



An-Najah National University
Faculty of Engineering and Information Technology
Computer Engineering Department



Real Estate Management System

Software Graduation Project

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Submitted on :
24th, Jan 2024

Presented in partial fulfillment of the requirements for Bachelor degree in Computer Engineering.

Dedication

Dedication to our loving parents, family, friends and for everyone who believed and loved us.

Acknowledgment

First, we would like to **thank our supervisor Dr. Amjad Abu Hassan** a lot for his helpful, kind, patience and taking care of us, and for making everything simple. He was always inspiring and encouraging us to move.

We would also like to **thank all the teachers and teacher's assistant in the Department of Computer Engineering**, and we feel proud to be students in it, as this helps us to improve our educational level as well as improve our skills.

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Disclaimer

This report was written by students at the Computer Engineering Department, Faculty of Engineering, An-Najah National University. It has not been altered or corrected, other than editorial corrections, as a result of assessment and it may contain language as well as content errors. The views expressed in it together with any outcomes and recommendations are solely those of the students. An-Najah National University accepts no responsibility or liability for the consequences of this report being used for a purpose other than the purpose for which it was commissioned.

Abstract

Red House operates as a specialized real estate management system, offering a comprehensive set of services in the field. Our platform arrange and simplify the processes for customers and landlords, providing options for buying, selling, leasing, and monthly or daily rentals properties. We enhance the user experience by incorporating features such as map-based property searches, user and property history services, and efficient contract and payments management.

Our approach take on to following best practices in software engineering, leveraging the most suitable technologies for each aspect. Through analysis similar real-life systems, we identify potential weaknesses and address the specific needs of both the local and global communities in the real estate filed.

The end result is a software solution that empowers landlords to identify the most suitable customers for their properties while assisting customers in finding properties that align with their specific requirements. Additionally, our platform offers robust contract and payment management services to facilitate self-tracking of transactions or collaboration with a lawyer.

Chapter 1: Introduction

- **Background and Motivation**

In response to the significant growth in the real estate industry and recognizing the importance and size of this field, for example, a study conducted by the American Bureau of Labor Statistics (BLS) and the Consumer Expenditure Survey (CES) in America suggests that individuals may spend approximately 30 to 50% of the money they accumulate throughout their entire lives in the real estate sector, either directly or indirectly. However, many real estate systems in real life focus solely on one side of the services, such as listing properties and performing basic operations like buying and renting. They often overlook the aspect of assisting landlords and customers. By empowering landlords with valuable insights, it enables them to make informed decisions regarding potential customers. Similarly, customers also need assistance, making it easier for them to align their objectives and requirements.

- **Statement of the problem**

Landlords typically lack information about customers interested in renting or buying their properties. Simultaneously, customers face challenges in finding properties that meet their needs, exacerbated by the high costs associated with broker offices. Moreover, existing real-life systems fail to integrate comprehensive services, including user history and flow of management contracts, tracking payments.

- **Objective**

Our objectives provide real estate management system aim to improve the overall experience for property owners and customers (renters & buyers) by providing essential information, enhancing competitiveness, and promoting diversity in the real estate sector by implementing filters and map-based property search, booking. making it easier for customers to achieve their objectives, also provide essential environment to enhance the agreement process on contracts and payments between the landlord and the customer.

- **Scope of the work**

The scope of our real estate management system project is to develop a comprehensive software solution that addresses the problems and objectives outlined in the Problem Statement and Objectives sections. The system is designed for use landlord and customers, brokers (agents), admins of the system.

▪ Importance of the work

Red House's real estate management system holds significant importance, contributing to the enhancement and efficiency of real estate operations. It plays a pivotal role in:

- Streamlining Property Transactions:

RedHouse simplifies the processes of renting, buying, and booking properties, providing a solid and manageable flow. By incorporating features like map-based property searches, user and property history services, and efficient contract and payment management, it streamlines the entire property transaction process. This not only benefits landlords in identifying suitable customers but also aids customers in finding properties aligning with their specific requirements.

- Enhancing Competitiveness:

The platform's implementation of filters, map-based property searches, and booking functionalities contributes to enhancing competitiveness in the real estate sector. RedHouse empowers property owners and customers by providing essential information, making the real estate market more dynamic and diverse.

- Facilitating Agreement Processes:

RedHouse provides an essential environment for landlords and customers to enhance the agreement process on contracts and payments. This feature allows for self-tracking of transactions and collaboration with legal professionals, ensuring transparency and efficiency in property-related agreements.

- Promoting Diversity in the Real Estate Sector:

Through its comprehensive services and user-friendly approach, RedHouse contributes to promoting diversity in the real estate sector. The platform addresses the specific needs of both local and global communities, ensuring a more inclusive and accessible real estate environment.

In summary, Red House's real estate management system significantly contributes to streamlining processes, enhancing competitiveness, facilitating agreements, and

promoting diversity in the real estate sector, making it a valuable solution for property owners, customers, and industry professionals.

- **Organization of the report**

The report is structured into six chapters, starting with an introduction and then proceeding to chapter of constraints, standards, and codes. Following that, we go into previous similar systems and their key weaknesses and key points and what we add in literature review chapter, In a methodology chapter will outline the project's developmental stages, including the tools and technologies used. Our results and discussion section will detail the obstacles we get over and the successes we achieved. Lastly, we will provide recommendations and future development goals in the conclusion chapter.

Chapter 2: Constraints, Standards and earlier course work

▪ **Constraints and Limitations**

1. feature constraints: we faced many challenges when searching for all the necessary features that must implement together in order to serve all landlords and customers requirements.
2. Time Limit for Developing RedHouse app: The time frame for developing the RedHouse was constrained by various factors, including the team's existing Commitments such as managing system operations and handling other projects. In addition, since this was our first experience developing apps using Flutter and Dart programming languages, it required a significant amount of time to ramp up at the beginning of the development cycle, which was limited to just four months.
3. Fixed budget for development and implementation: certain features were not included in the app due to the associated costs for implementing them, These limitations were taken into consideration throughout the development process to ensure that the project was completed within the set budget and time frame.
4. platform constraints: we test and build our project on Android devices due to the lack of resources for IOS Devices

▪ Standards

• MVC pattern

The MVC pattern was employed in our system, providing a structured approach to application architecture. The system is organized into distinct layers to facilitate clarity in the flow of work. These layers are outlined as follows:

1. Model Layer:

The Model layer encapsulates the application's data and business logic. It manages the state of the application and enforces rules for data manipulation.

2. View Layer:

The View layer represents the user interface (UI) of the application. Implemented using Flutter widgets, it displays data from the Model layer and captures user input.

3. Controller Layer:

The Controller layer acts as an intermediary between the Model and the View. It processes user input from the View, updates the Model accordingly, and triggers necessary UI updates.

This MVC architectural pattern enhances code organization and maintainability by separating concerns within the system, fostering a clear and cohesive structure.

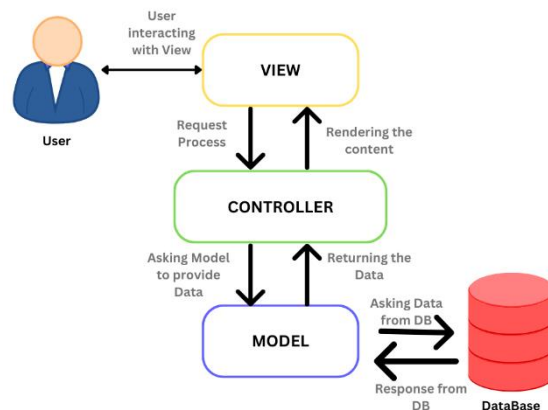


FIGURE 1: MVC PATTERN FIGURE EXPLANATION

- **Agile Model**

The Agile methodology is a project management approach that involves breaking the project into phases and emphasizes continuous collaboration and improvement.

Teams follow a cycle of planning, executing, and evaluating. . We classified the tasks we had to do into the following five groups:

1. Brainstorming to get all needed requirements and features required.
2. Design the requirements: We designed the UML diagram to clarify the functionality of new features and how they will interact with our system.
3. Development part: for this part, we started writing the code for the front end, and after we finish all the code required for the front part, we begin writing the code for the back end of each screen in the app.
4. Testing: we connect the back end with the front end and make sure that every page works correctly
5. Feedback: we kept getting feedback from our supervisor to ensure that the app that we built satisfied the requirements.



FIGURE 2: APPLYING AGILE MODE

Chapter 3: Literature Review

For many years, real estate management systems have existed in various forms, initially with basic paper records and later advancing to digital systems. The transition began in the latter part of the 20th century as computer technology became more prevalent in business and various industries. During this time, early versions of real estate management software started to appear, and some might have been proprietary systems developed by individual real estate companies to streamline their internal processes.

As technology continued to advance, dedicated software solutions catering to the real estate industry began to emerge. Recently, real estate management systems have gained popularity, and there are now many systems in this field. However, some of these systems focus primarily on one aspect of the services, such as listing properties and performing basic operations like buying and renting. They often overlook the aspect of assisting landlords and customers. By empowering landlords with valuable insights, these systems enable them to make informed decisions regarding potential customers. Similarly, customers also need assistance, making it easier for them to align their objectives and requirements.

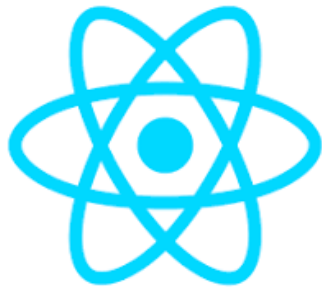
So our system may not be new to the rest of the world. There are applications similar to our application in real estate institutions, but as we say previous our system is aim to improve the overall experience for property owners and customers (renters & buyers) by providing essential information, enhancing competitiveness, and promoting diversity in the real estate sector, making it easier for customers to achieve their objectives, also provide essential environment to enhance the agreement process on contracts and payments between the landlord and the customer and make the flow of renting or buying, booking property more solid and manageable and this extend to agreement on the contract.

Chapter 4: Methodology

This chapter discusses the research methodology, including data collection, analysis, and processing. It also covers the tools, methods, and systems utilized in the development of RedHouse and the findings obtained.

- **Tools, Methods and Programming Languages**

In order to develop the RedHouse Management system, we utilized a variety of tools, methods, and programming languages. For the front-end development, we used Flutter and Dart programming languages for mobile app and React Js for the admin panel, which allowed us to create a modern and intuitive user interface. For the backend development, we utilized ASP.NET CORE to create a RESTful API for handling the system data and logic. We also designed a relational database schema using SQL Server to store and manage the system data. Throughout the development process, we followed the Agile methodology and utilized Git for version control to ensure efficient collaboration among team members.



- **Client Side**

The design of the client side of the real estate management system began with extensive research to devise a creative and innovative concept for the application's design to achieve more effective and user-friendly real estate management system.

- Framework: We decided to leverage the power of Google's cross-platform

UI framework for client-side development. Flutter is a popular open-source mobile application development framework created by Google that

utilizes the Dart programming language. It offers a wide range of features, including hot-reload, widget-based development, and platform-specific widgets, among others. Through Flutter, we can create mobile apps for iOS and Android with a single code base that renders everything on its own, eliminating the need for previous native programming for these two platforms

and saving a significant amount of time and effort in developing cross-platform apps. Therefore, Flutter is a viable and efficient tool for developing

mobile applications, and we chose to use it for our real estate management app for its reliability, speed, and cross-platform capabilities. Flutter's popularity has grown steadily over the years, with Google's support and the community's contributions. As of May 2023, Flutter has been downloaded more than 290 million times worldwide, and there are over 120,000 Flutter packages available for developers to use, demonstrating its extensive ecosystem.

And for the web admin panel we built it with react Js

- **Server Side**

- Architecture of the server-side: We implemented the client-server architecture for our real estate management system, allowing multiple clients such as the website and mobile application to utilize the same API. Our servers were designed to support a RESTful API, ensuring efficient communication

between the clients and the server.

- Server Side Framework : We Work with ASP.NET CORE.

We utilize ASP.NET Core as our server-side framework for its seamless integration with the Microsoft technology stack, leveraging C# language familiarity. ASP.NET Core offers a robust environment, combining ease of learning, comprehensive documentation, scalability, and optimal performance. Embracing the MVC architecture, our application benefits from a well-structured codebase. ASP.NET Core's asynchronous support, middleware architecture, and cross-platform compatibility enhance the reliability and efficiency of our server-side structure, ASP.NET Core solution it's perfect for building efficient API services for both mobile and web applications

- Version Control

To effectively manage the large size of our real estate project and ensure proper backup

and version control, we created three GitHub separate repositories. The first repository was dedicated to storing the app code, the second repository was for the server-side RESTful API code, and the third repository was dedicated to the web version of the app code. Version control was essential for our project as it allowed us to keep track of changes made to the code over time, identify and fix any issues or bugs that arose, and collaborate effectively as a team. It also provided us with a secure backup of all the code, enabling us to easily revert to a previous version if necessary. By utilizing version control, we were able to streamline the development process, reduce errors and conflicts, and ensure the stability and scalability of our project in the long term.

- Testing of the Server and API

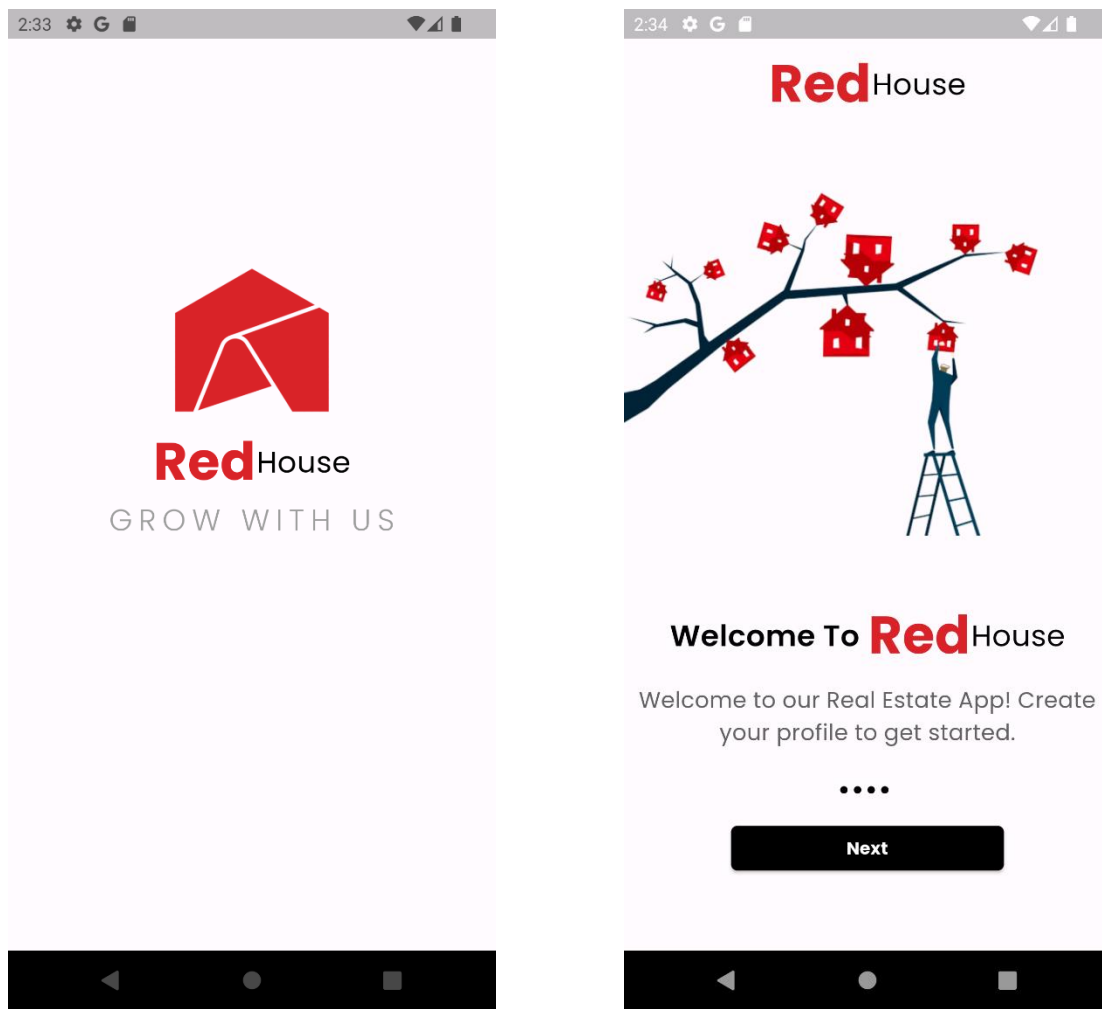
Testing the server and API is crucial in ensuring that the system runs smoothly and without any problems. To that end, we use Swagger

