

SMART BARIWALA

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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 “**Smart Bariwala**”, submitted by **Tahmid Ferdous**, ID No: 161-15-6966 and **Bayazid Miah**, ID No: 161-15-7063 and **Md Shakil**, ID No: 161-15-7307 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 (BSc) and approved as to its style and contents. The presentation has been held on 04.11.2019

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DECLARATION

We hereby declare that this project has been done by us under the supervision of **Most. Hasna Hena, Senior Lecturer, 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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We would like to thank our entire coursemate at Daffodil International University, who took part in this discussion while completing the course work.

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

ABSTRACT

The goal of this project is to help the house owners & renters to work with their problems in a more easy and efficient way. We used the Android Platform to make our Android app. In our app by using send bill feature owners can send monthly bill receipts to the renters so that renters can get bill receipts by using this app. Using a to-let system owner can post an advertisement for his empty flats and the renters can search the area to find the nearby homes. Another feature of this application is a panic button if there is any problem in the apartment & it should be used when any problem occurs. Since the security system of our country's house is not good enough, so that panic button will be very helpful for safety. The renters can complain to the owners if they have to face any kind of problem of the flat by using the complaint box feature. The complaint box will help the owner to let him know what's the problem of renters.

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CHAPTER 1

Introduction

1.1 Introduction

“Smart Bariwala” application will help a house owner to do his work smarter way, this application also helpful for renters and those people who search for homes. Owners and renters both of them can add their information. By using the to-let system the owner can post his advertisement and the renters can find the place by search area name. After search area name renters can get those areas advertisement after that renters can contact the house owners who gave that Ad and booking flats. Owners can send bill receipts to the renters, after send the bill receipt if the owner finds any mistake in the receipt then he can edit it and send it again and If owners have any notice, he can send it to the renters. The panic button should be used when any problem occurs. It should be pressed three or four times to alarm. If renters have any complaints, they can send complaints to the owners and the owner can get renters complains solve those issues. The owner also can delete complains.

1.2 Motivation

It's really hard for renters to find empty flats for them and it's also time-consuming. On the other hand, for owners sending bill receipts is also time-consuming. So that's why we motivated to make this app. Our motivation is to help the owners & renters to work with their problem in a more easier and efficient way, this application will be helpful for who are searching for homes, Since the security system of our country's house is not good enough, so that panic button will be very helpful for safety, that's why we were motivated to work with this application.

1.3 Objectives

1. To-let
2. Bill receipt
3. Notice
4. Panic Button
5. Complain Box

The owner can post an advertisement for his empty flats and the renters can search the area to find the nearby homes by using the to-let system. Owners can send monthly bill receipt to the renters so that renters can get bill receipt. House owners can send notice to the renters. The panic button should be used when any problem occurs. If renters have any complaints they can complain to the owners.

1.4 Expected Outcome

- The difficulty in searching for homes will be decreased.
- The owners and renters will be able to do their works in an easier way.
- The relationship between owners and renters will be good
- The security of a home will be increased.

1.5 Report Layout

Chapter 1: This is all about the introduction of our project. In this chapter Introduction, Motivation, Objectives, Expected Outcome and Report Layout are described.

Chapter 2: Is all about the Background of the project. In this chapter Introduction, Related Works, Comparative Studies, Scope of the Problem and Challenges are described.

Chapter 3: Is all about the Requirement Specification of our project. In this chapter Business Process Modeling, Requirement Collection and Analysis, Use Case Modeling and Description, Logical Data Model, and Design Requirements are described.

Chapter 4: Is all about Design Specification of the project. In this chapter Front-end Design, Back-end Design, Interaction Design and UX, and Implementation Requirements are described.

Chapter 5: It's all about Implementation and Testing. In this chapter Implementation of Database, Implementation of Front-end Design, Implementation of Interactions, Testing Implementation, and Test Results and Reports are described.

Chapter 6: In this chapter Conclusion and Future Scope are described.

CHAPTER 2

Background

2.1 Introduction

We used the android platform and android studio to make the ‘Smart Bariwala’ app. Android Studio is the official integrated development environment (IDE) for Android application development. It is based on the IntelliJ IDEA, a Java integrated development environment for software, and incorporates its code editing and developer tools. And for the database, we use the Firebase database. Its Real-time provides a real-time database and backend as a service. The service provides application developers an API that allows application data to be synchronized across clients and stored on Firebase's cloud. Build apps fast, without managing infrastructure. Firebase gives you functionality like analytics, databases, messaging and crash reporting so you can move quickly and focus on your users.

2.2 Related Works

We had searched on the internet and google play store and we found many apps like

- Smart Home Management System
- Smart Living
- Smart House Cloud
- Smart Home Controller
- Smart Home Automation
- Smart Home Solution

We install those apps and we saw there are many features like AC, Lights, Fan, Door controller, Smoke detector, Camera streaming, and many other advantages. But we could not find our features in those apps without the to-let feature. There are many apps in google play store about to-let and we found some website that provides a to-let advantage. We also provide a to-let advantage in our apps. So, we can say the only to-let feature is related to other works.

2.3 Comparative Studies

There are many apps about smart home management system. Those apps are IoT (Internet of Things) based apps. It interweaves sensors, connected devices, networking, cloud, and analytics elements that can be combined in countless ways to yield new applications. But our apps are not IoT based apps and we could not find our features in those apps without to-let features. There are many apps in google play store about to-let and we found some website that provides a to-let advantage. We also provide a to-let advantage in our apps but our to-let UI is not similar. Those apps have many features like AC, Lights, Fan, Door controller, Smoke detector, Camera streaming, and many others advantages and our apps features are to-let advantage, send bill receipt to the renter's advantage, send notice advantage to the renters, send complaints to the owner advantage and panic button.

2.4 Scope of the Problem

One of the problems we faced is that Software Fragmentation. Google launched a fresh edition of Android every year with a different new set of properties and improvements. But the pace at which the newly released editions of Android is accepted is extreme show. So, we found it hard to develop a claim with the same set of features for current as well as old versions of the Android operating system.

2.5 Challenges

The major challenges we have faced to develop “Smart Bariwala” application is

- Software fragmentation
- Device fragmentation
- Absence of Standard User Interface for Android
- Programming Language
- Increasing App Visibility, Patent and Copyright Issues
- Hardware Features
- Lack of Uniform UI Design Rules
- API Incompatibility
- Security Flaws

