the datastore and do not have to be bothered of writing ApIs. I have used if for handling the back-end of the app.

The Emulator

It is a virtual android operating system that helps developers to use various versions of android to debug and test an android app [6]. I have tested my app to check whether it is run or not on a physical device.

CHAPTER 5

Implementation Results And Testing

5.1 Database Implementation

Firebase frees developers to focus crafting fantastic user experiences [5]. By the means of firebase users can modify the datastore and donot have to be bothered of writing ApIs. I have used it for handling the back-end of the app.

My app's fatabase has mainly tro parts, one is for owner and the other is for renter. These two part carry huge data for the whole app.

Here for both owner and renter signin code is given below which is shown in figure 5.1.

```
    mAuth.signInWithEmailAndPassword(email, password)
            .addOnCompleteListener( activity: this, new OnCompleteListener<AuthResult>() {
                @Override
                public void onComplete(@NonNull Task<AuthResult> task) {
                    if (task.isSuccessful()) {
                        // Sign in success, update UI with the signed-in user's information
                        startActivity(new Intent( packageContext: Login.this,Empty.class));
                        progressDialog1.dismiss();
                    } else {
                        // If sign in fails, display a message to the user.
                        Toast.makeText( context: Login.this,  text: "Check your email or password",
                                Toast.LENGTH_SHORT).show();
                        progressDialog1.cancel();
                    }
                }
            });
    }

    @Override
    public void onStart() {
        super.onStart();
        // Check if user is signed in (non-null) and update UI accordingly.
        FirebaseUser currentUser = mAuth.getCurrentUser();
        updateUI(currentUser);
    }
    private void updateUI(FirebaseUser currentUser) {

        if (currentUser!=null)
        {
            startActivity(new Intent( packageContext: Login.this,Empty.class));
            progressDialog1.dismiss();
        }
    }
```

Figure 5.1: Firebase and Java

5.2 Implementation of Front-End Design

After the implementation of all functions and features, the application was installed and so run on an android cellular phone. It works perfectly. The details are briefed below:

At first, a welcome activity takes places, Here is some text fields and two buttons. One is Login and another is Signup.

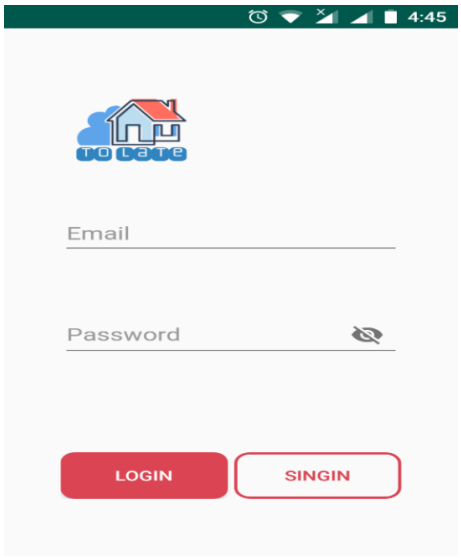

Figure 5.2: Sign-in Page

If user have account then he/she will go for login. Otherwise he/she has no account then he/she will go for signup button to create an account.

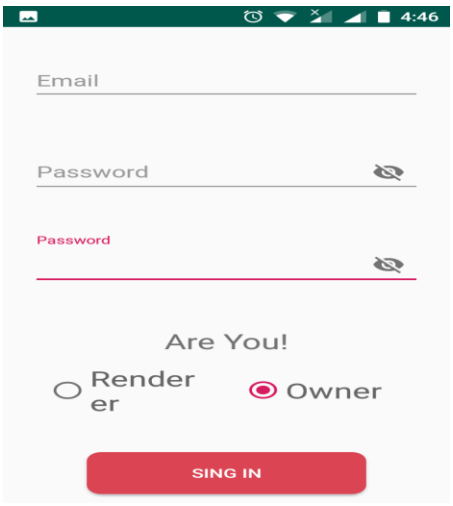

Figure 5.3: Registration Selection

After creating an owner account, this profile appears to the window. The profile contains with a profile picture, name, contact number, email, address etc.

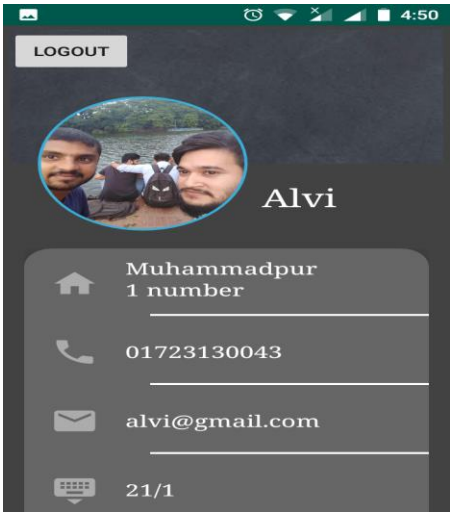

Figure 5.4: Home Page for Owner

In here owner will publish his/her advertisement like this.