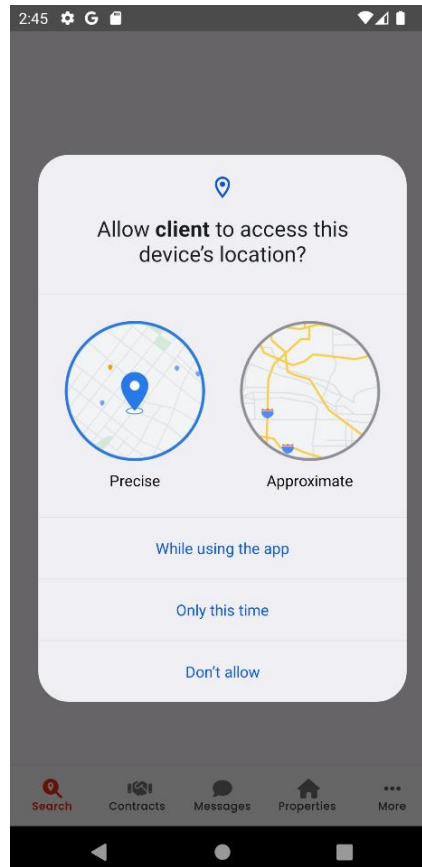
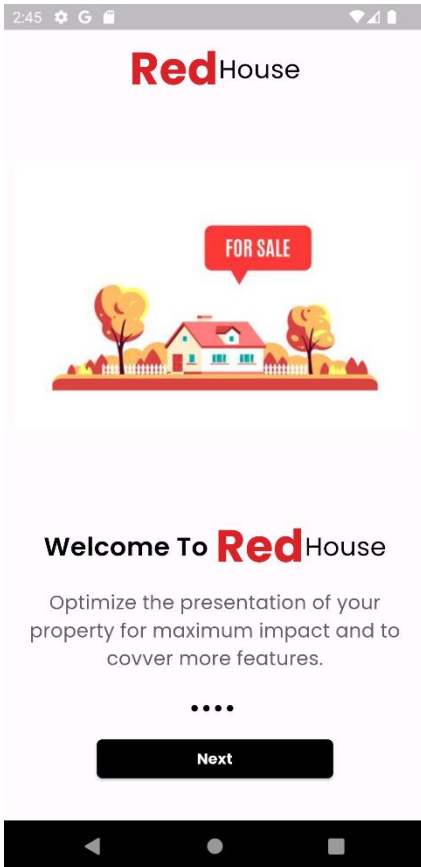
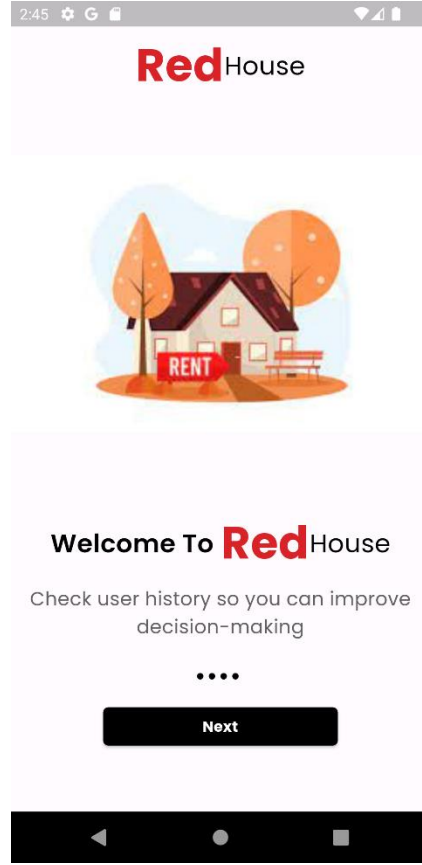
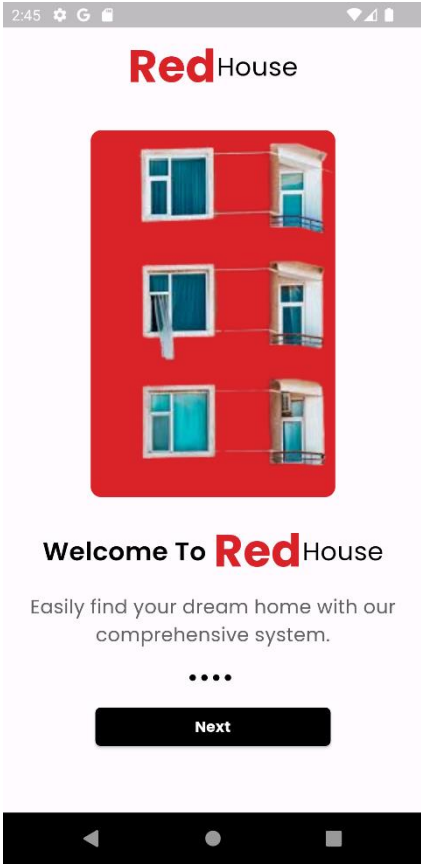
Swagger, now known as the OpenAPI Specification, is a widely adopted set of open standards for designing and documenting RESTful APIs. It enables developers to describe API structures in a machine-readable format, ensuring standardized and easily consumable documentation. The specification, usually written in JSON or YAML, not only facilitates human-readable API documentation but also supports automatic generation of client libraries, interactive API exploration, and code generation for various programming languages. Swagger's emphasis on machine-readable descriptions, interactive API exploration, and standardized documentation fosters collaboration, enhances understanding, and simplifies the integration of APIs into diverse applications.

❖ System Features and Implementation

- **Onboarding screen (Fresh user)**

The onboarding screen is the first screen that users see when they open the RedHouse application. It is designed to provide a quick overview of the app's key features and to help users get started with the app. The onboarding screen typically includes a welcome message, a brief description of the app's purpose. Overall, the goal of the onboarding screen is to provide a positive first impression of the app and to guide users through the initial setup process shown only once highlighting time at the first start of the application. By providing clear instructions and highlighting the app's key features, the onboarding screen can help to improve user engagement and retention.

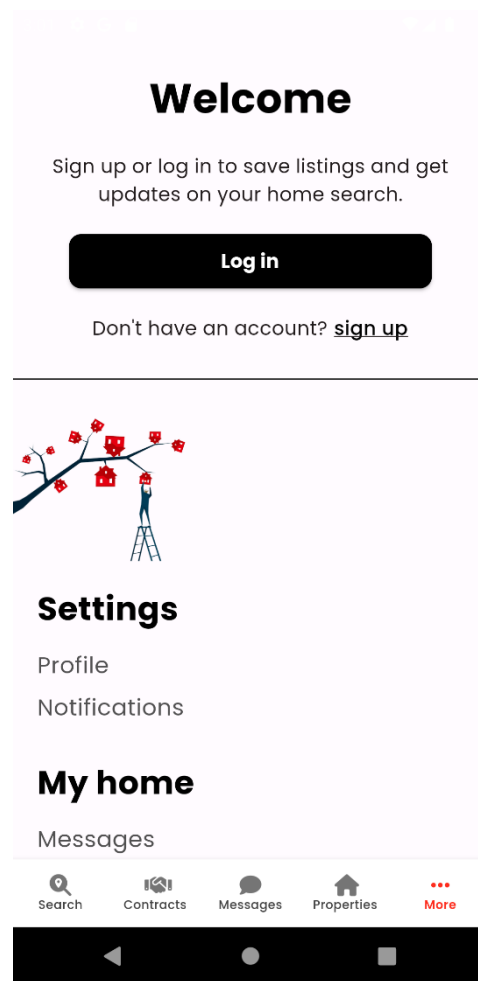
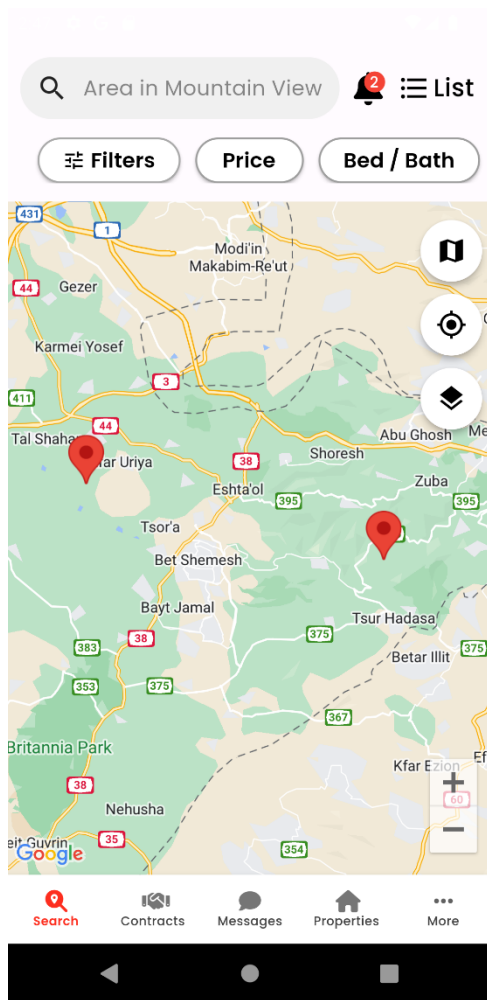




- **Login as visitor**

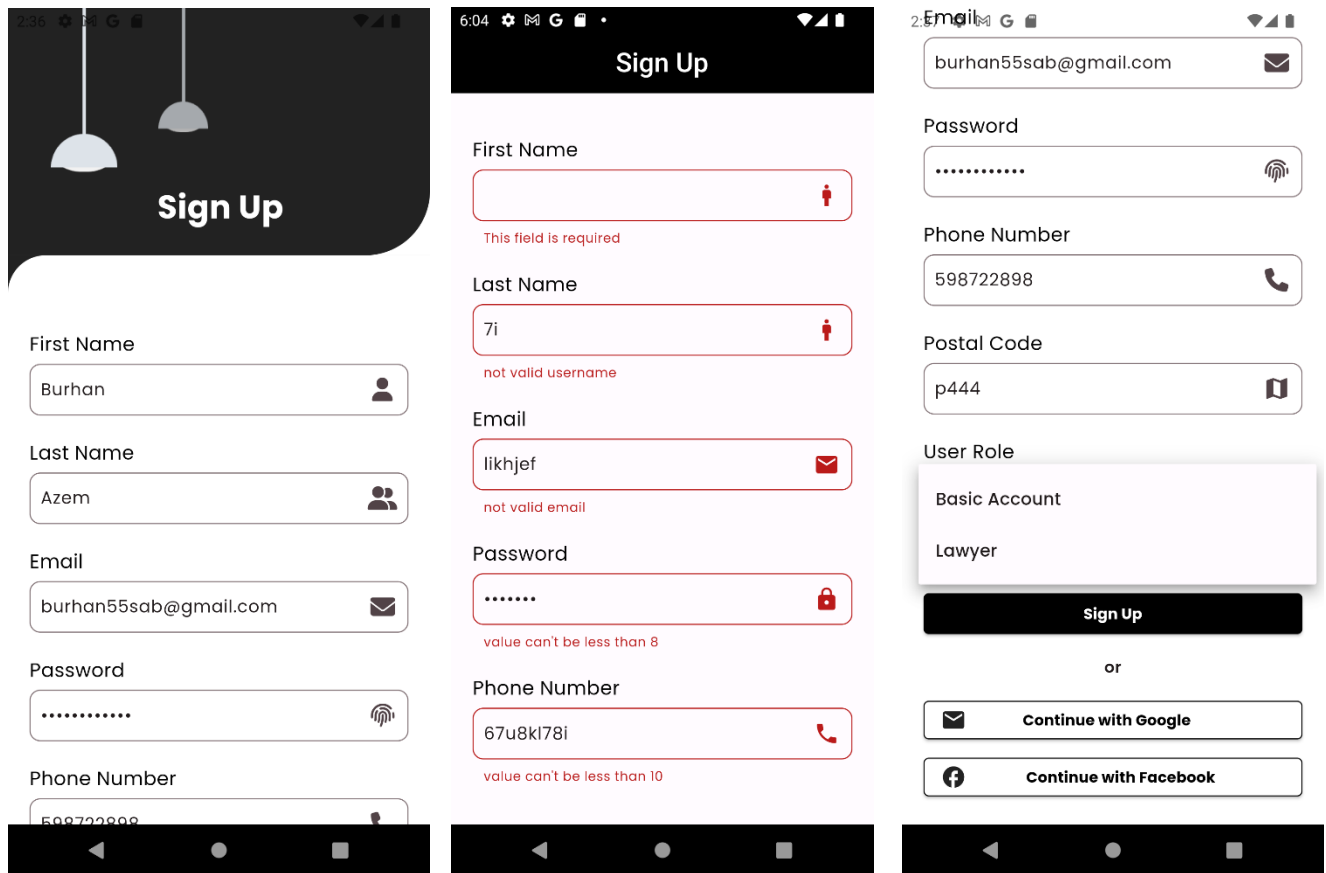
when all onboarding pages presented you will enter as visitor, which you have limited things to do, so you can enter on the main page (search page) and search by map and filter the properties based on your needs.

If you decide to go with property or add property you should sign up or login.



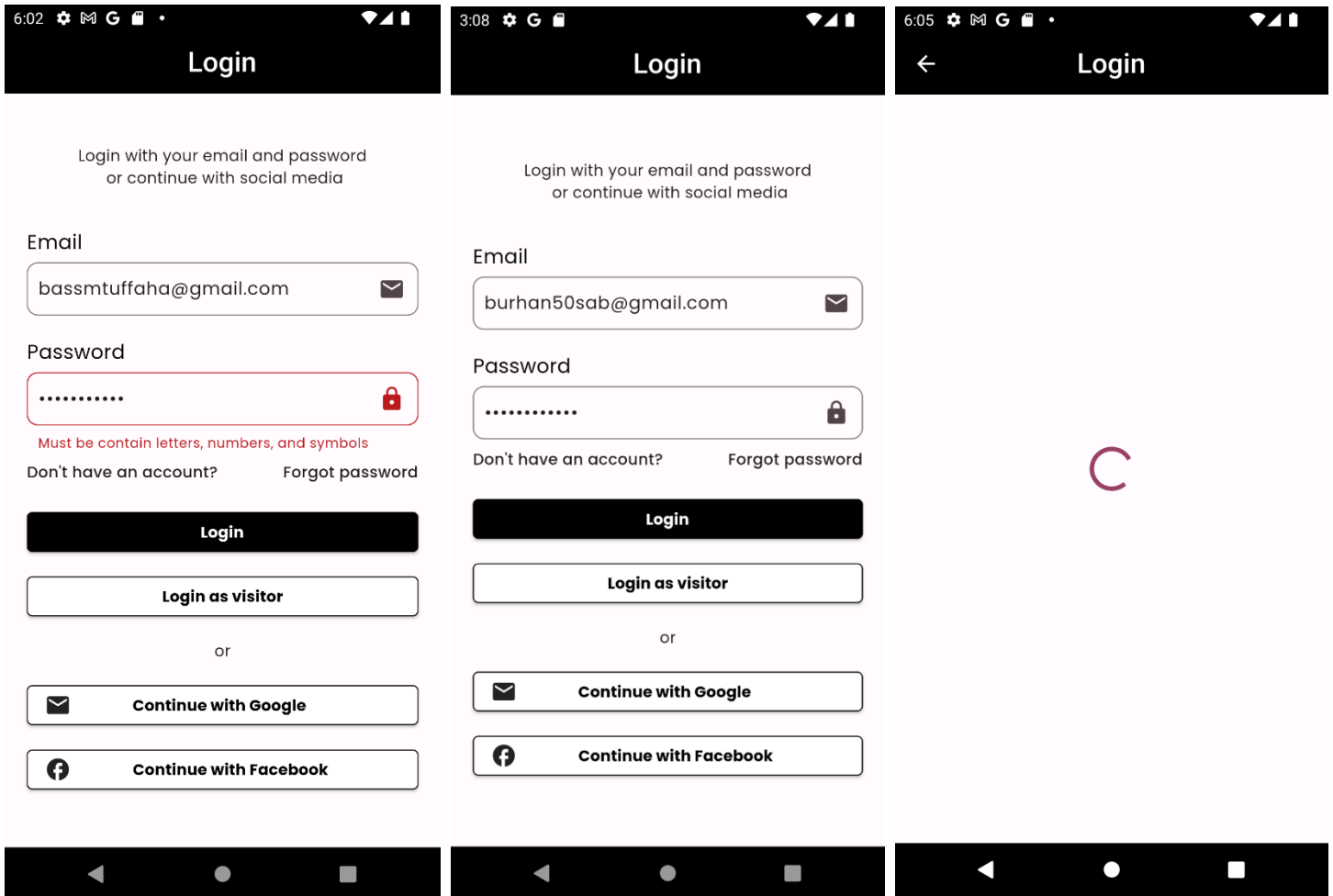
- **Registration (sign up)**

The signup page prompts users to input email, password, username, and phone number, user role (Basic account or lawyer) and postal code for account creation, featuring validation for each field. Email validation checks for correct format and application-specific requirements, ensuring accurate contact information. Password validation enforces security standards such as minimum length and specific characters. Username validation ensures uniqueness to prevent confusion. Phone number validation verifies correct format and additional requirements like area code. This comprehensive validation enhances accuracy and security, fostering a reliable user experience.