CHAPTER 3

Requirement Specification

3.1 Business Process Modeling

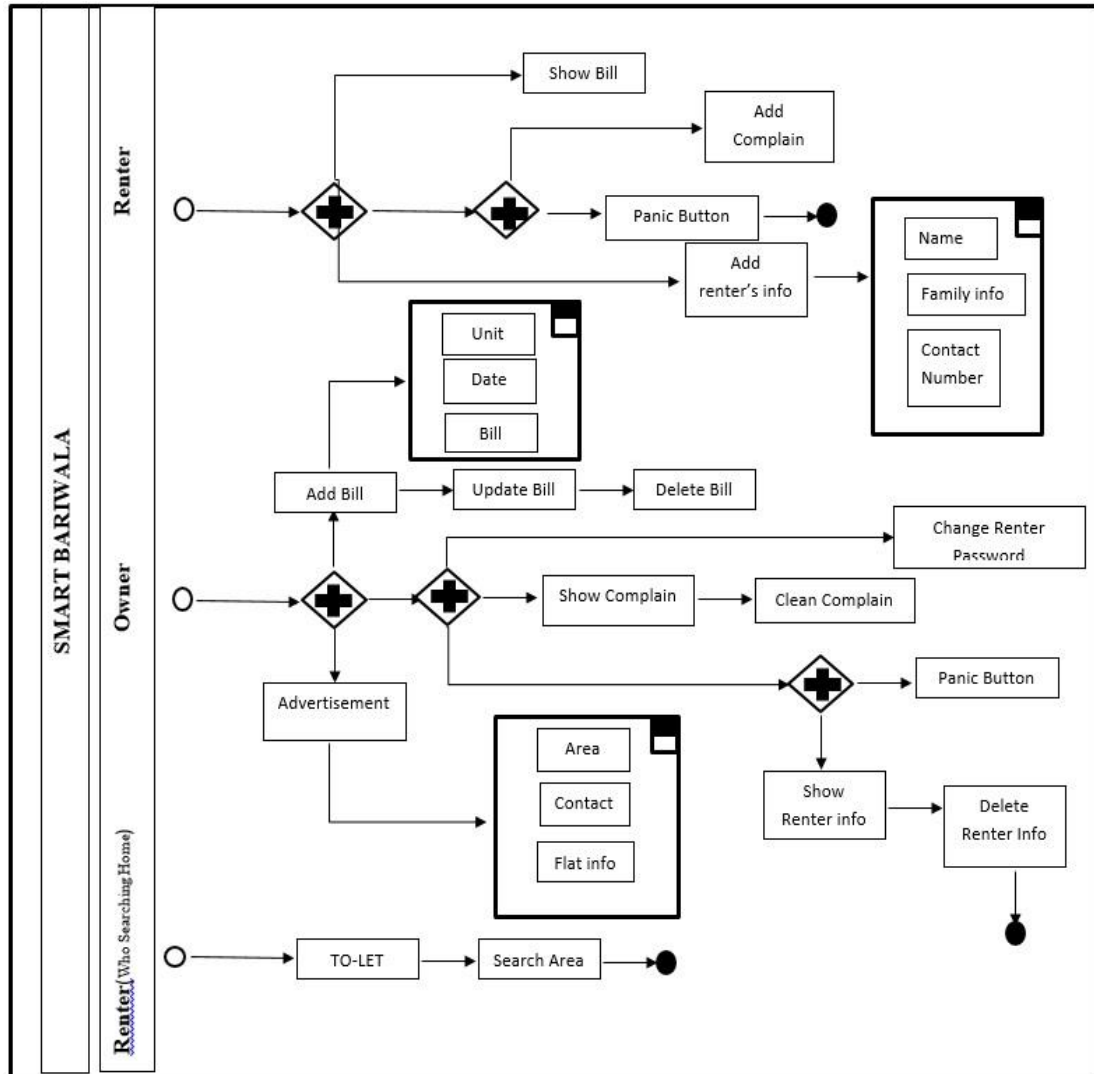


Figure - 3.1 Business Process Modeling [Image Source: [5]]

3.2 Requirement Collection and Analysis

Our project is about Android applications. We used the android platform, To Design an application like 'Smart Bariwala' application some components like text field, edit text, password field, and button, will be needed to form a registration form for an account. A database system will be required to store information details of all registered accounts. Different button for different activities is needed also which can take a user from one activity to another activity. For example, add a bill, Panic Button, Add complain and Show complain.

3.3 Use Case Modeling and Description

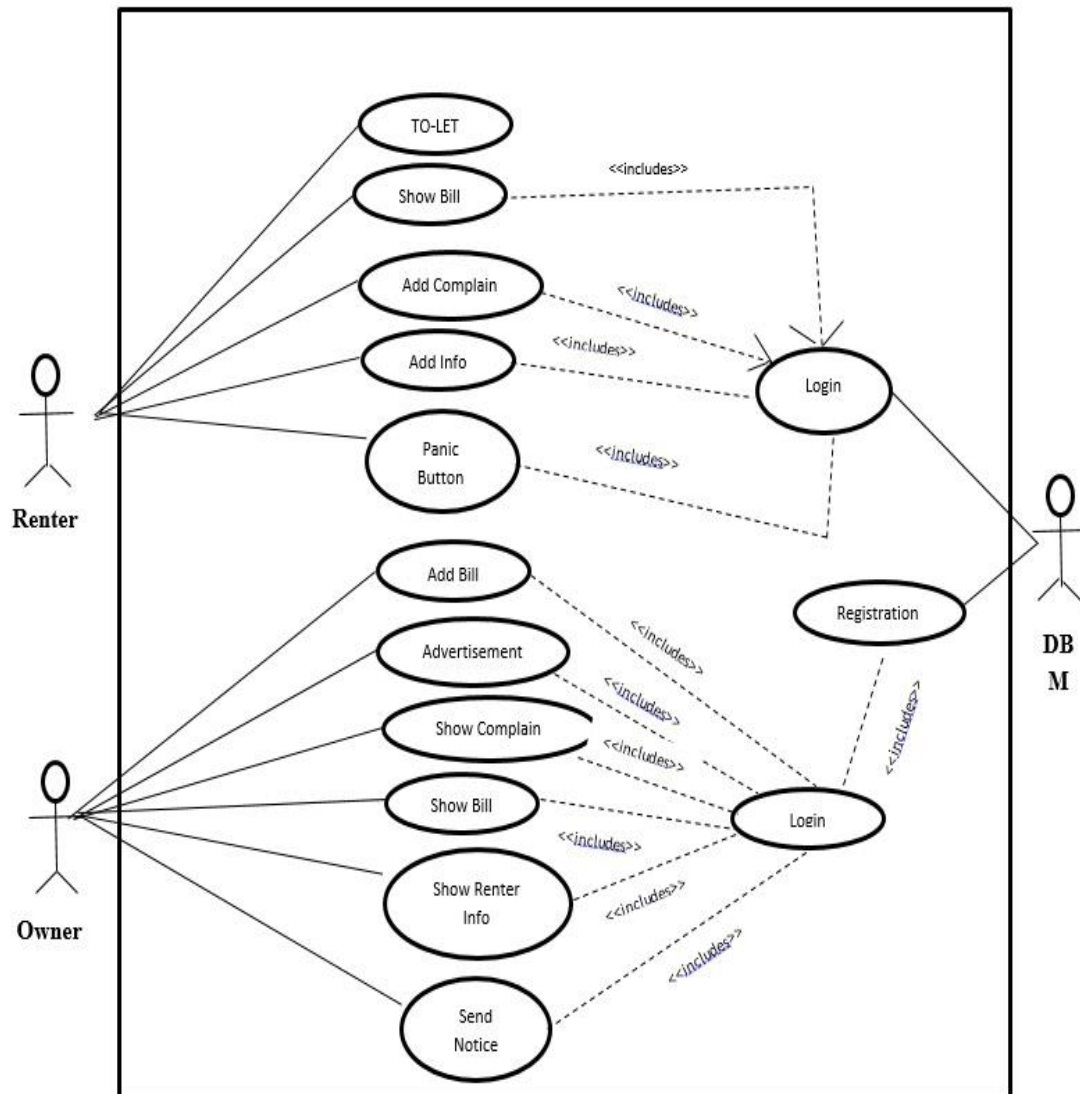


Figure - 3.2 Use Case Modeling [Image Source: [6]]