Figure 5.5: Owner Ad Page

Owner can be specified his criteria like this process.

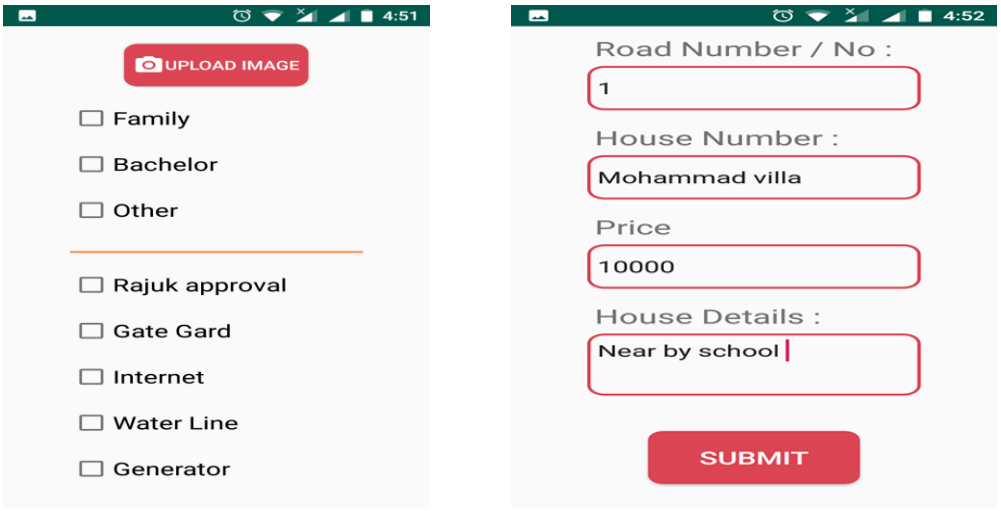

Figure 5.6: Rent Information giving Page

A renter also can be create an account like an owner. Here is an account of renter.

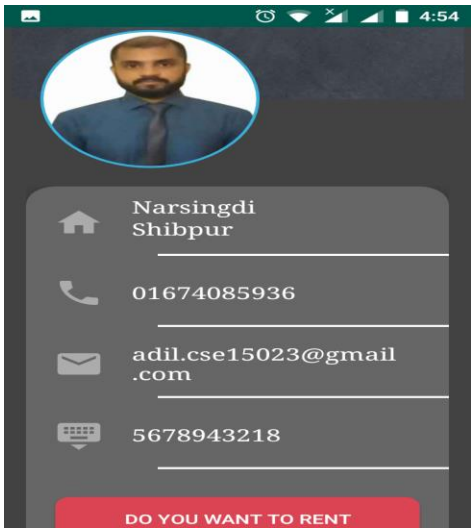

Figure 5.7: Renter Home Page

A renter can see advertisement like this. Here is full specification of house/flat/room/hostel/seat.

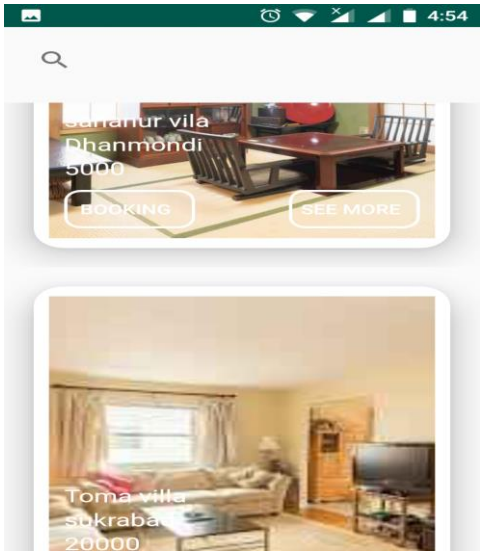

Figure 5.8: Ad Searching Page

A renter can search for place by typing name and budget amount also.

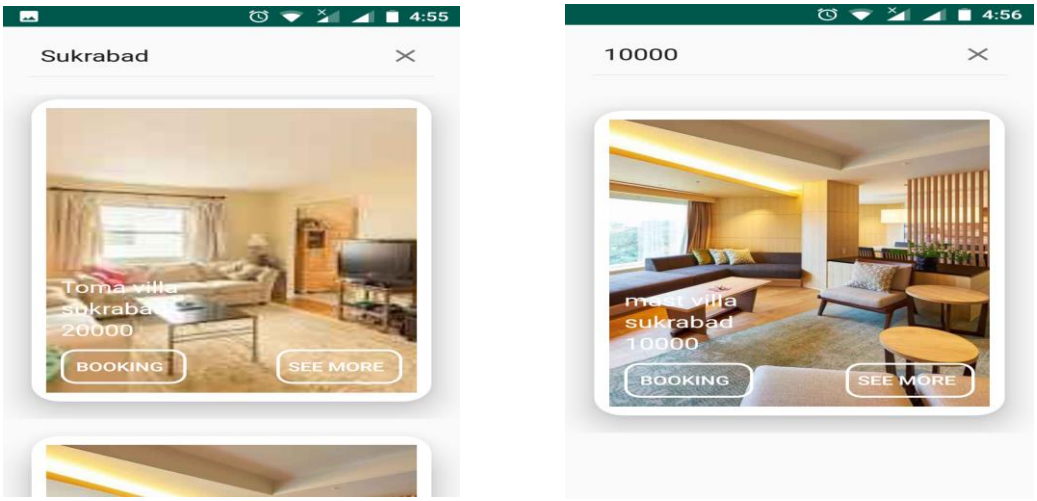

Figure 5.9: Ad Searching Page

A renter can call or booking this add by this process.