- **Login**

Here at login page you should enter correct email and password for user already registered and you will enter as normal user (Basic account or landlord account, customer account, agent account) or as Lawyer else you will have validation message



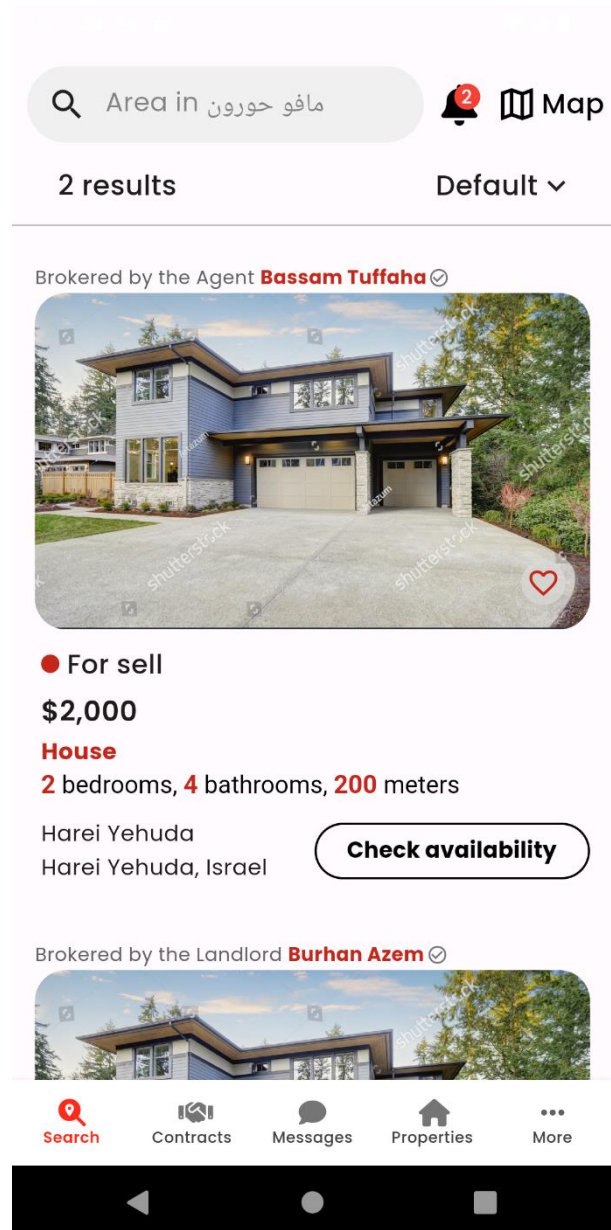
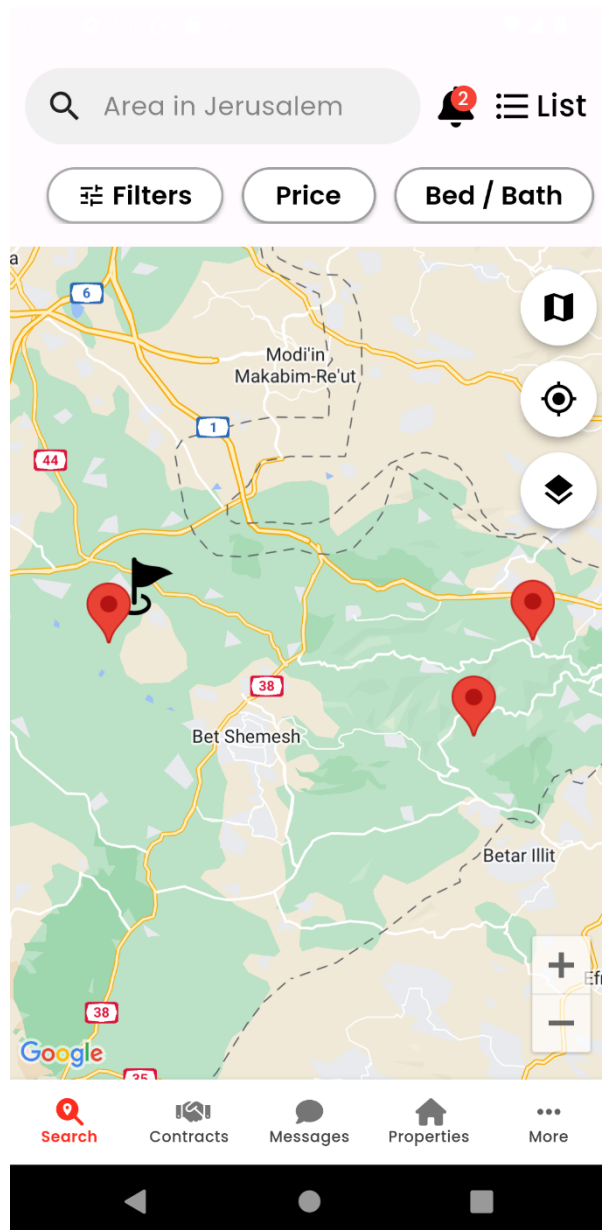
• Main Page (Search Page)

The first page that appears for the user after logging in is the redhouse app, which serves as the main page. On this page, customers can conduct searches using a map and filters to find properties that align with their requirements for either purchase or monthly/daily rent.

As illustrated below, the search results will be displayed both on the map and in list format.

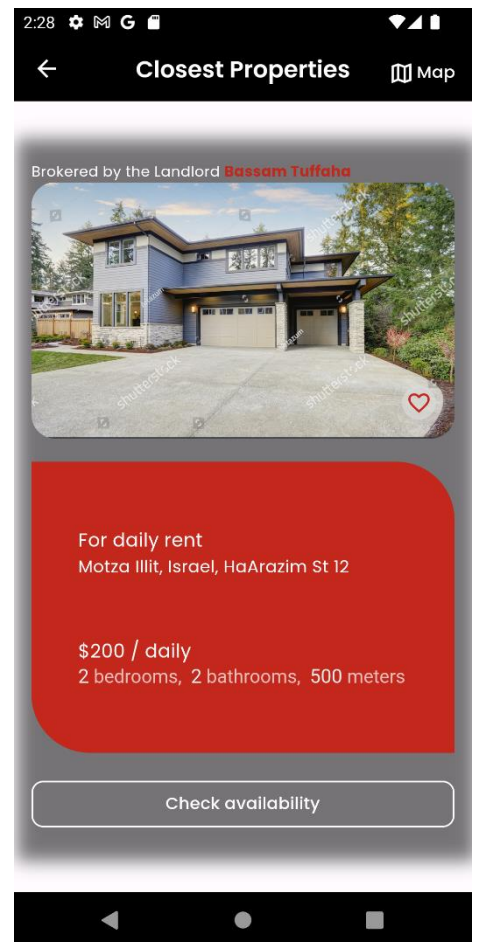
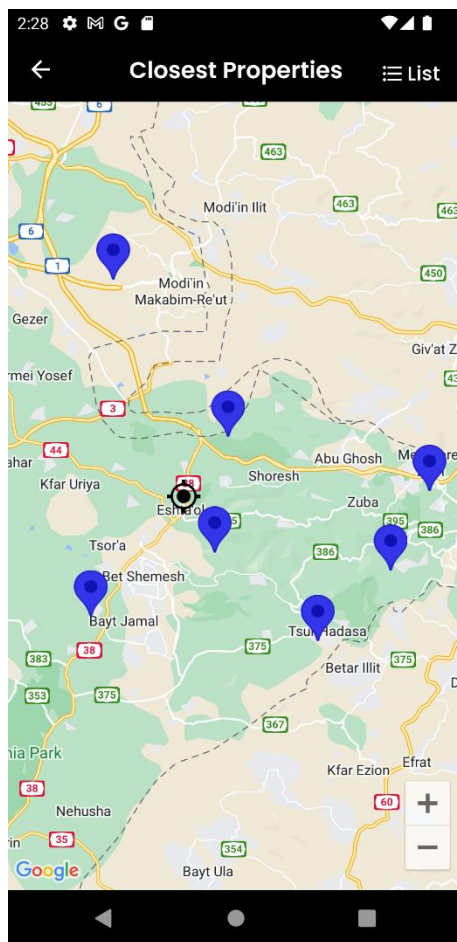
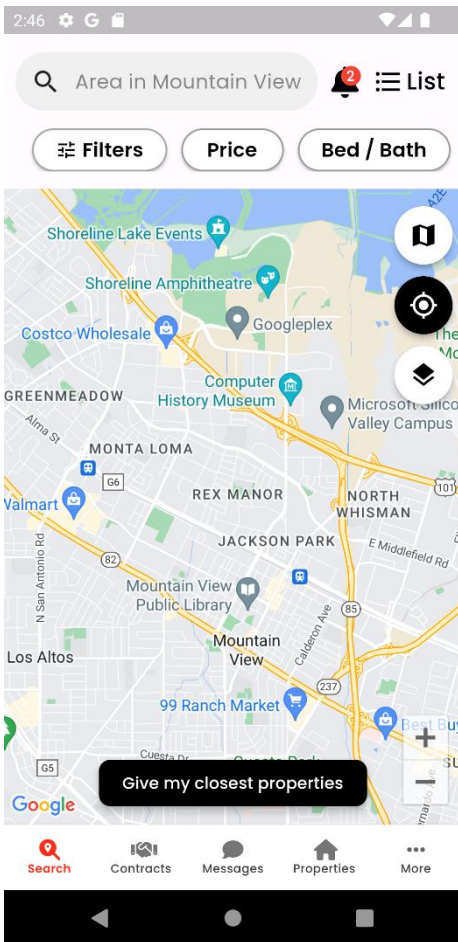
How Property Retrieval Works:

- When the user opens the map for the first time, it automatically zooms to the user current location, allowing him to view properties in their area.
- The map retrieves properties specifically for the city that the user zooms in on, ensuring optimal performance and efficiency.



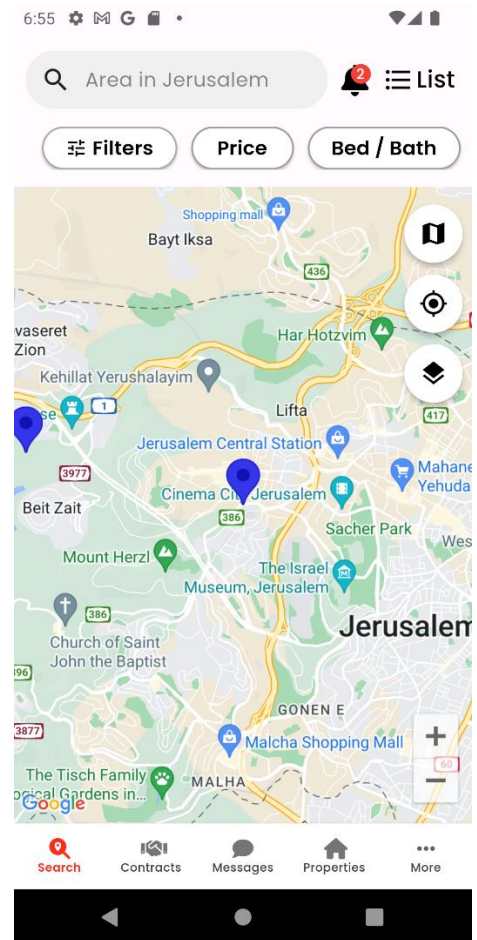
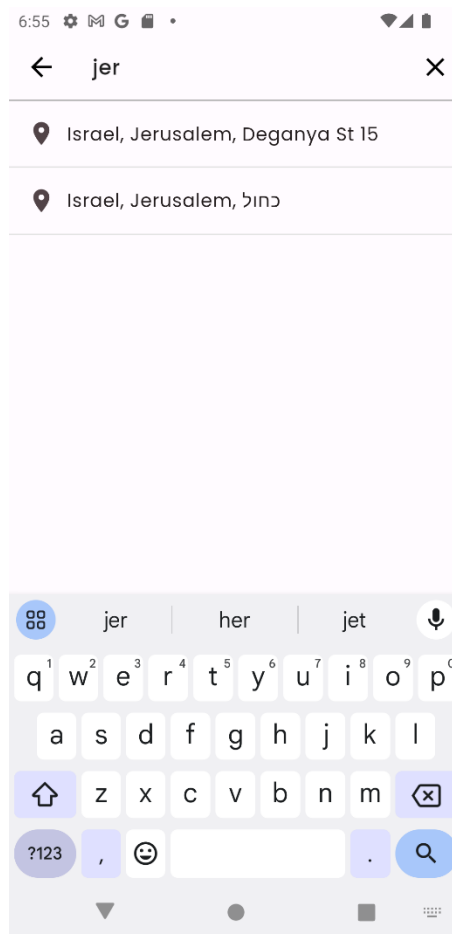
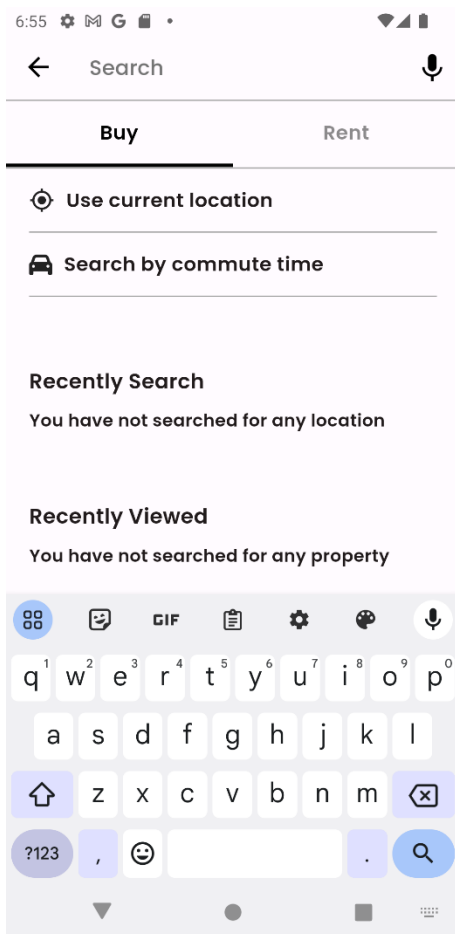
- **Closest properties to user**

Can the user view all properties within a 25 km radius of their current location



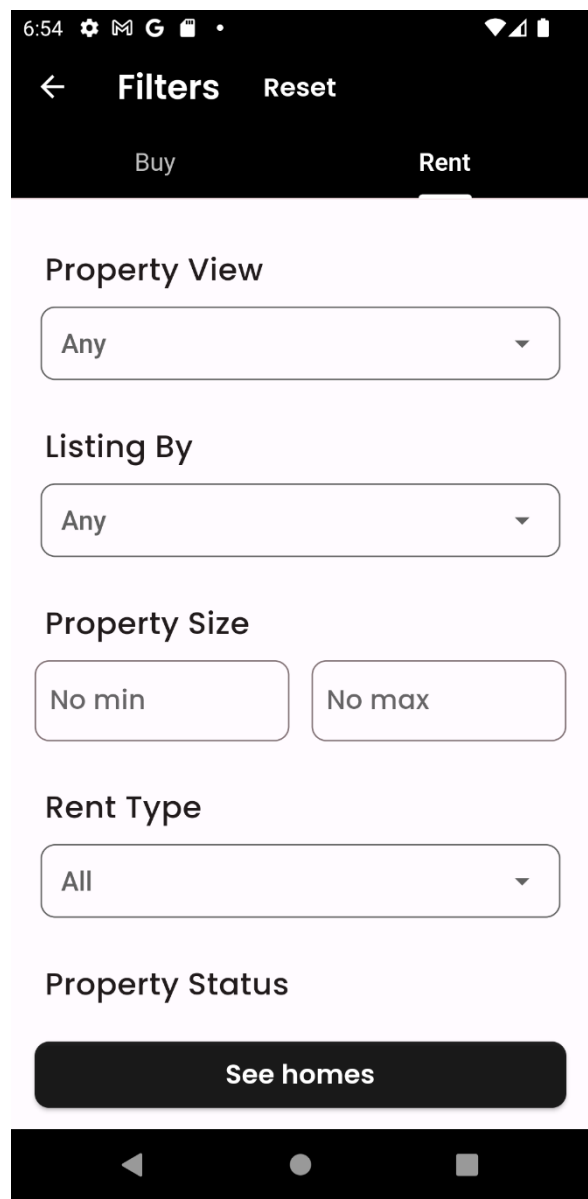
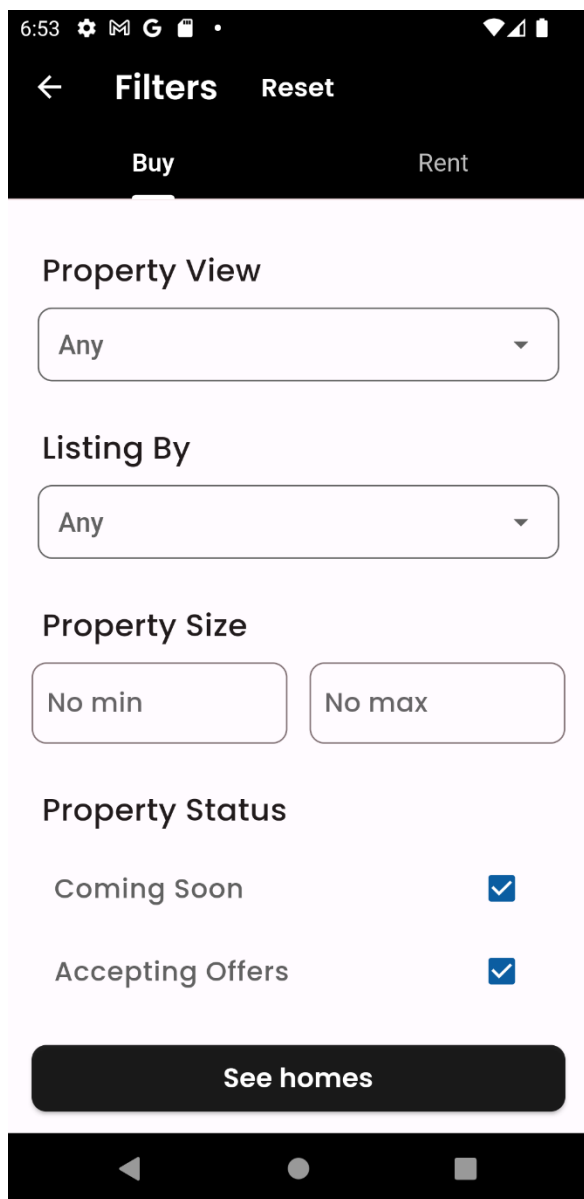
• Search on Map:

Users can search for a specific area by entering details such as country or state, city, and address. The autocomplete feature will return any properties related to the search query. Additionally, users can search for a specific property using its unique property code number.