3.4 Logical Data Model

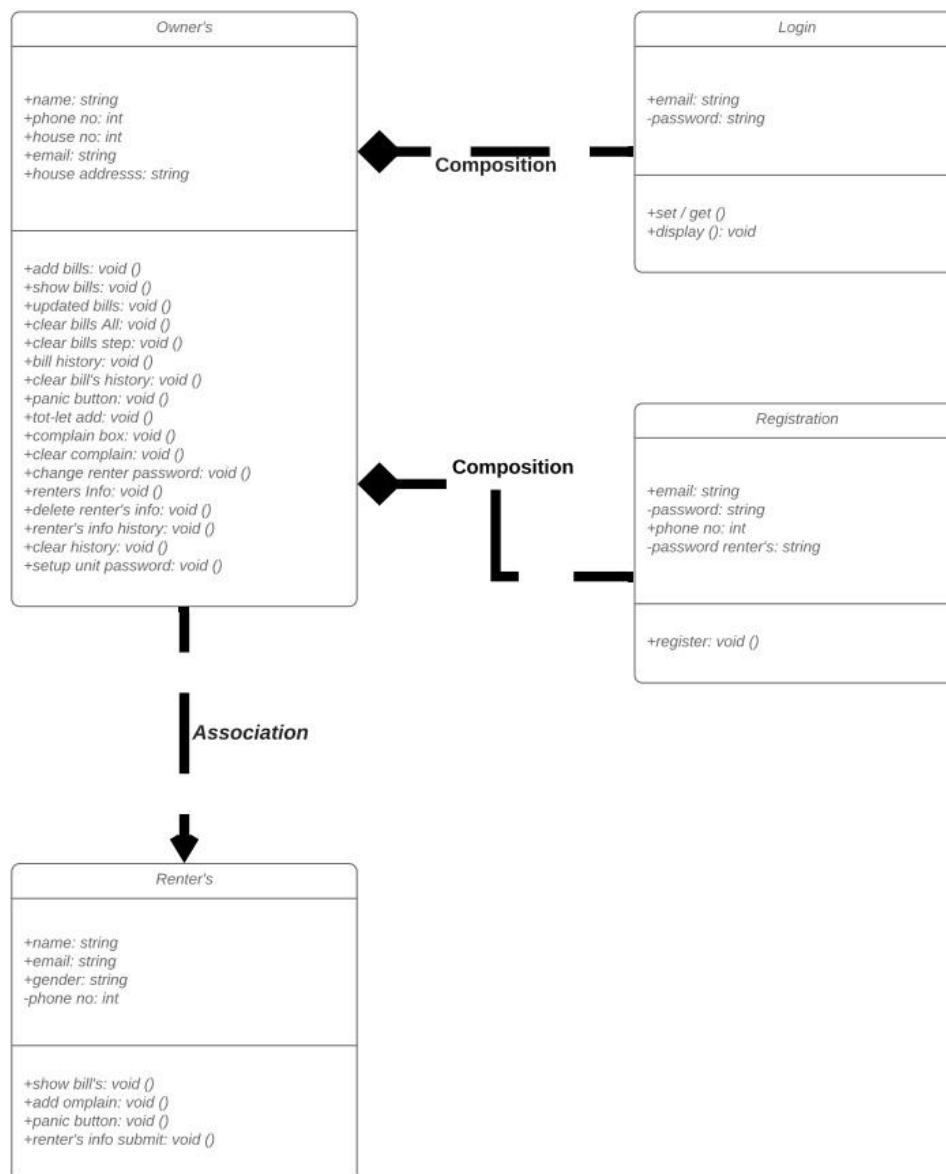


Figure - 3.4 Logical Data Model [Image Source: [4]]

3.5 Design Requirements

To interact with mobile application some components would be necessary for the user interface. To Design an application like ‘Smart Bariwala’ some components like text field, edit text, password field, and button, etc. will be needed to form a registration form for an account. A database system will be required to store information details of all registered accounts. Different button for different activities is needed also which can take the user from one activity to another activity. For example, Add bill, Panic Button, Add complain, Show complain.

CHAPTER 4

Design Specification

4.1 Front end design

For our application project, we used XML to design the app layouts. Extensible Markup Language (XML) is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.

The design goals of XML emphasize simplicity, generality, and usability across the Internet. It is a textual data format with strong support via Unicode for different human languages. Although the design of XML focuses on documents, the language is widely used for the representation of arbitrary data structures such as those used in web services [1].

Unlike Java (which is Back Bone of your app), XML helps you to design your app, how it will look, how components like buttons, text view, etc. will be placed and their styling. Apart from these, XML is also used for parsing data either from a database or server into your android app. (XML parsing).

4.2 Back end design

For our project backend design/Implementation we used “Java Language” for programming.

Java is a programming language that produces software for multiple platforms [2]. When a programmer writes a Java application, the compiled code (known as bytecode) runs on most operating systems (OS), including Windows, Linux, and Mac OS. Java derives much of its syntax from the C and C++ programming languages.

4.3 Interaction design & UX

Our goal was to make the application system easier and efficient for users. We tried to keep the interface lite and easier cause if it's lighter then it will be supported by most of the lower devices easily and there will be fewer lag issues.

4.4 Implementation requirement

For implementation purposes, we did this following requirement,

- Lite and easier XML designs.
- Efficient java coding.
- Efficient conditions to handle the application.
- Firebase database and algorithms for faster fetch of data.
- Logical coding algorithms.

CHAPTER 5

Implementation and Testing

5.1 Implementation of database

In our full application, we've used the "Firebase Database" system cause it's faster and easier to handle. Here is an image of our database file performed by our android devices.