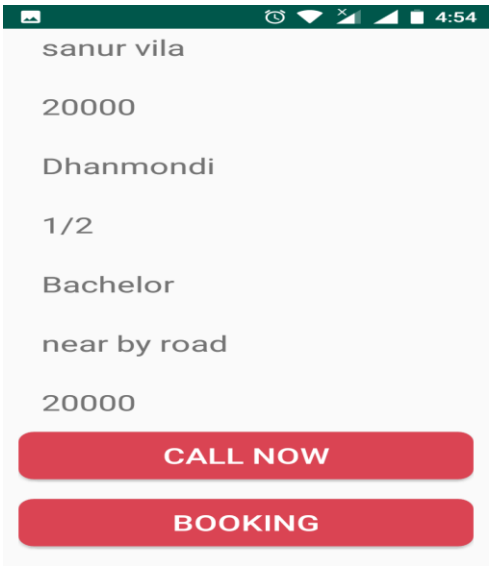

Figure 5.10: Contacting / Booking Page

Here is the all procedure to rent a house/flat/hostel/seat.

5.3 Implementation of Interactions

To make an app more used the app has to be more interactive. To make an app it requires some material design with user friendly system. For a convenient system the design should include good icon and beautiful text font with some good designed button.We have tried to make our application more interactive to the users. So, we made the system responsivefor a better user experience by using good icons with good text font and button.

5.4 Testing Implementation

This is the process of testing the implementation of a system. It is a way to understand whether an application is working well as expected or not. Our Testing implementation table is given below in table 5.1:

Table 5.1: Testing Implementation

No	Tested Case	Test Input	Expect Outcome	Actual Outcome	Result
1	Registration	Register as Owner	To successfully register	Registration complete	passed
2	Registration	Register as renter	To successfully register	Registration complete	passed
3	Sign-in	Enter email and password to enter the system	To enter the system	Entered the system	passed
4	Sign-in	Enter non-registered email and password	To not let in the system	Didn't enter the system	passed
5	Upload Pictures for Ad	Select Picture and Upload	To show Pictures	Picture shown	passed
6	Searching for flat or room	Input area, amount	To show related Ads	Related Ads shown	passed

5.5 Test Results and Reports

We have checked our application to find out whether it works as we expected or not. So the testing results will make us understand the limitations of our system and help us to improve it. We tried to test every function we used in this app to make the app successful one.

We have tested our To-let app many times with different android phones to check that it works successfully or not. And finally it worked perfectly as we expected on every device.

CHAPTER 6

Conclusion And Future Scope

6.1 Discussion and Conclusion

This app is a useful tool for users those who don't have enough time to go to places ,find and book flat or room.

This app also works for both owner and renter. Both are being benefited by using this app. In this app the renter can directly call the owner for booking flat or rooms.

6.2 Scope for Further Developments

We have also plan for further improvement and adding more features in this app such as:

- Video record system
- Google map for more accuracy of locations
- Add rating and report system.

REFERENCES

[1] Ren, P., Xu, Z., & Gou, X. (2016). Pythagorean fuzzy TODIM approach to multi-criteria decision making. *Applied Soft Computing*, *42*, 246-259.

[2] “What is the difference between front end and back end development”. [Online].

Available: https://bn.quora.com/.

[3] “Front End vs. Back End Mobile App Development: Learn what you need to know in 5 minutes”. [Online].Available: https://julyrapid.com.

[4] “Android SDK”. [Online]. Available: https://www.webopedia.com.

[5] “What is Firebase”. [Online]. Available: https://howtofirebase.com.

[6] “Run Apps on the Android Emulator”. [Online]. Available: https://developer.android.com.

[7] “Build Your First App”. [Online]. Available: https://developer.android.com.

APPENDIX

APPENDIX A: PROJECT REFLECTION

This is about project reflection. From Summer 2018 we have started our journey to make our application.

The main Facility of our application is to search and book flat, rooms etc. easily.

This app also allows anyone to give ads of flat or room which are approved by RAJUK . Firstly we build a flowchart model of our application to understand how it will flow step by step and after many hard work and spending time behind it finally we reached our destination.

This “To-let” app will be very useful for both the owner and renter. And as our application is comparatively better than other similar applications “To-let” will be a very helpful application for it’s users.

to-let

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