- **Filtering Properties on the Map:**

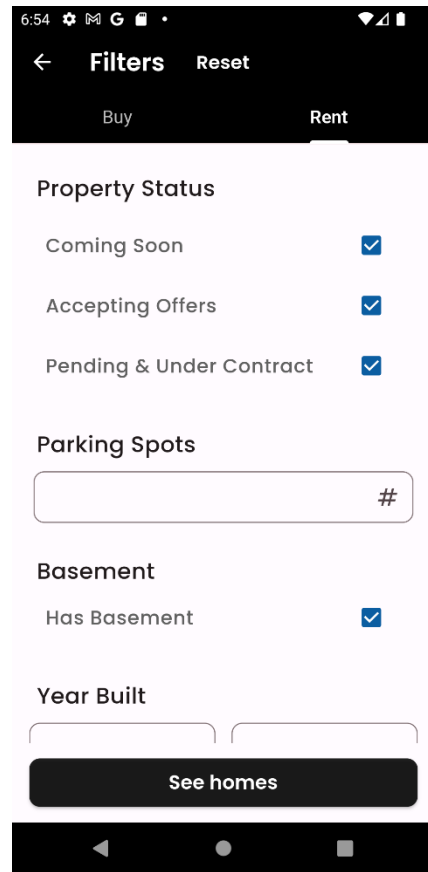
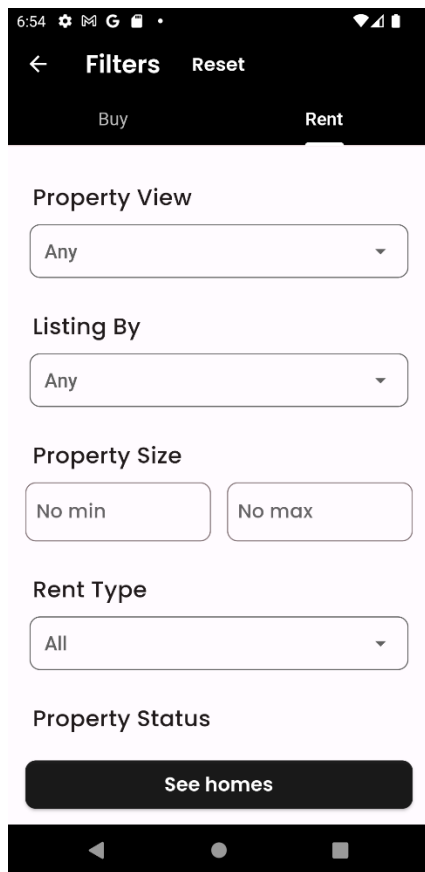
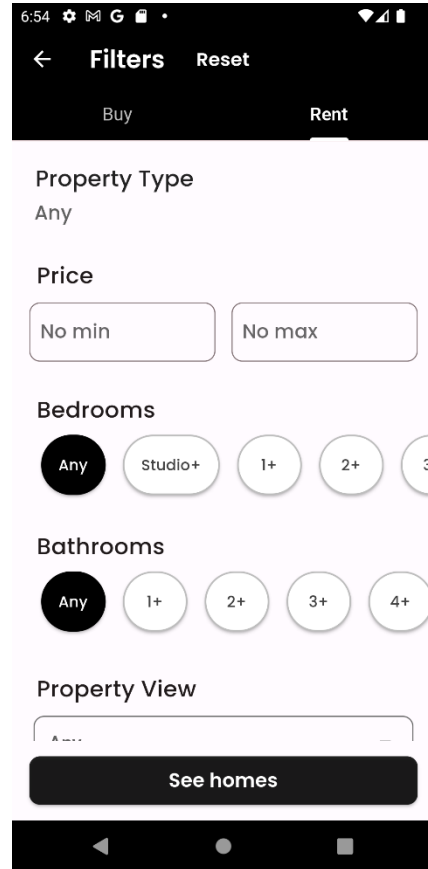
Users can utilize 14 filters to refine property searches on the map after zooming into a specific area. Users have the option to choose between two tabs, as illustrated below. One tab applies filters to retrieve properties listed for sale, while the other tab retrieve on properties available for daily/monthly rent.

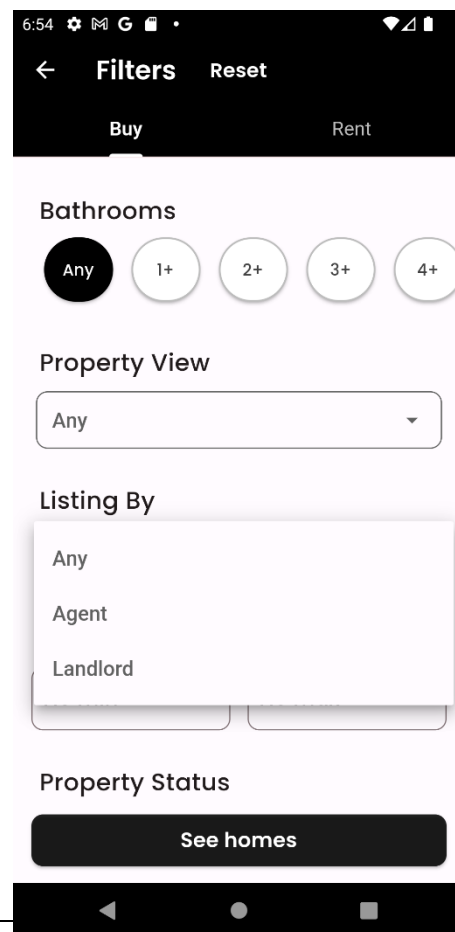
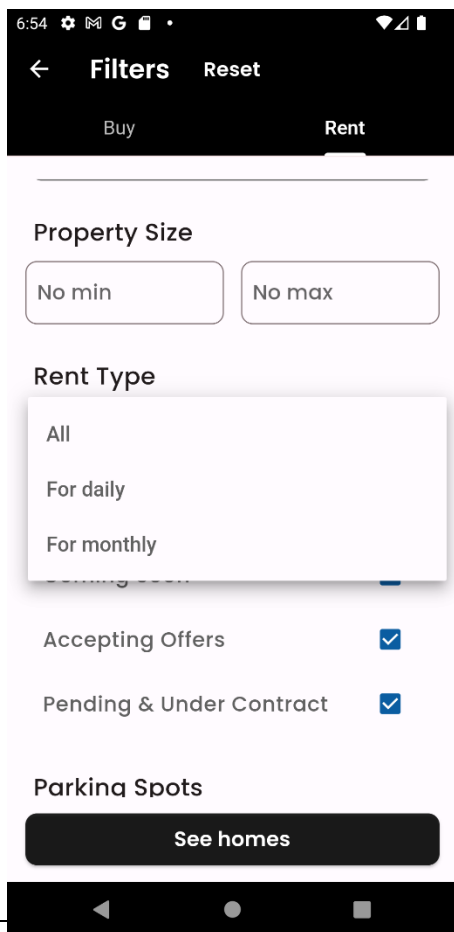
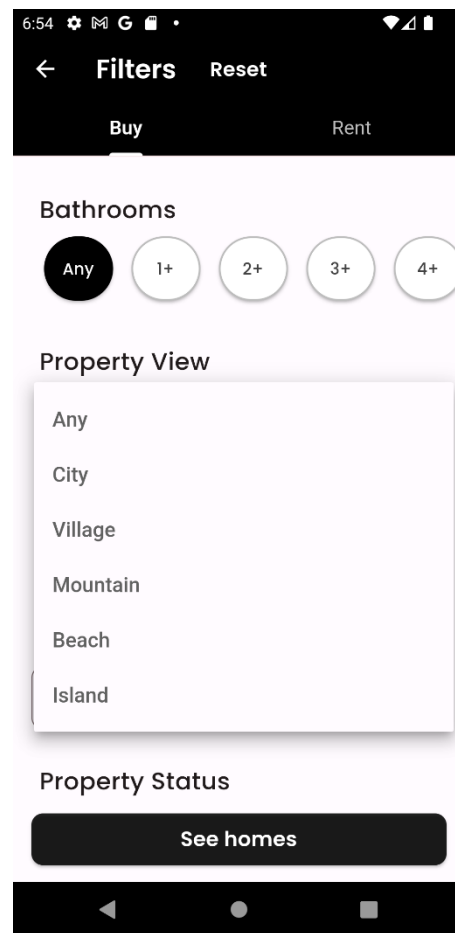
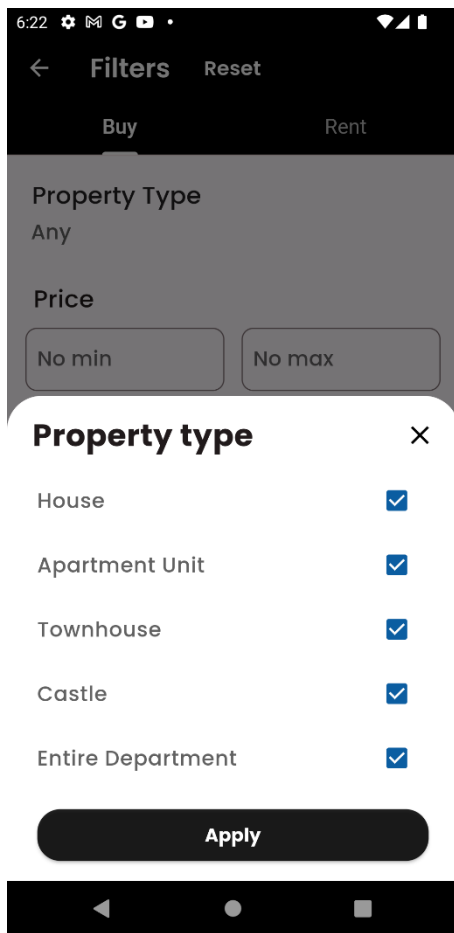


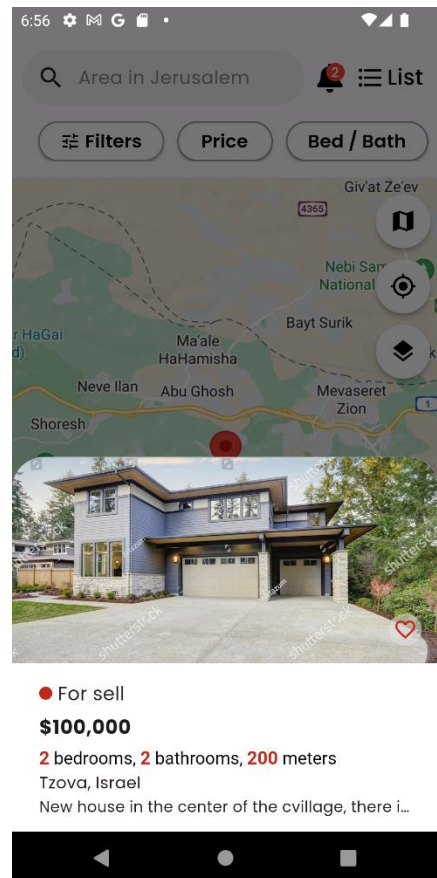
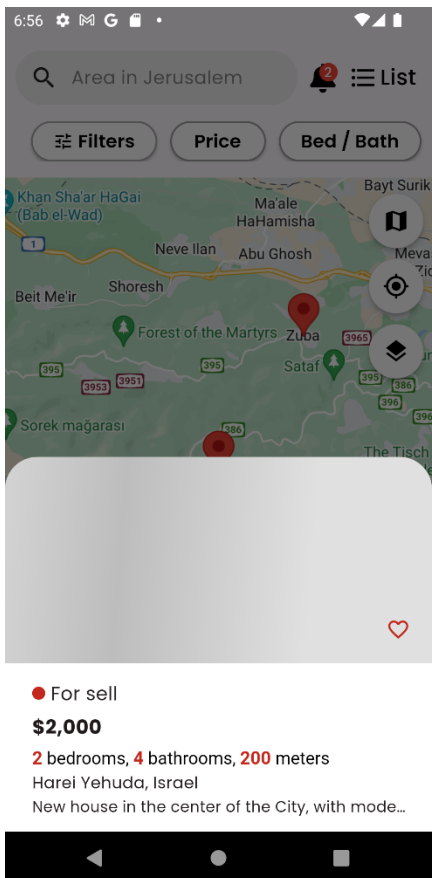
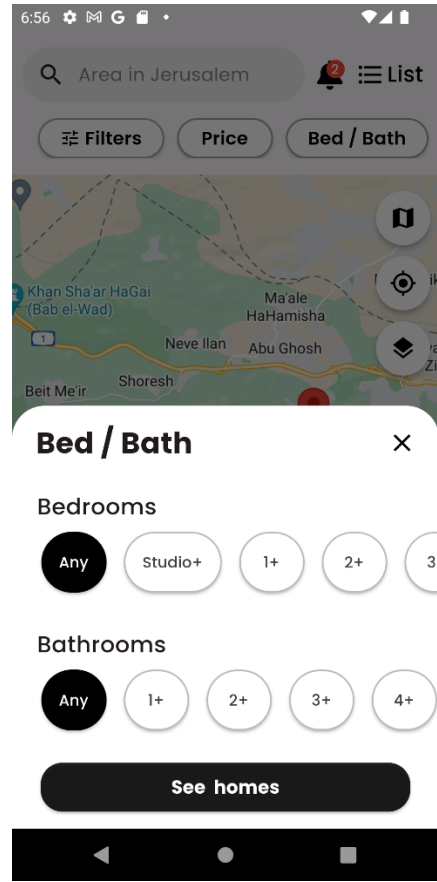
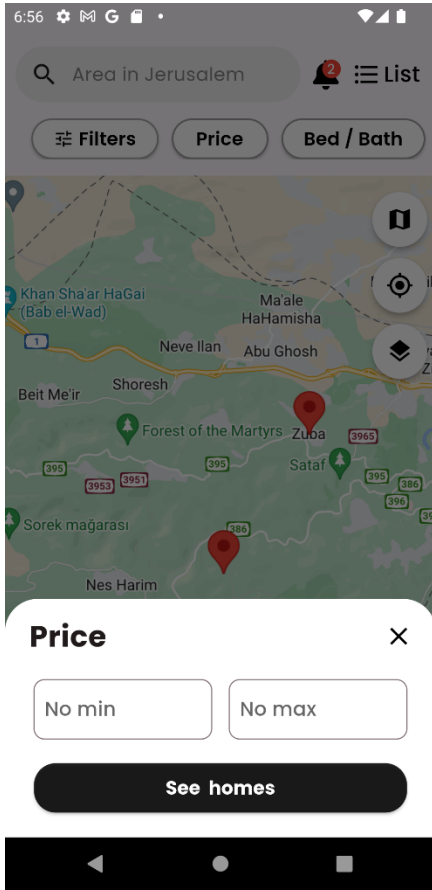
- **Filtering Properties posted for rent:**

Filters:

- Filter by Property Type (House, Department unit, TownHouse, Castle, Entire Department)
- Price Filter (min, max)
- Number of Bedrooms Filter
- Number of Bathrooms Filter
- Property view Filter (City, village, Mountain, ...)
- Filter by Rent Type (Daily/Monthly rent)
- Listing By Filter (Landlord, Agent)
- Property Size Filter (min, max)
- Property Status (Accepting Offers, Coming soon, Ander Contract)
- Filter by number of parking spots
- Filter by is has Basement
- Filter by Built year