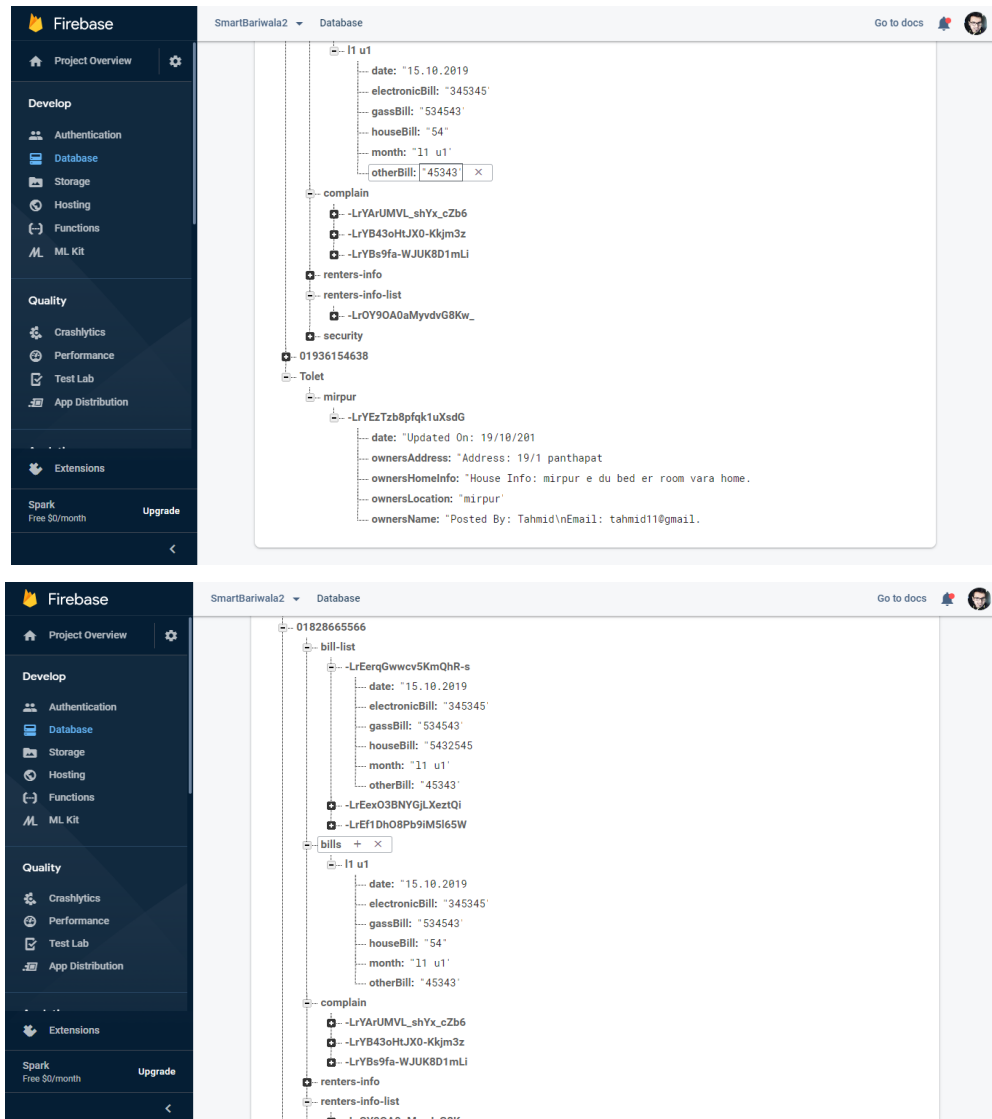


Figure -5.1 Implementation of database

So, it's our file format from the database that was performed by our devices to save in the database. We've implemented these lines to save data in the firebase database. Right

here we can see a code of validation and how data saved in the database using the setValue() method.

```
if (view.getId() == R.id.addRentersComplain)
{
    String unit = "Unit: "+unitComplain.getText().toString();
    String date = "Date: "+dateComplain.getText().toString();
    String complain = "Complain: " + complainDescription.getText().toString();

    if (unit.length() < 7)
    {
        unitComplain.setError("Available for renters only");
        unitComplain.requestFocus();
        Toast.makeText(getApplicationContext(), text: "Available for renters only", Toast.LENGTH_SHORT).show();
        return;
    }

    if (complain.length() < 12)
    {
        complainDescription.setError("Please insert valid description");
        complainDescription.requestFocus();
        return;
    }

    String key = databaseReference.push().getKey();

    RenterComplainAddConstructor constructor = new RenterComplainAddConstructor(unit,date,complain);
    databaseReference.child("complain").child(key).setValue(constructor);

    Toast.makeText(getApplicationContext(), text: "Complain sent successfully", Toast.LENGTH_SHORT).show();

    finish();
}
```

Figure -5.1 Part of a code of this application

This is how we implemented the data to get and set in the database & we've used a single dataSnapshot() method to get the data from firebase and for multiple data in arrays we've used adapters and constructors and other methods to fetch them [3].

5.2 Implementation of front-end design

Here is all implemented in the description of our application.

The Front Page/Login Page

1. Sign in Page

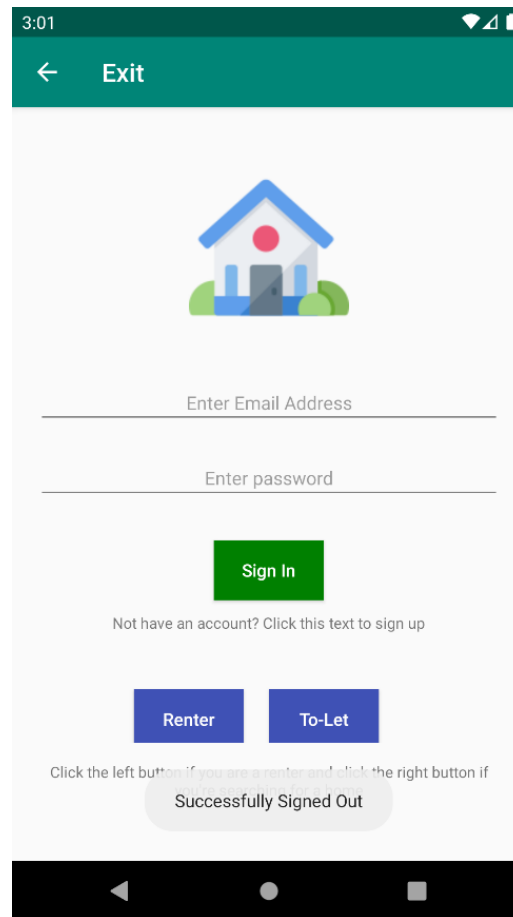


Figure-5.2 Sign-in Activity

It's the first activity of the application where the homeowner needs to write his email and password to access this app. The "Sign in" button is the button for accessing the app. If he does not have an account then he needs to press the text "Not have an account? Click here to sign up".

The next button "Renter" is for the renters of the home and "To-let" is for them who are searching for homes.

2. Sign Up page

The owner needs to open an account if he needs to use this application.

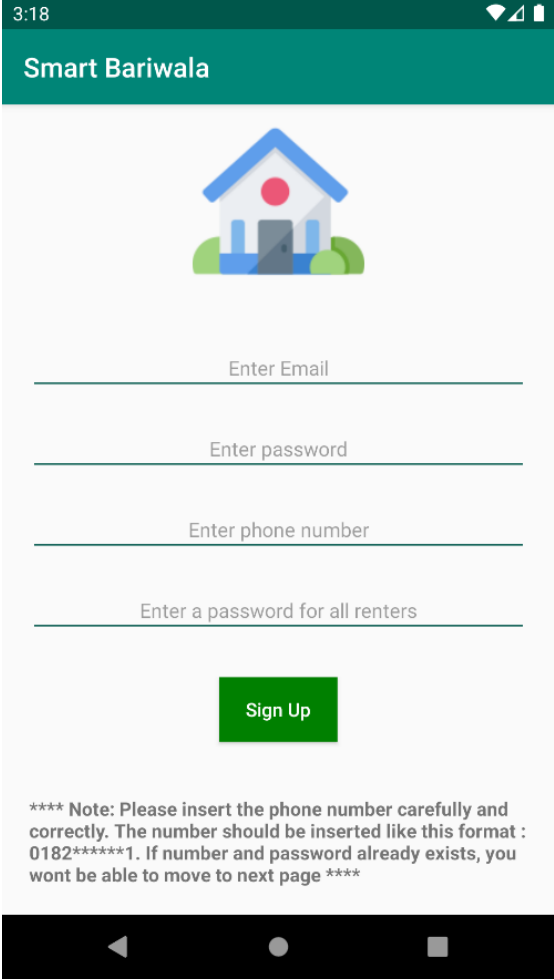
A screenshot of a mobile application's sign-up screen. The app is titled "Smart Bariwala" in a teal header. Below the header is a house icon with a red dot on the roof. The form consists of four text input fields with labels: "Enter Email", "Enter password", "Enter phone number", and "Enter a password for all renters". Below these fields is a green "Sign Up" button. At the bottom, there is a note in small text: "**** Note: Please insert the phone number carefully and correctly. The number should be inserted like this format : 0182*****1. If number and password already exists, you wont be able to move to next page ****". The screen is framed by a black Android navigation bar at the bottom.

Figure-5.2 Signup Activity

The owner needs to write his email id, a new password for his account, his personal phone number and lastly, he needs to set a password for renters. There is a security note available for him “Note: Please insert the phone number carefully and correctly. The number should be inserted like this format 0182*****1. If number and password already exist, you won’t be able to move to the next page”.