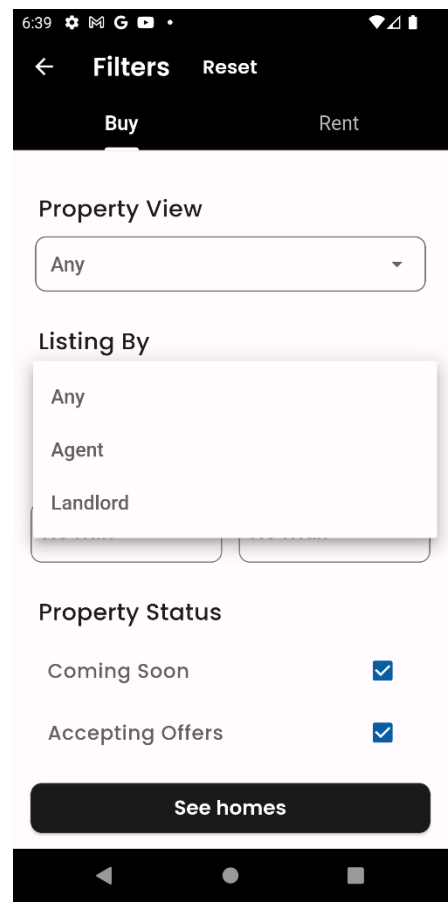
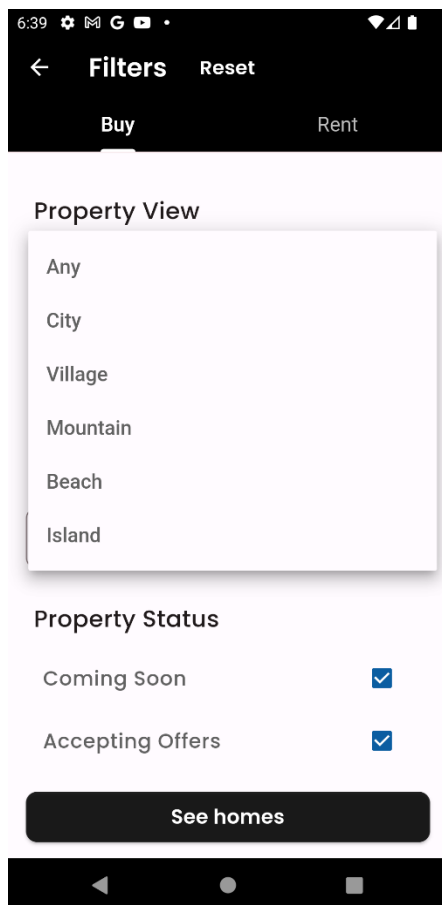
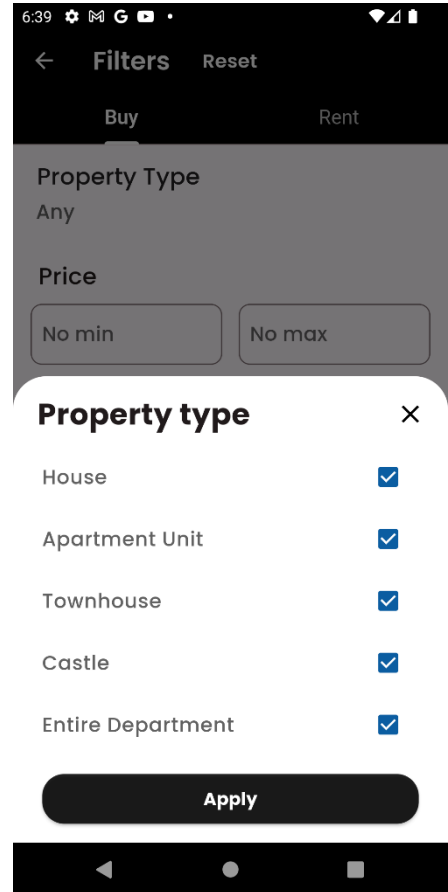




- **Filtering Properties posted for sell:**

Filters:

- Filter by Property Type (House, Department unit, TownHouse, Castle, Entire Department)
- Price Filter (min, max)
- Number of Bedrooms Filter
- Number of Bathrooms Filter
- Property view Filter (City, village, Mountain, ...)
- Listing By Filter (Landlord, Agent)
- Property Size Filter (min, max)
- Property Status (Accepting Offers, Coming soon, Ander Contract)
- Filter by number of parking spots
- Filter by is has Basement
- Filter by Built year

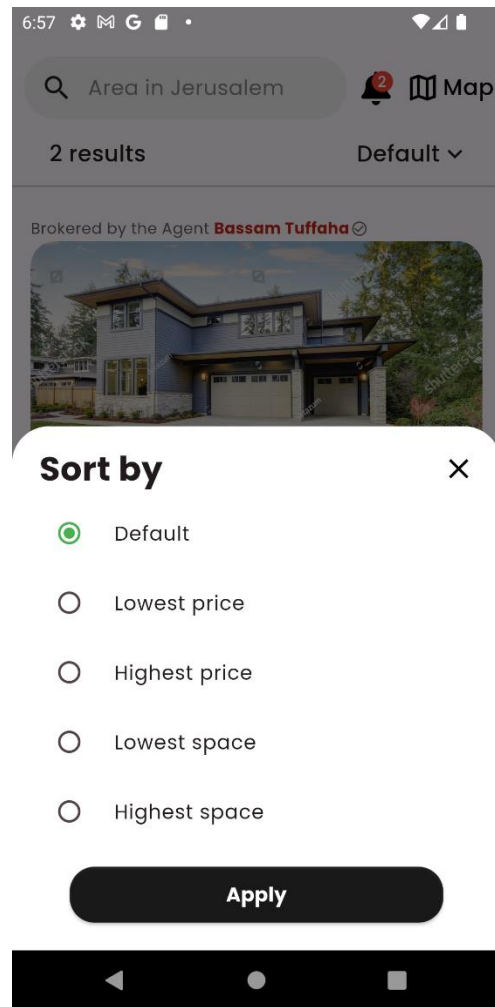
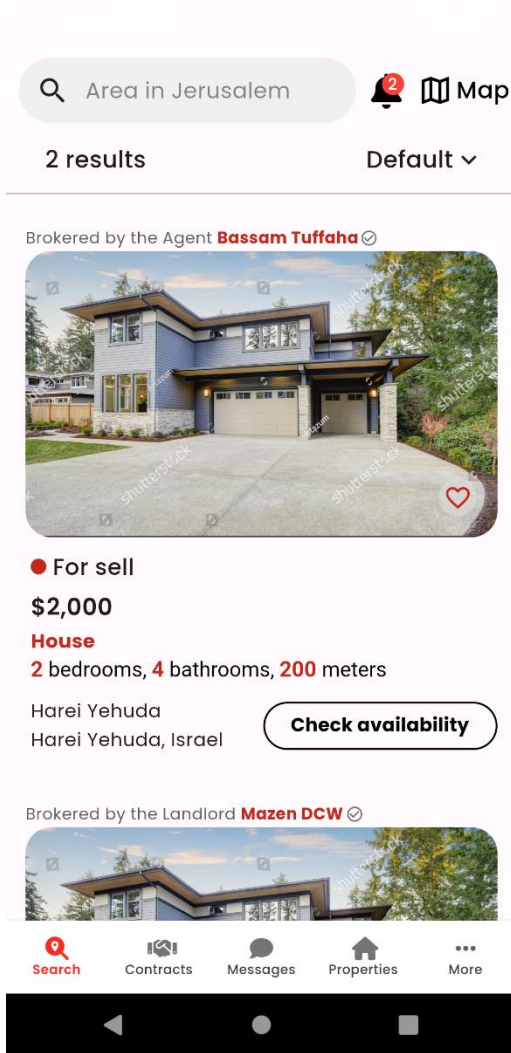


- **Listing properties and Property details:**

As we say before all properties appear in the map, can the user access them as list see details for each property for there type of properties For monthly rent

For daily rent

For sell



- **For Sale Property Details:**

All details that can be used for filtering purposes are available within the property details. Additionally, users can view the landlord's profile and history and property history price for transactions. If a user wishes to purchase the property after taking a tour, they need to submit an application. This allows the landlord to also review the customer's profile.

Year built Property view

House / 1 Units
Property type

Harei Yehuda, Harei Yehuda
Israel

This property does not have parking
Are you looking for parking?

Property Status:
This property is available, accepts requests and offers.

Request to Buy **Request a Tour**

For sell

\$2,000

Property Code
704 405 779 3

2 bedrooms, 4 bathrooms, 200 meters

Built in 2020
Year built

Mountain
Property view

House / 1 Units
Property type

Request to Buy **Request a Tour**

Posted by a **Agent**

Bassam Tuffaha
Click here to see history

Property
Click here to see history

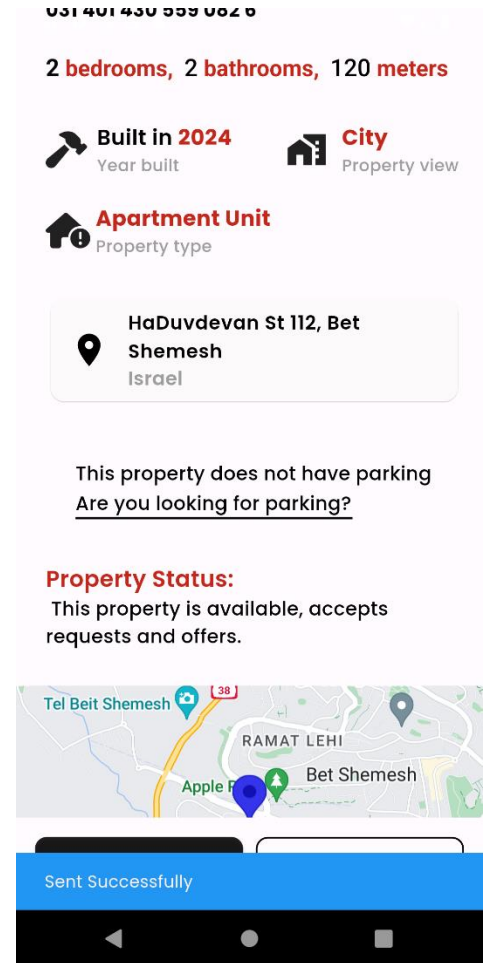
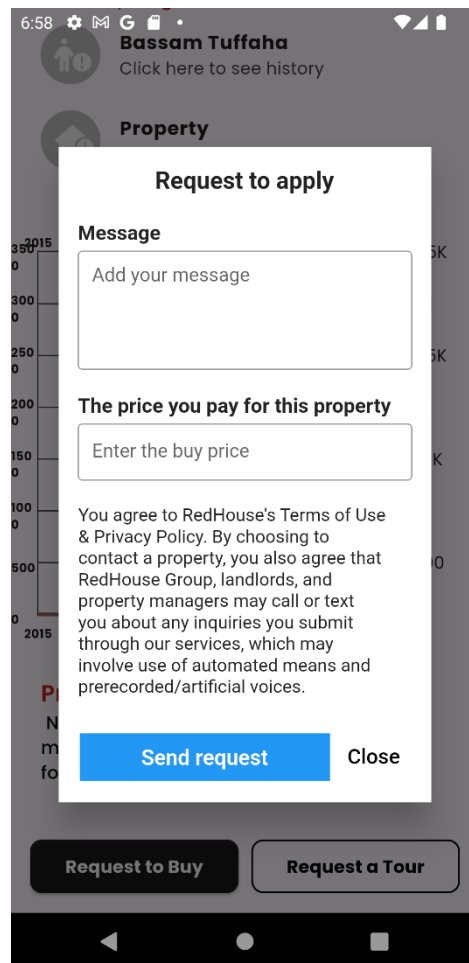
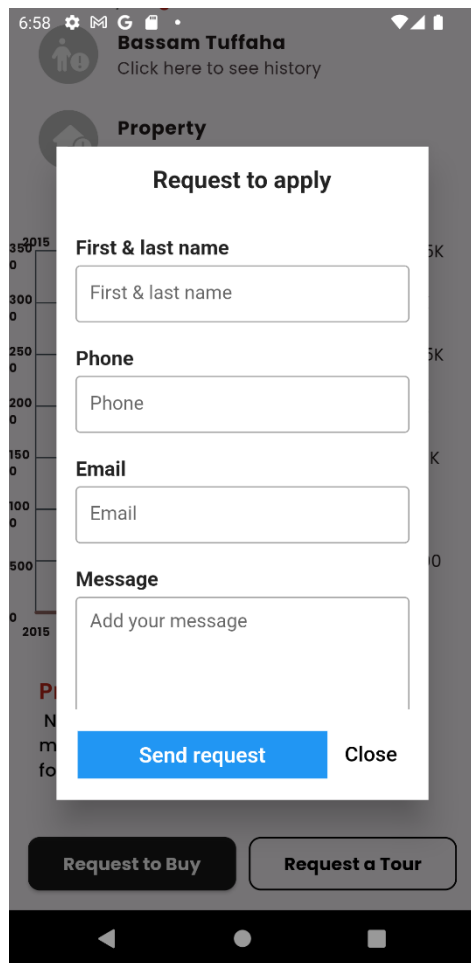
Property Description:
New house in the center of the City, with modern style and medtorean fation, good for investment

Request to Buy **Request a Tour**

Year	Price (K\$)
2015	0
2016	0
2017	0
2018	0
2019	0
2020	0
2021	0
2022	0
2023	3.5
2024	3.5

- **Request to buy:**

. If a user wishes to purchase the property, they need to submit an application including name and email, message and suggested price. This allows the landlord to also review the customer's profile and history.



- **For Monthly rent Property Details:**

The same details in the property for sell

.also If a user wishes to rent the property, they need to submit an application including name and email, message and suggested price. This allows the landlord to also review the customer's profile and history.



• For monthly rent

\$1,300 / monthly

Property Code

031 401 430 559 082 6

2 bedrooms, 2 bathrooms, 120 meters

Built in 2024
Year built

City
Property view

Apartment Unit
Property type

HaDuvdevan St 112, Bet

Request to Rent

Request a Tour

031 401 430 559 082 6

2 bedrooms, 2 bathrooms, 120 meters

Built in 2024
Year built

City
Property view

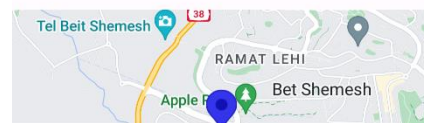
Apartment Unit
Property type

HaDuvdevan St 112, Bet Shemesh
Israel

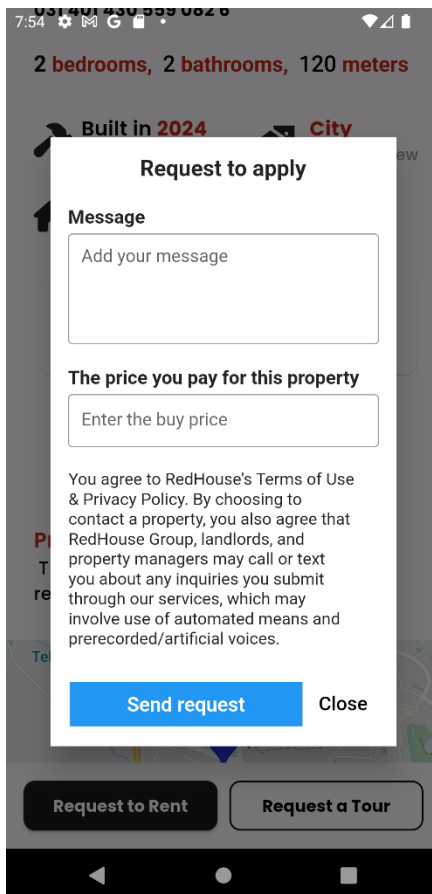
This property does not have parking
Are you looking for parking?

Property Status:

This property is available, accepts requests and offers.

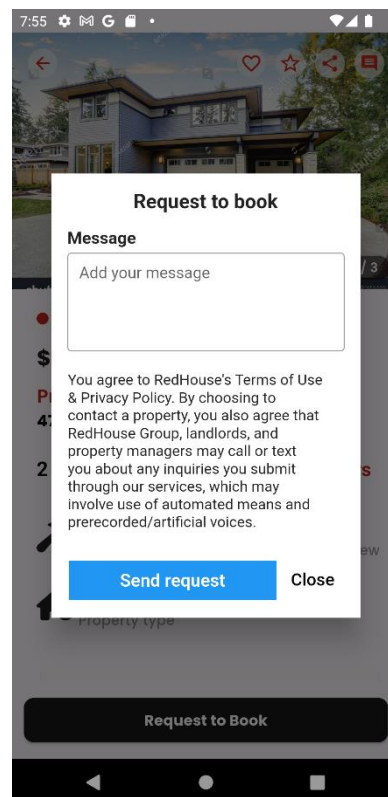
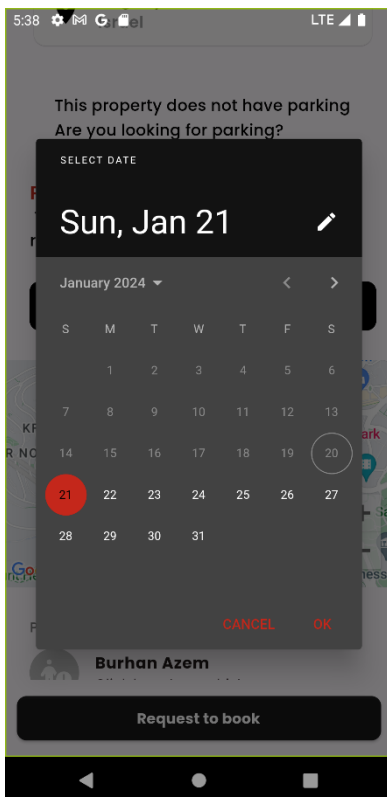
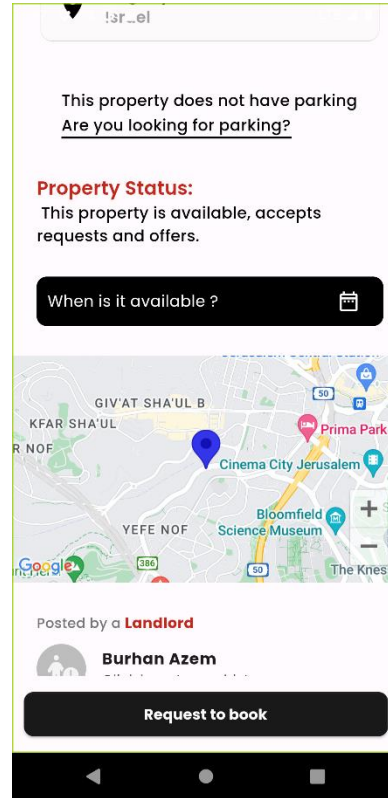
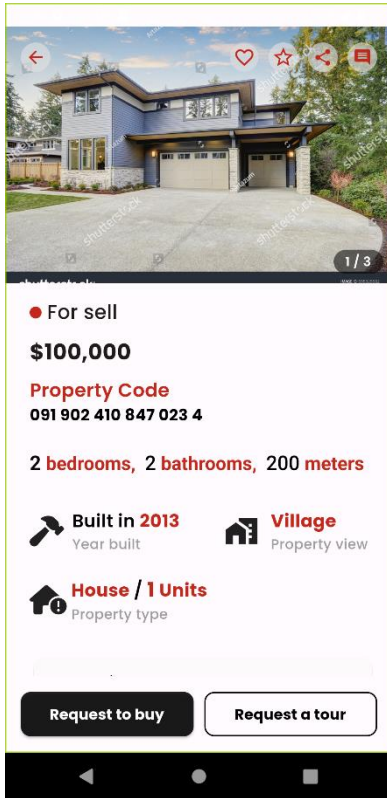


Sent Successfully



- **For Daily Rent Property Details:**

Similar details are provided as for properties for sale and monthly rent, with the addition of information about the property's available days. To booking, users need to submit an application containing their name, email, message, and suggested price. This process allows the landlord to review the customer's profile and history.