There is a validation step for every insertion. If he gives a wrong input that is not valid then it will show error texts to write the steps correctly. Right now, here we can see a validation text – “please insert email

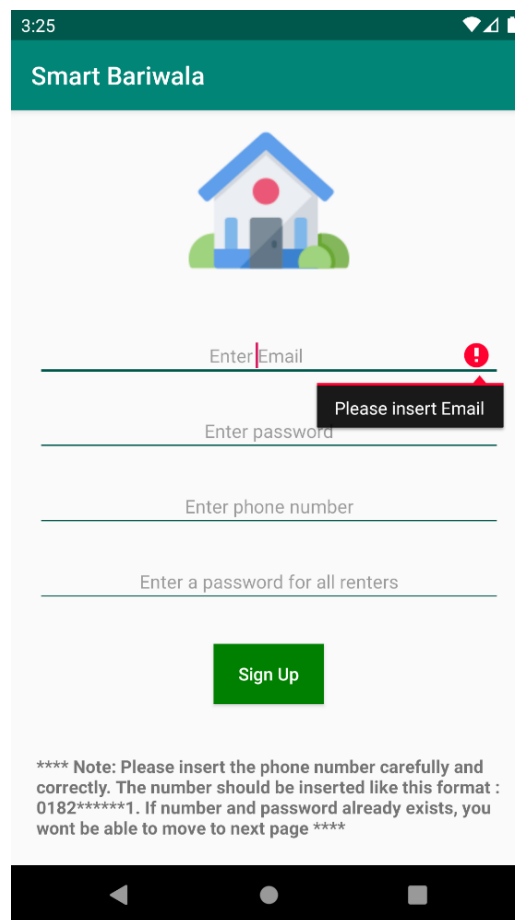


Figure-5.2 Validation

If the user gives all the information correctly then the app will let the user go to the next page. The app has a one-time login system. This means the user doesn't need to login every time to login to the system.

2. The main page (Owner)

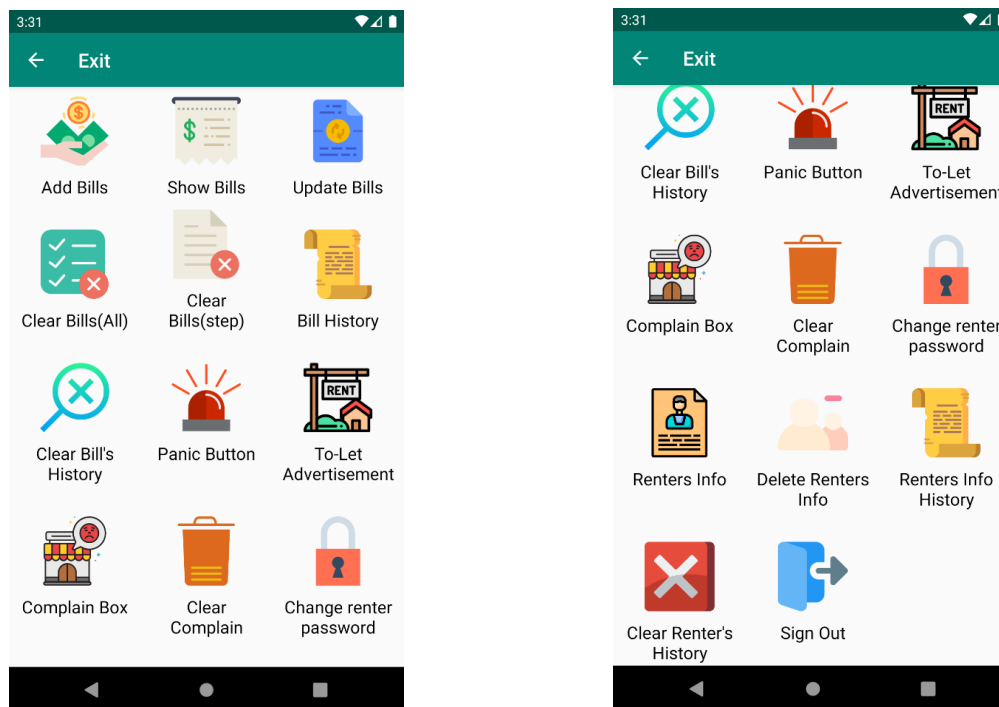


Figure-5.2 Main Menu

After a successful login, this activity will arrive where the owner can,

- Add Bills
- Showing Bills
- Update Bills
- Clear All bills (All in one click)
- Clear bills (Step by step)
- Bill history
- Clear Bill history (All in one click)
- Panic Button
- To-let advertisement
- Complain Box
- Clear Complain(All in one click)
- Change the renter's password
- Renters info
- Delete renters info

- Renters info history
- Clear renters info history
- Lastly, Sign out option

4. Add Bills

The “Add bills” is an option where the renter can add his bills. For adding bills the renter needs to pass a security step before adding bills. The renters need to write his phone number and a 4 digit password that he did set for renters.

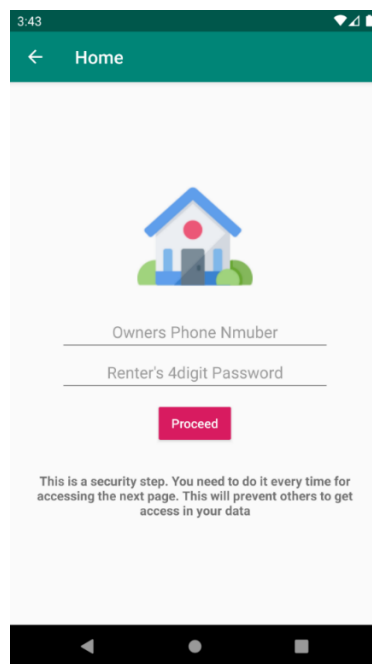


Figure-5.2 Security Access

This security step will prevent others to access in sending bills or if someone tried to sell anonymous data in bills. After passing this option this option will appear for the owner to add the bills.

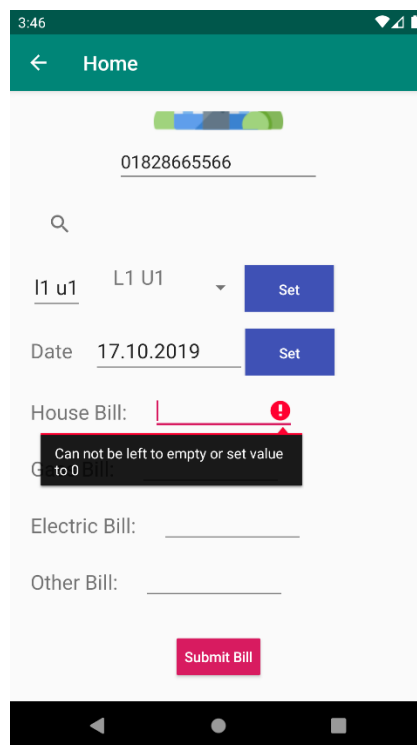


Figure-5.2 Validation

Here we can see activity for the owner to set the bills and there are validations to set up the bills. The fields cannot be empty and if the owner wants to left it empty he can set the value to 0. Like the security steps for this activity, every activity for the owner has the security steps to access this activity.

5. Show Bills

The next option is to show bills. This activity is available for owners and renters. This activity is used to show bills. Before showing bills the owner/renters first needs to pass the security steps then it needs to select the unit of them and lastly the bills will be visible to them.

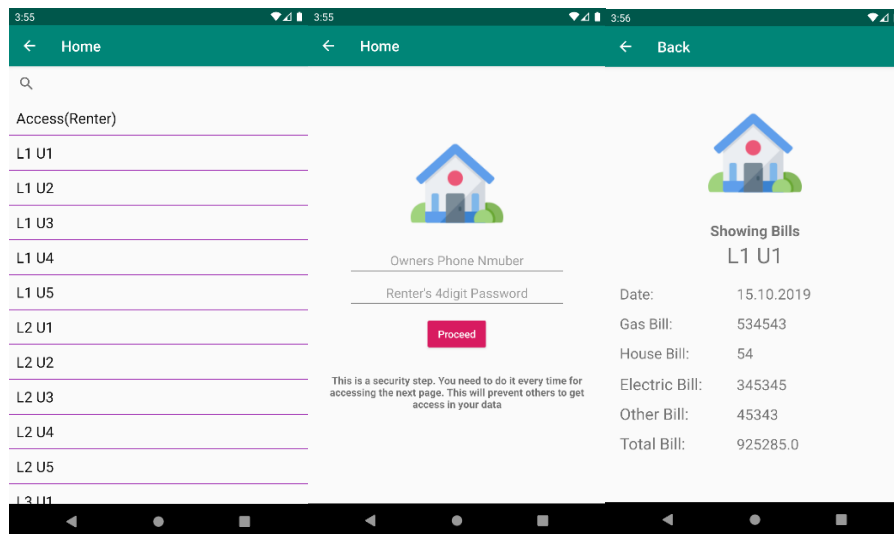


Figure-5.2 Showing Bills

So these were the steps for the owner for setting bills.

6. Update Bills

In this option, the owner can update given existing bills if he wants. All he needs to pass the security steps and the unit input to get the existing bills to update.

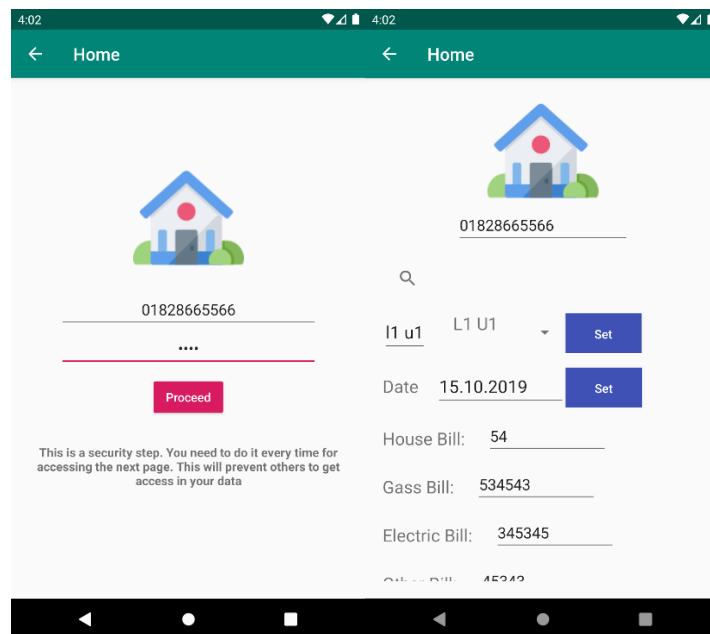


Figure-5.2 Update Bills

7. Clear bills(Step) / Clear bills(All) / Clear Bills History

The three of this option has a similar type of actions. The clear bills(step) will clear the bills in a stepwise order. The clear bills(All) will clear all the existing bills & the clear bills history will clear the bill's history.

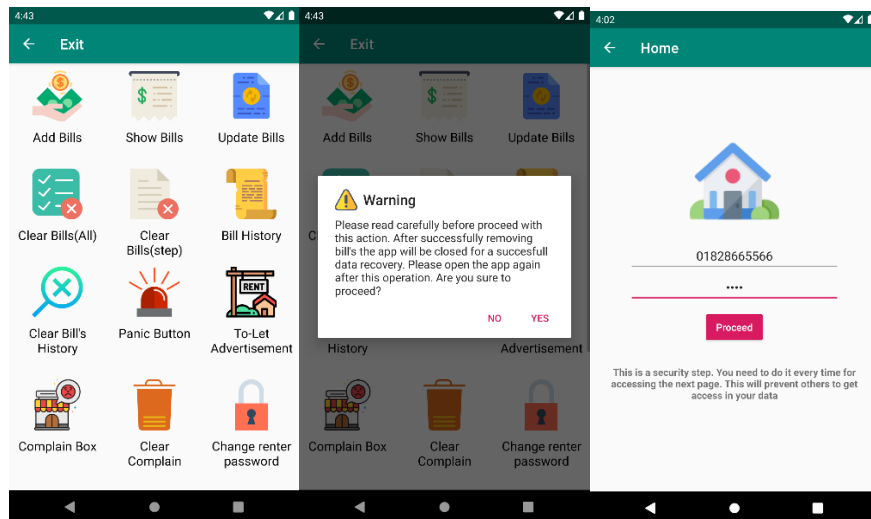


Figure-5.2 Clear Bills

After passing these steps, the bills will be successfully cleared.

8. Showing Bills History

It's an option to show the existing bill histories in a row.



Figure-5.2 Showing Bills History

This is how history will be shown in the activity.

9. To-let Advertisement

The to-let advertisement is designed for the renter to post his advertisement for home.

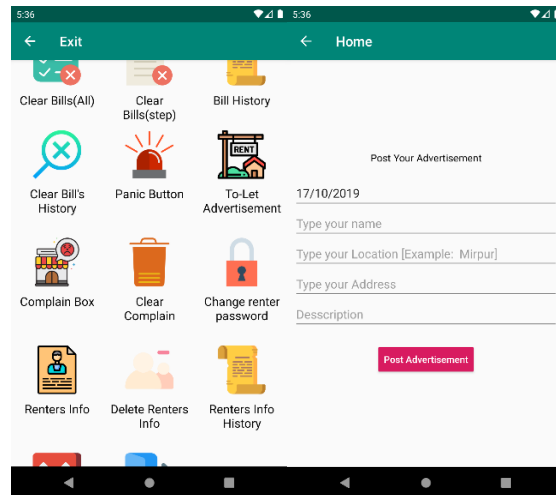


Figure-5.2 To-let Advertisement

After posting the advertisement it will be available for everyone who is searching for homes.

10. Renters Info & Renter's Info History

Its an option for the owner to search the renter's info in the application submitted by renters. The two options are similar but the only difference is the history will show the upload history of the information of the renters with a search system & the renter's history will show the brief time upload lists.

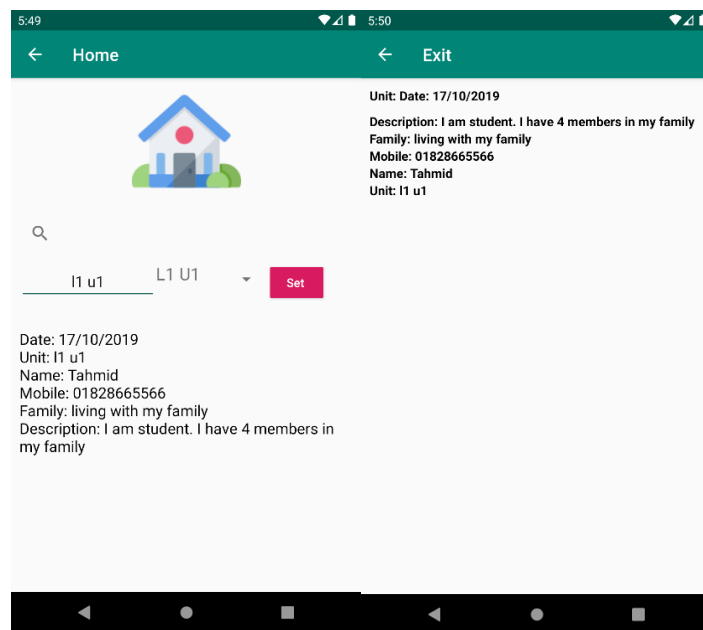


Figure-5.2 Renters info history

11. Delete renters info & clear renters info history

The two of this option has a similar type of actions. The removing renter's info(step) will clear the renter's info in a stepwise order. The clear renter's info history(All) will clear all the existing bills & the clear bill's history will clear the bill's history.