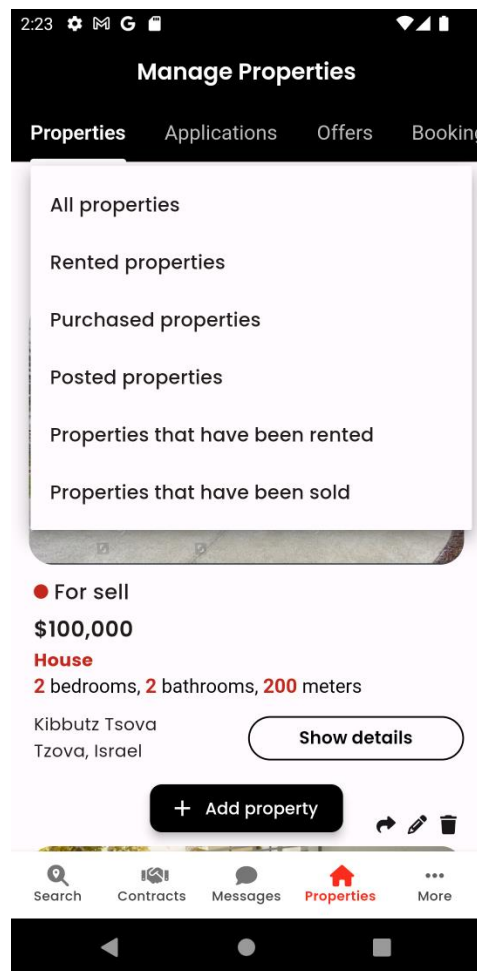
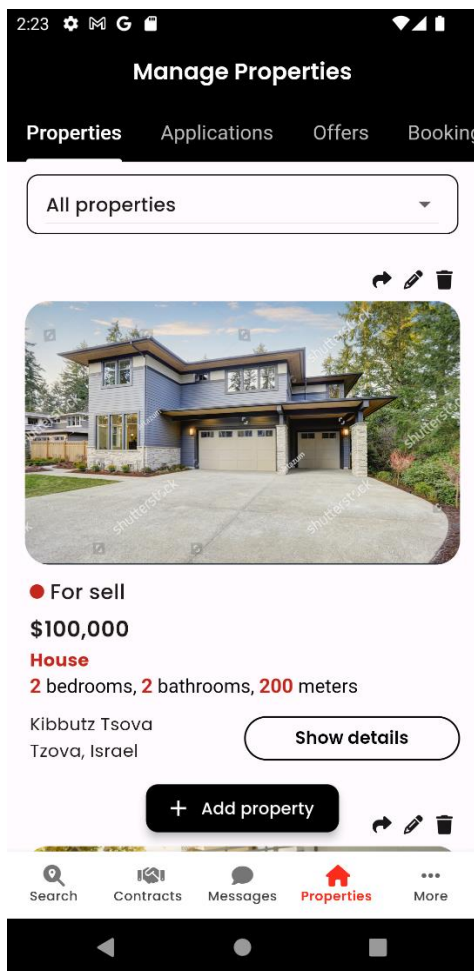
- **Manage Properties:**

On the Manage Properties page, you can control and monitor properties, applications, offers, and bookings. Below, each topic will be explained in detail.

- **Properties:**

In the Properties tab, you can add, update, delete, and view details of each property. Additionally, users can apply filters to view specific categories of properties, such as:

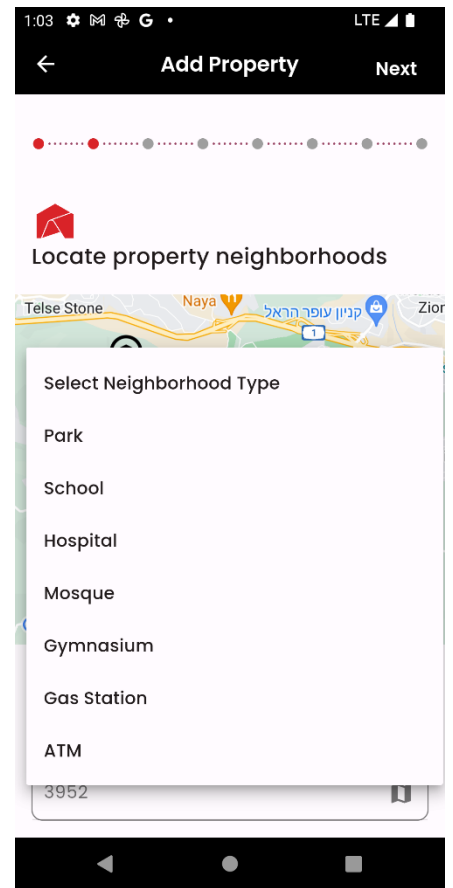
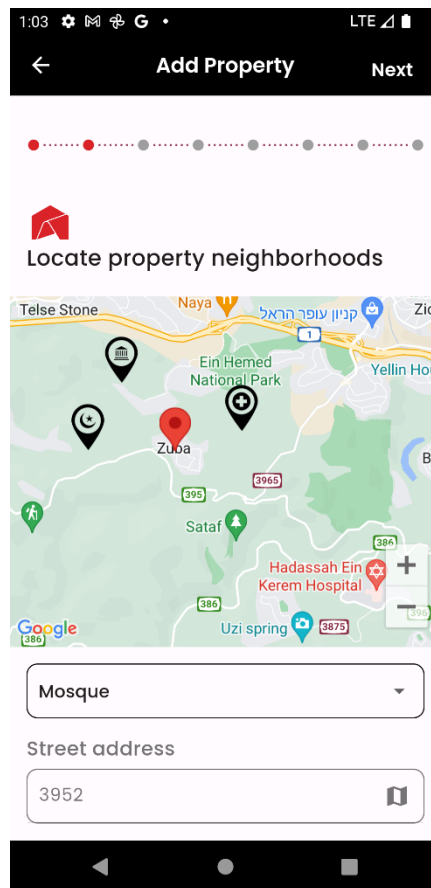
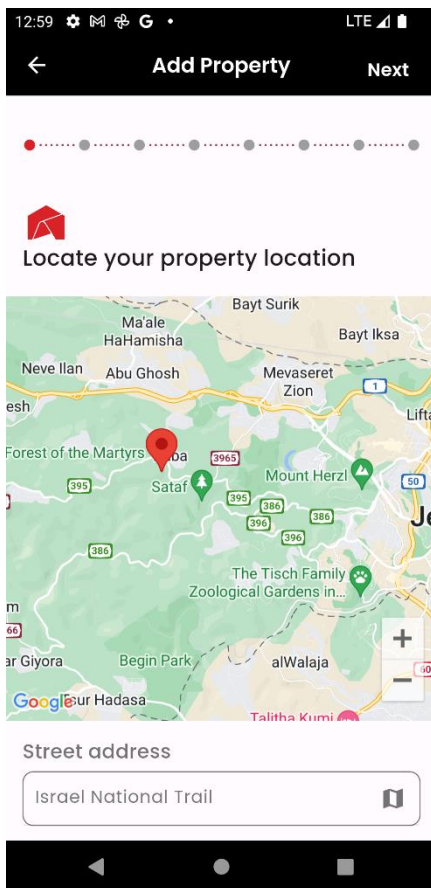
- Rented properties
- Purchased properties
- Posted properties (user properties)
- Properties that have been rented
- Properties that have been sold
- All properties (including the above properties)



- **Add Property:**

The user starts adding the property by:

- Selecting the location of the property on the map.
- Adding neighborhoods of the property, such as hospitals, mosques, and schools.
- Providing other details of the property, including square meter area, price, property type, property status (accepting offers, coming soon), built year, number of bedrooms, number of bathrooms, and pictures of the property.





Enter information about the property type

Property type

House

Number of units (if needed)

#

Listing type

- For daily rent
- For monthly rent
- For sell



Enter more information about your property

Property price

Example: 2000

Parking spots

Example: 3

Is available basement ?

Yes

Property view

City



Enter information about the property type

Property type

- House
- Apartment Unit
- Townhouse
- Castle
- Entire Department

- For daily rent
- For monthly rent
- For sell



Enter more information about your property

Property description

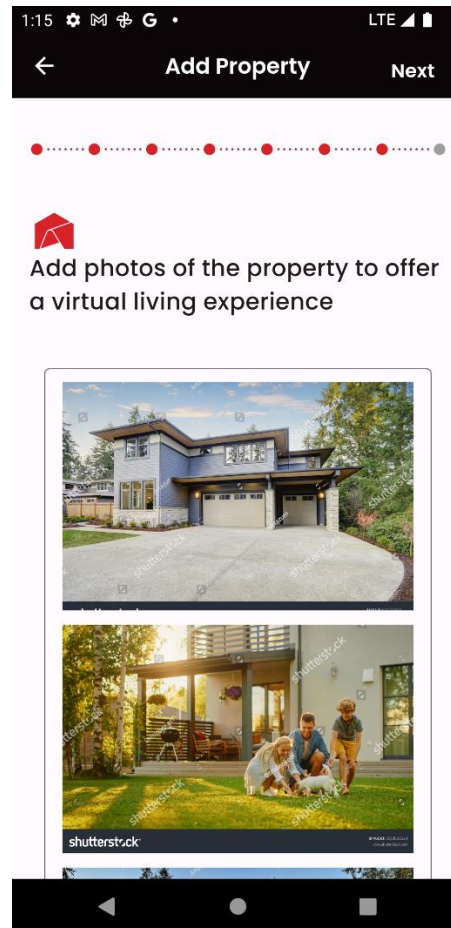
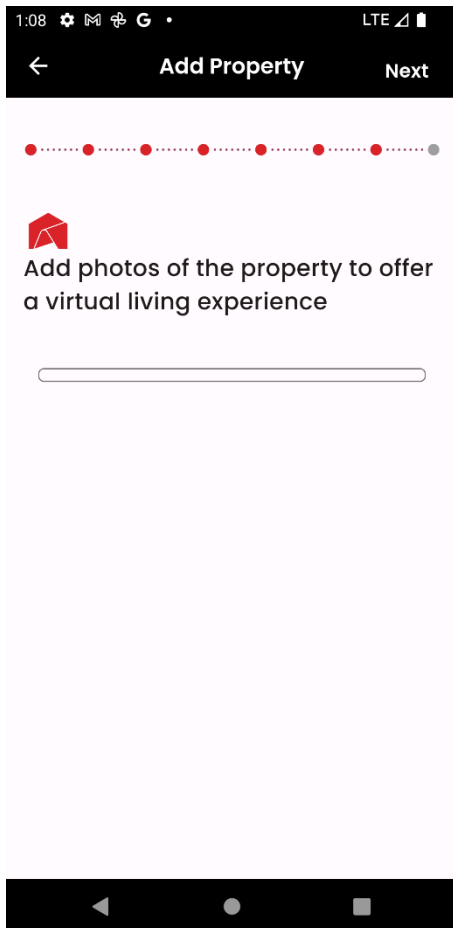
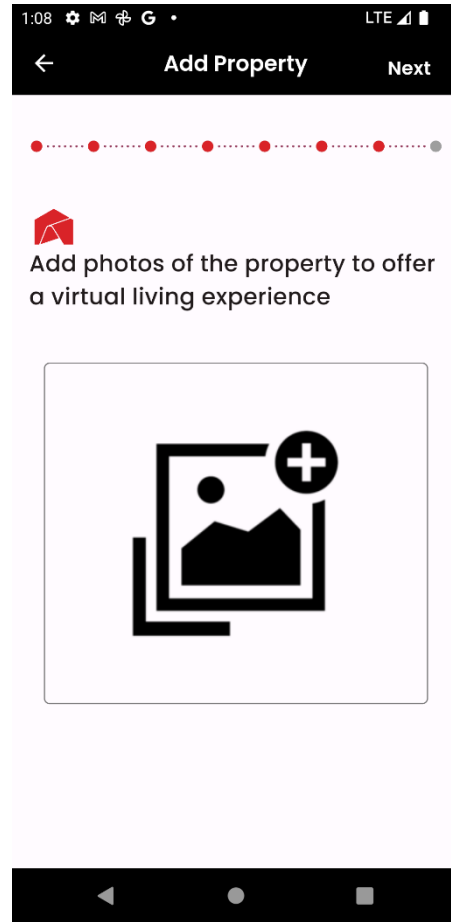
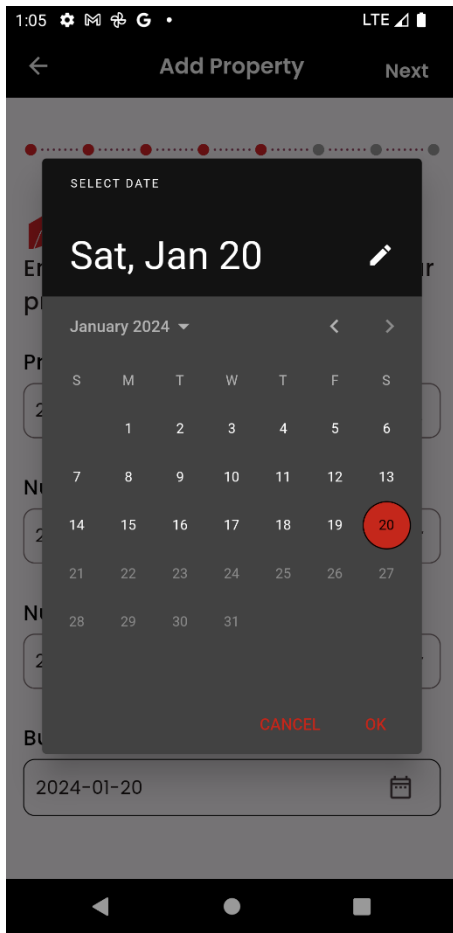
New house in the center of the cvillage, there is close schol and very beautiful view.