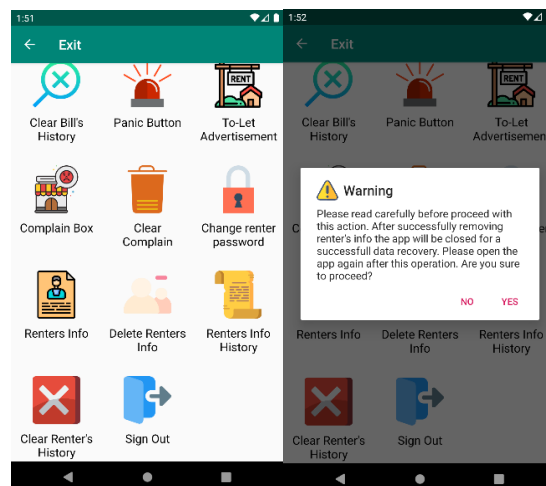


Figure-5.2 Deleting renters info history

12. Signing Out

The sign out will help the renter to completely sign out from the application.

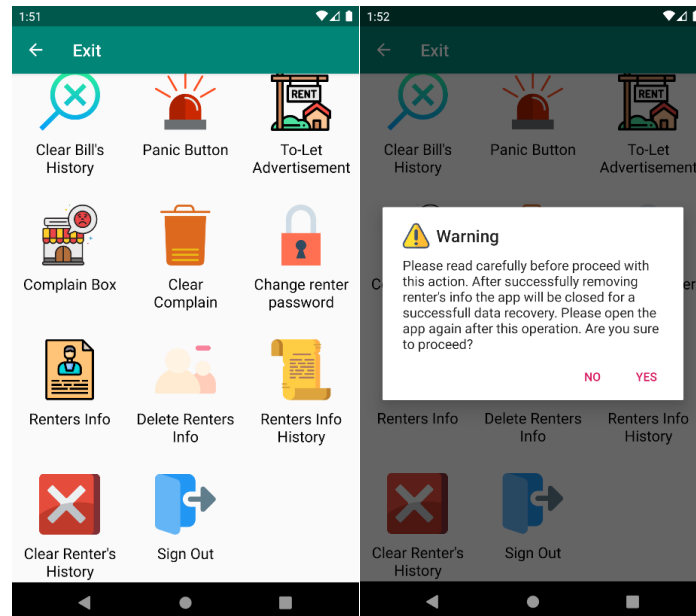


Figure-5.2 Sign Out

13. The panic button will shoot alarm if something wrong happens in the flat.

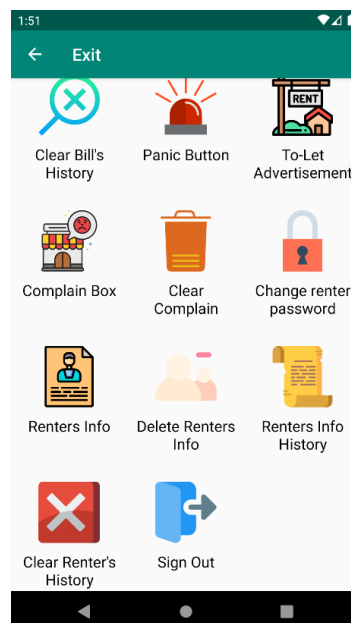


Figure-5.2 Panic Button

14. Complain box

The complain box will show the complaints sent by the renters.

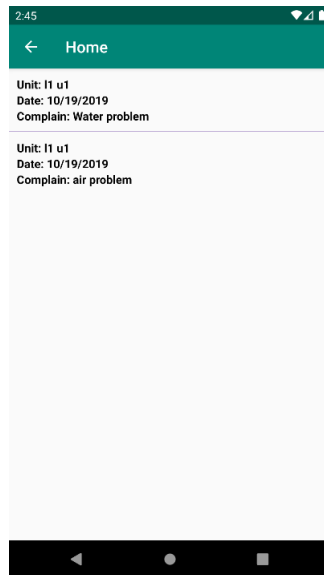


Figure-5.2 Complain box

- **Renter's login page**

This is the first page for renters to login into the page (Initial state) where a renter needs to access with owner's number as input and password as owner's 4 digits given password set by the renter.

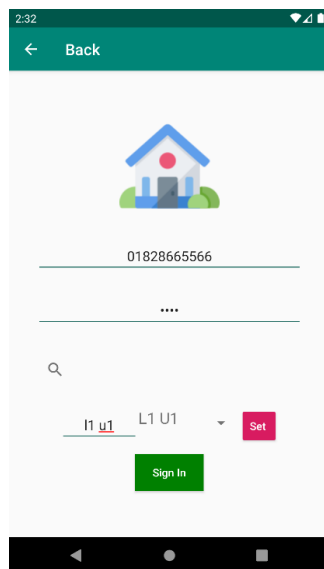


Figure-5.2 Renter's login page

There are several options for the renter to use after login as renter

- Showing bills
- Panic Button

- Renter's info submit

The showing bills and panic button options topics are already described here. Here the renter's info submit topic will be described.

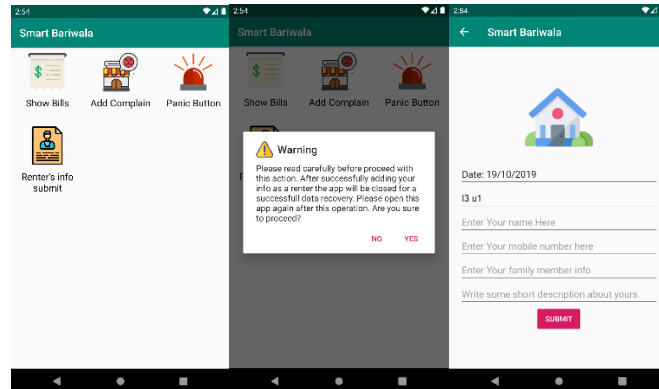


Figure-5.2 To-let advertisement

The renters' info submit option will be very helpful for both homeowners and renter to store the info and searching the info's when its necessary to get.

- To-let

The to-let option will be very helpful for them who are searching for homes.

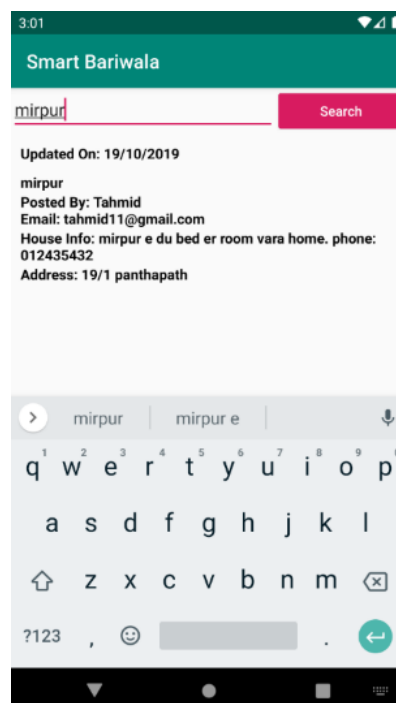


Figure-5.2 To-let search

5.3 Implementation of interactions

About this application, we tried to represent in a more easier way for the users to use this application and interact with the application more easily & it's a lightweight app to run in most of the devices. It has a huge range of devices to support including 4.4 to all the latest versions.



The image shows a screenshot of the 'Target SDK Version' and 'Min SDK Version' settings in an Android application. The 'Target SDK Version' is set to 28 (API 28; Android 9.0 (Pie)) and the 'Min SDK Version' is set to 19 (API 19; Android 4.4 (KitKat)). Both settings are displayed in a light gray box with a white background. The text is in a standard sans-serif font. The 'Target SDK Version' is at the top, and the 'Min SDK Version' is below it. Both have a dropdown arrow on the right side of the selection box.

Figure-5.3 Interaction implementation

5.4 Testing Implementation

Here is an image when we started the application if it has an error or not. We've tested in some of the virtual devices and these are the devices.

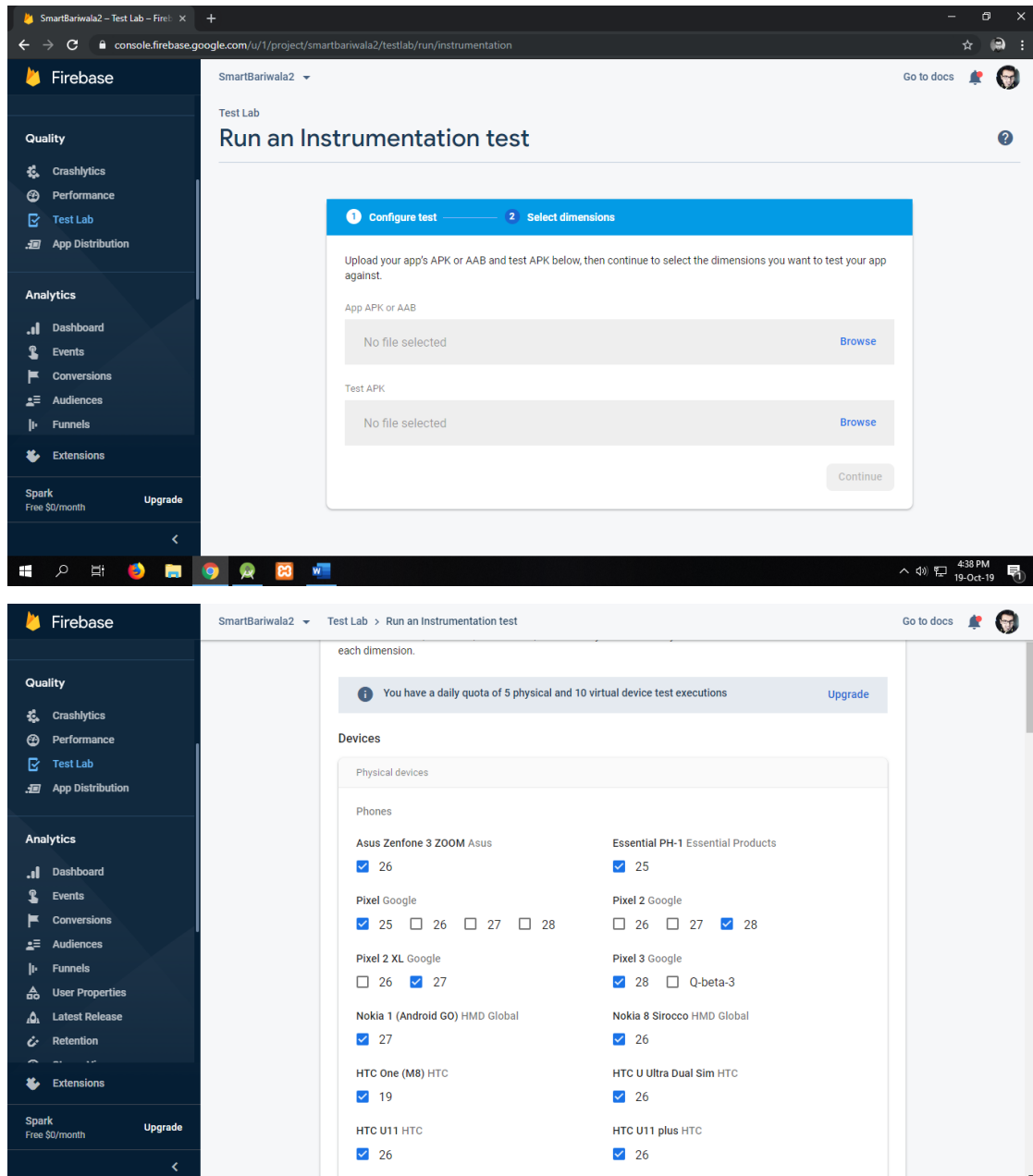


Figure-5.4 Testing application

5.5 Test result's and reports

Here is the test report of the application and we're glad cause we found 0% error's when we test our application in "Firebase Test Lab".

The screenshot displays the Firebase Test Lab interface. On the left is a dark sidebar with the 'Firebase' logo and navigation links under 'Quality' (Crashlytics, Performance, Test Lab, App Distribution) and 'Analytics' (Dashboard, Events, Conversions, Audiences, Funnels, User Properties, Latest Release, Retention, Extensions). At the bottom of the sidebar is the 'Spark' section, labeled 'Free \$0/month' with an 'Upgrade' button. The main content area is titled 'Test Lab' and includes a user profile 'SmartBariwala2' and a 'Go to docs' link. Below the title are tabs for 'Tests' and 'Templates'. A 'Run a test' button is visible in the top right of the test results section. A table lists the test results:

Test matrix	Test type	Started	Total devices	Issues
matrix-3vt1dlm7seszo	Robo	2 days ago	1	—

Figure-5.5 Test result

CHAPTER 6

Conclusion and Future scope

6.1 Discussion and Conclusion

‘Smart Bariwala’ application will be very helpful for house owners and renters. The difficulty in searching for homes will be decreased. The security of a house will be increased. The owners and renters will be able to do their works in an easier way and the relation between them will be good.

6.2 Scope for Further Developments

In the future, we will upgrade our features and add some new features. We will think about IoT. In the future house, the owner can turn on/off water motor by using the ‘Smart Bariwala’ application. It will possible when we add IoT and also owner can check the water level on the water tank. These two features will be very helpful for the house owner. Also, the owner can control the camera by using this app. The owner can lock/unlock the main gate of a house by using the app. Renters can send a monthly bill to the owner by using this app. All those things will be possible if we will think about IoT.

APPENDIX

Appendix A: Project Reflection

We started our project in Fall 2018 to implement this “Smart Bariwala” application. We have to try to make the user-friendly interface of our project. The features of the project are the to-let system, bill receipt, complain box, notice and panic button. This android app will help owners and renters to do their work easily. To implement this android application, first of all, we sketch our app interface. After a long journey and hard work finally, we able to reach our goal.

Appendix B: Related Issues

To implement our proposed application at first, we sketch our app design in the paper and we draw some models of our project like business process modeling, use case modeling, logical data model, etc. We found many apps like Smart Home Management System, Smart Living, Smart House Cloud, Smart Home Controller, Smart Home Automation, Smart Home Solution. But we could not find our features in those apps without the to-let feature. There are many apps in google play store about to-let and we found some websites that provide a to-let advantage. We also provide a to-let advantage in our apps.

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