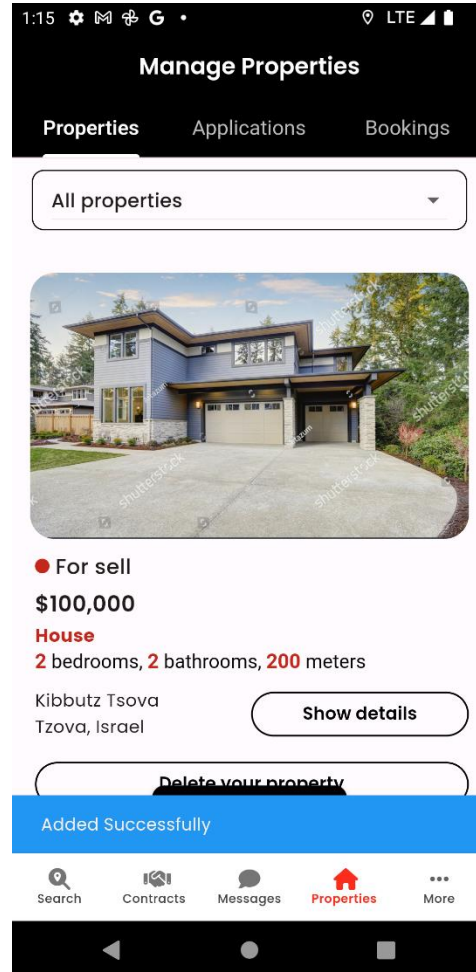
Property status

- Coming soon
- Accepting offers

2024-01-20

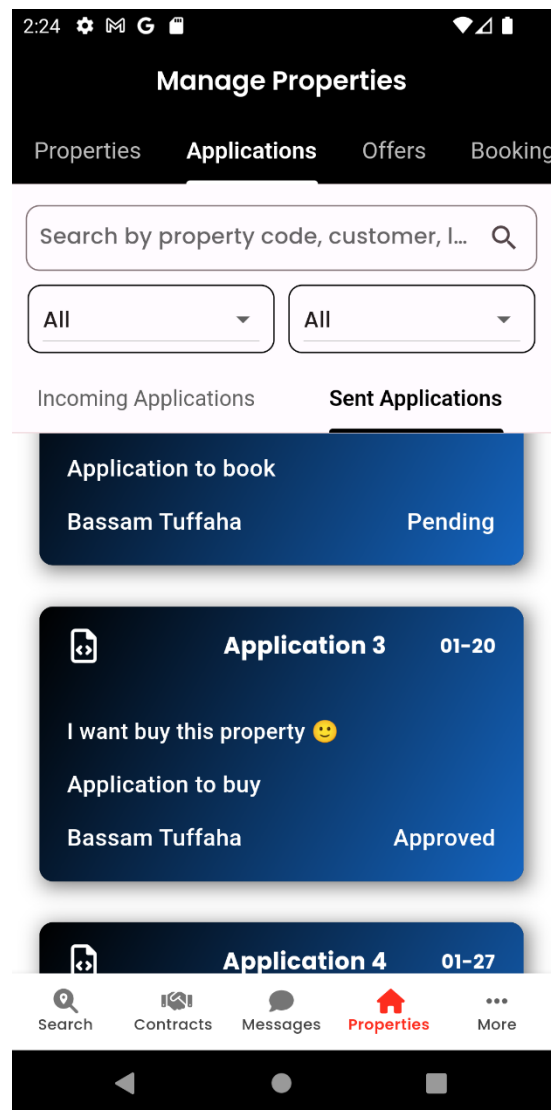
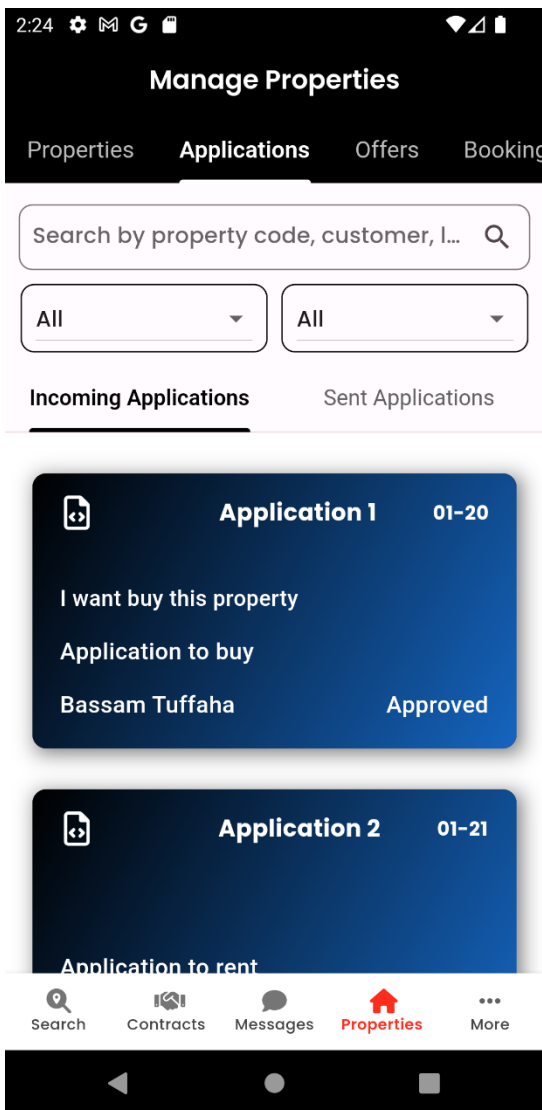






- **Applications:**

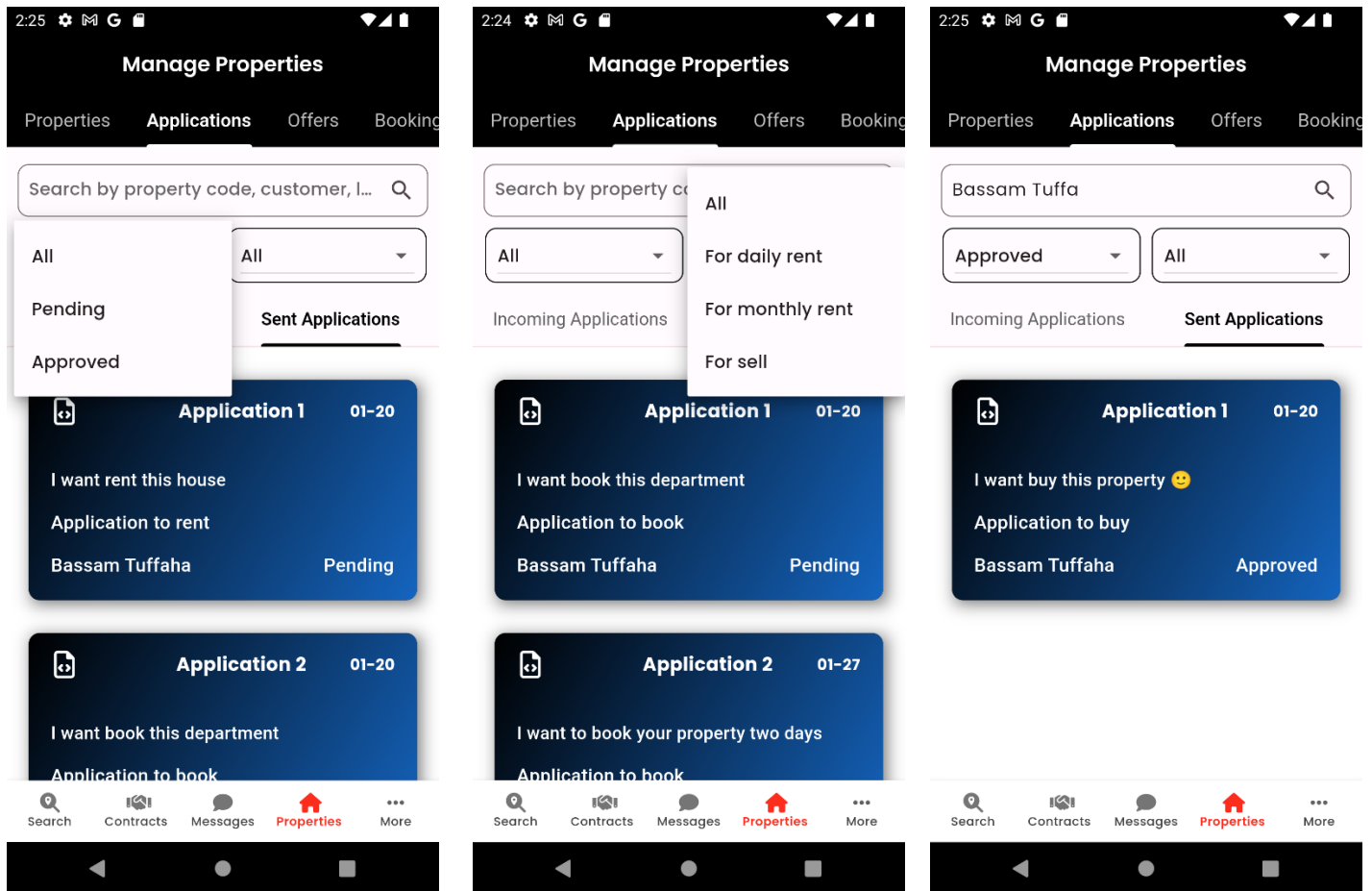
In the Applications tab, there are two main tabs: Incoming applications, which display the applications applied to the user properties, and Sent Applications, which show the applications sent by the user to other properties.



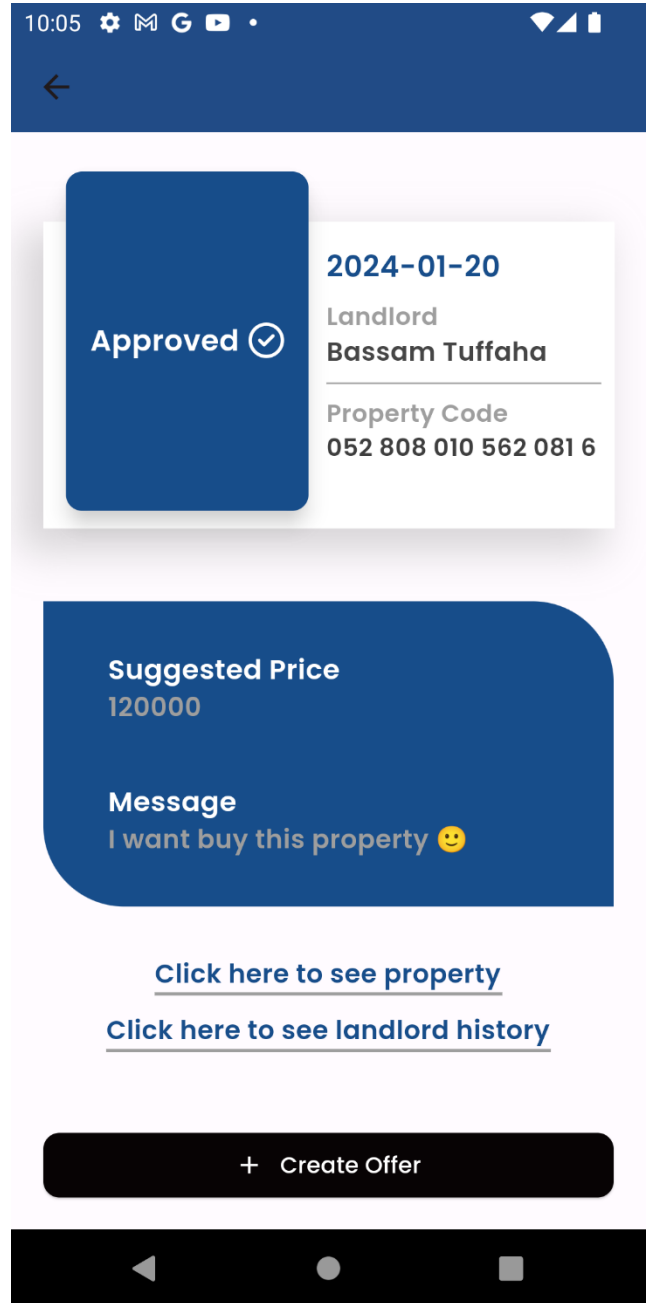
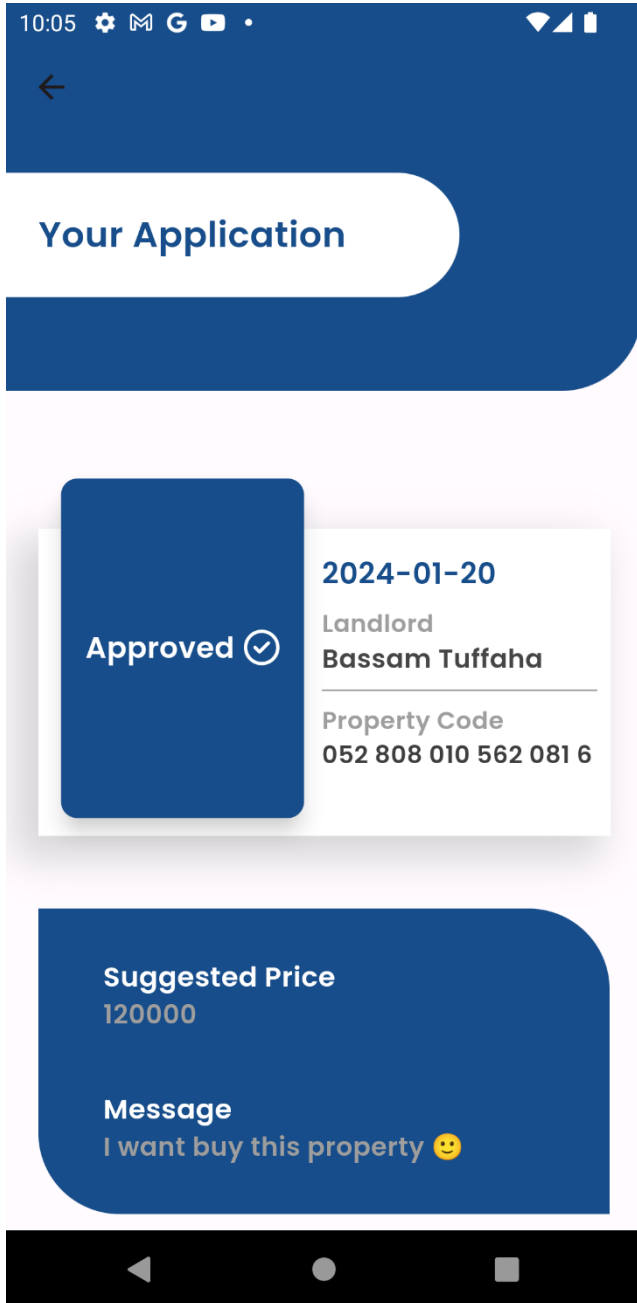
- **Applications:**

Additionally, the Applications tab has a search box (search by property code, user's name, etc.) and two filters as follows:

- o Filter for application status (Pending, Approved, All)
- o Filter for property type in the applications

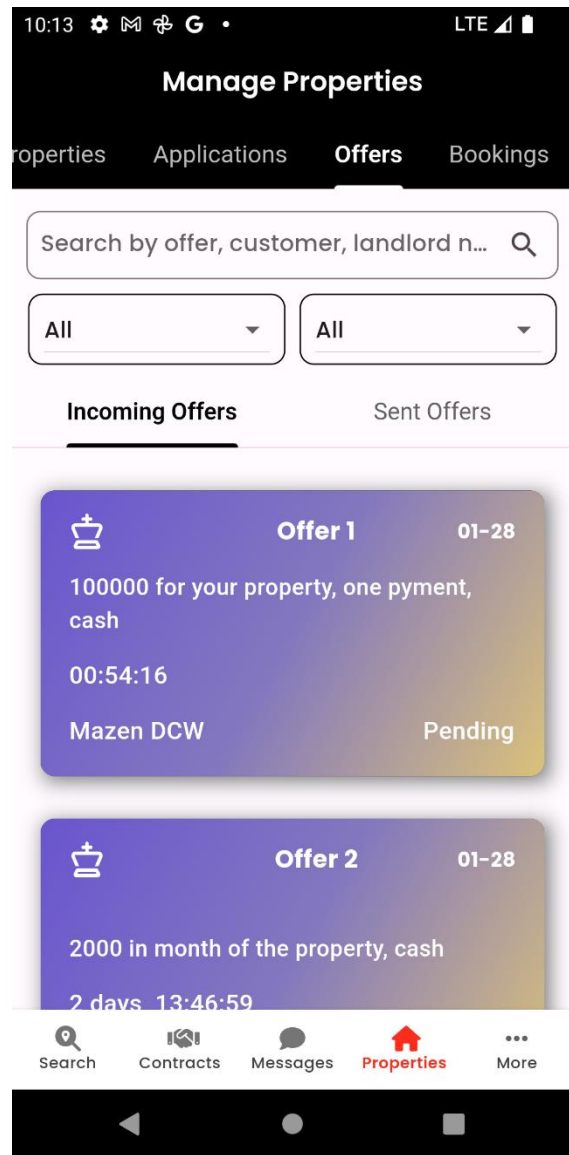
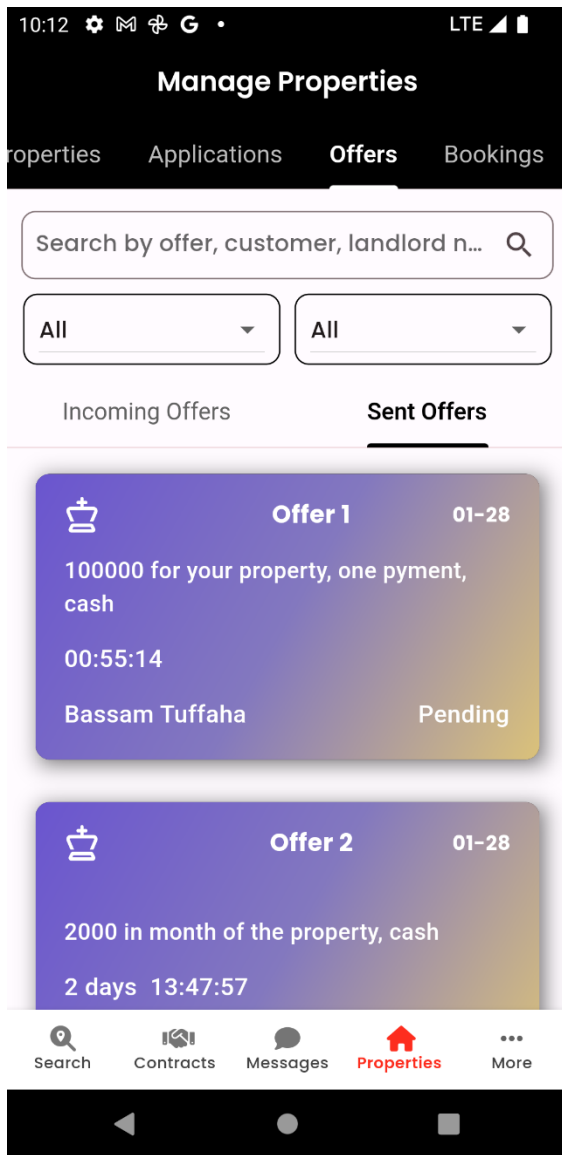


• Applications details:



- **Offers:**

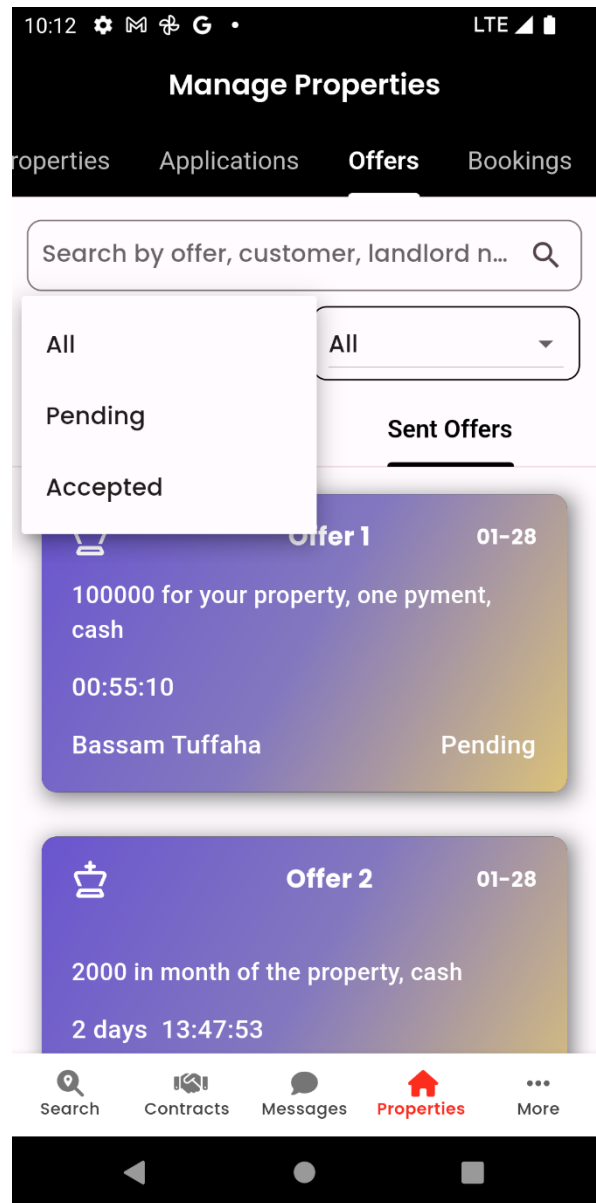
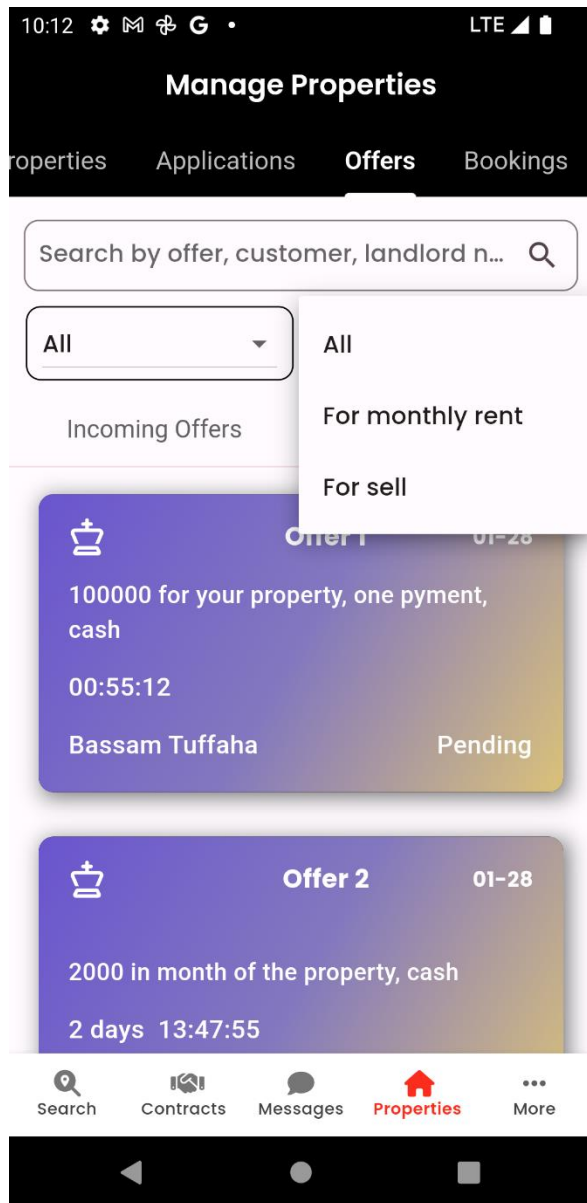
In the Offers tab, there are two main tabs: Incoming offers, which display the offers presented to the user properties, and Sent Offers, which show the offers sent by the user to other users.



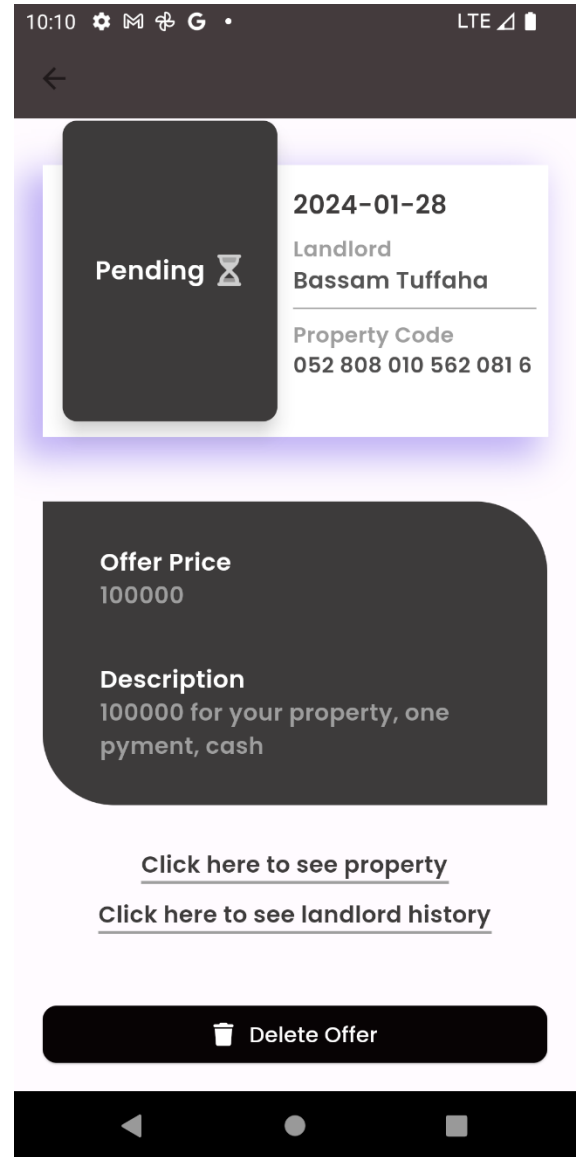
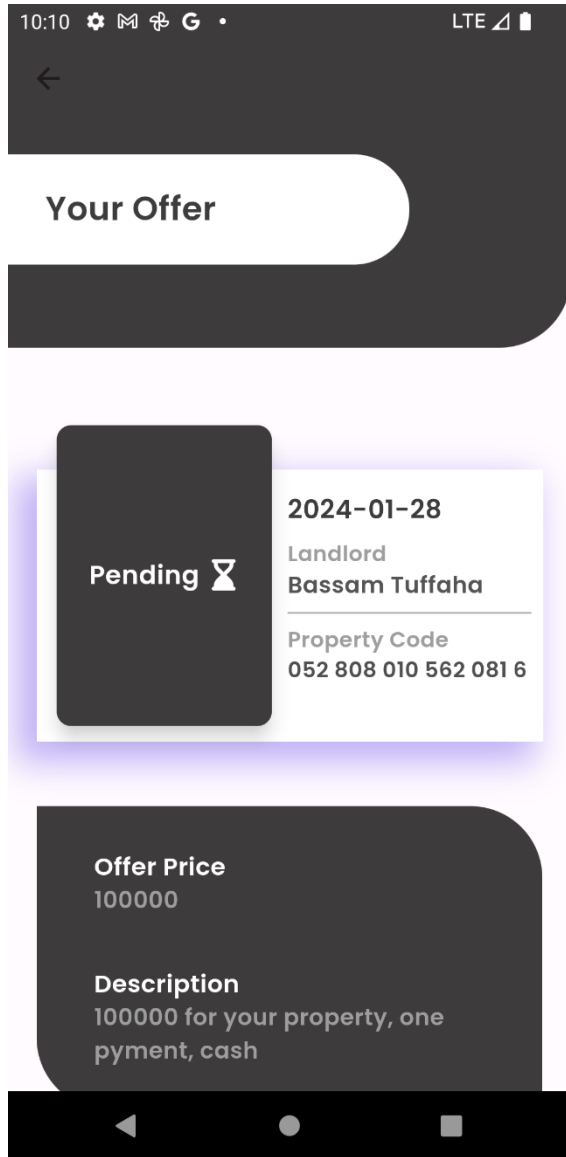
- **Offers:**

Additionally, the Offers tab has a search box (search by property code, user's name, etc.) and two filters as follows:

- o Filter for Offers status (Pending, Approved, All)
- o Filter for property type in the Offers

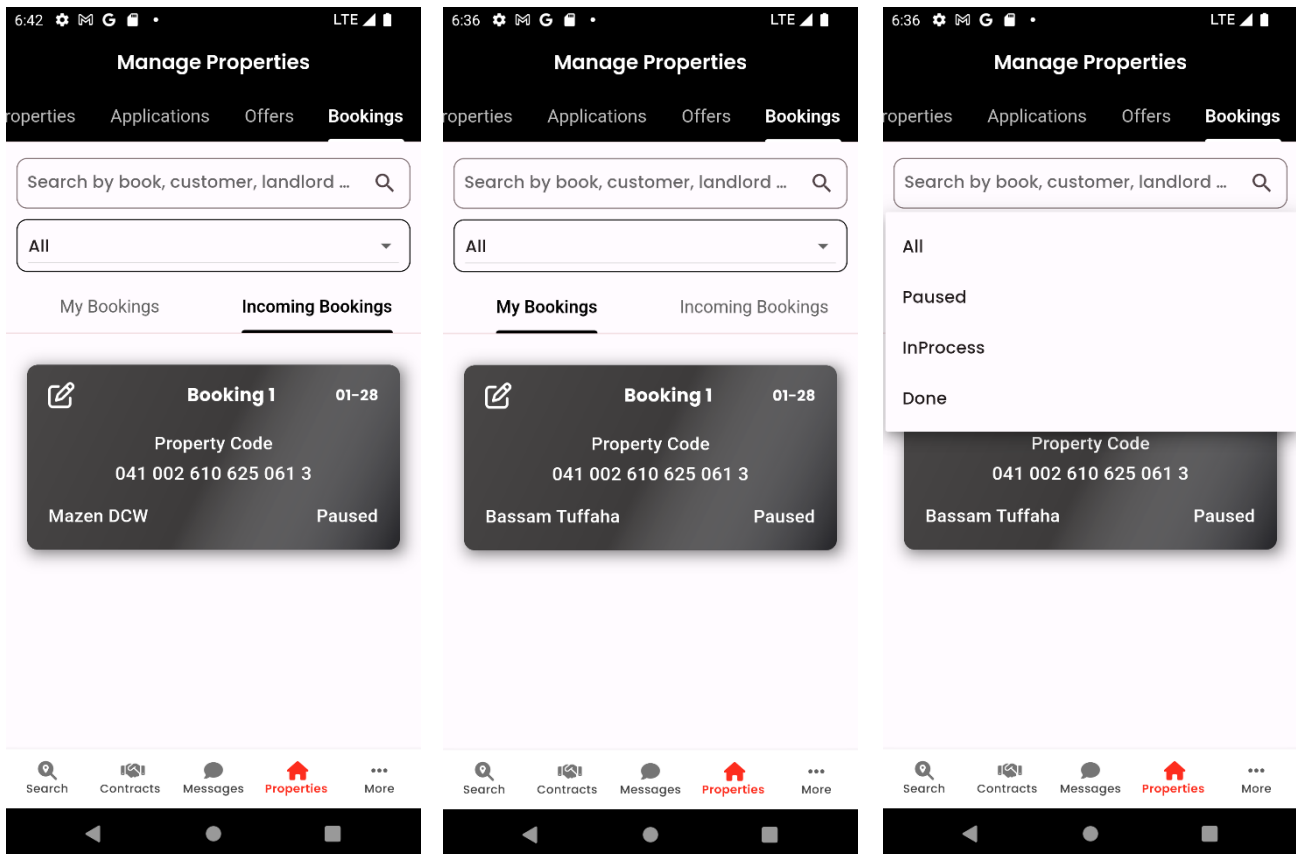


• Offers details:



- **Bookings :**

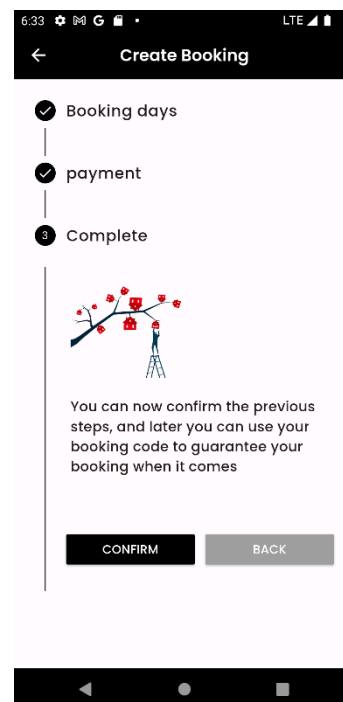
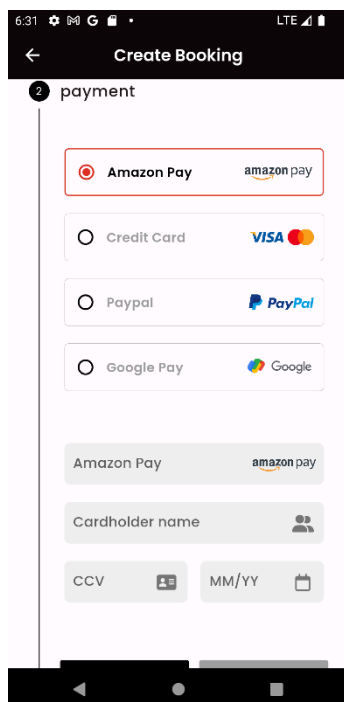
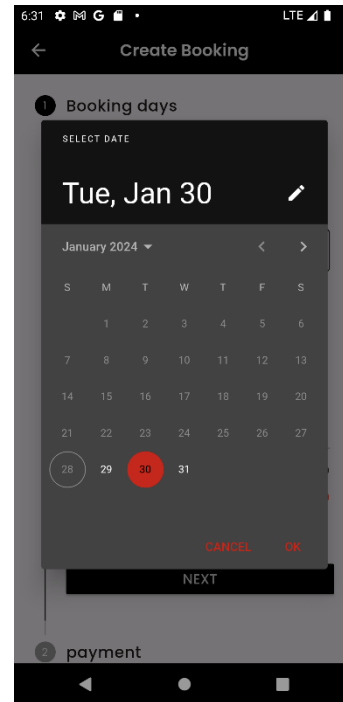
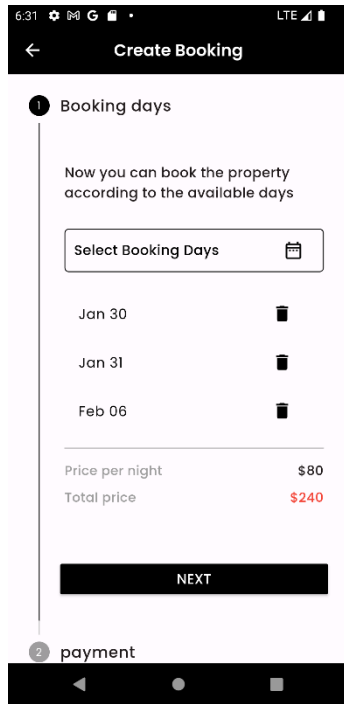
In the Bookings tab, there are two main tabs: Incoming Bookings, which display the Bookings that made it user to the user's properties, and My Bookings, which show the Bookings sent by the user to other users properties.



Booking Process:

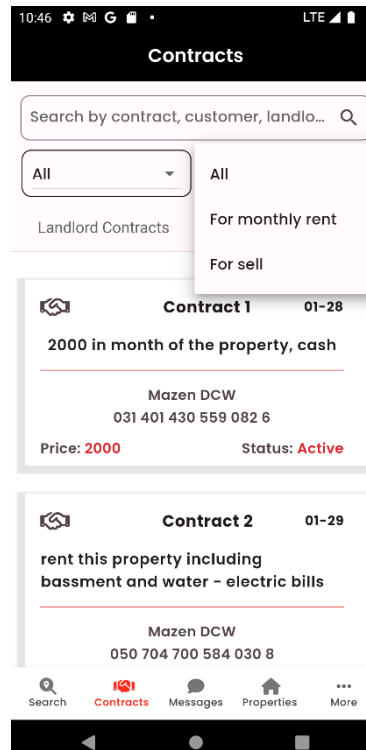
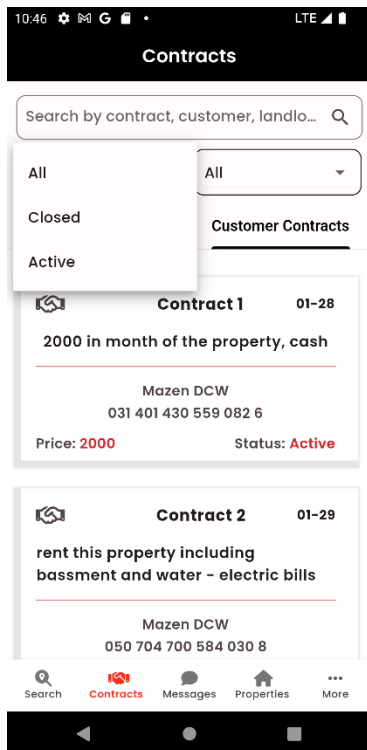
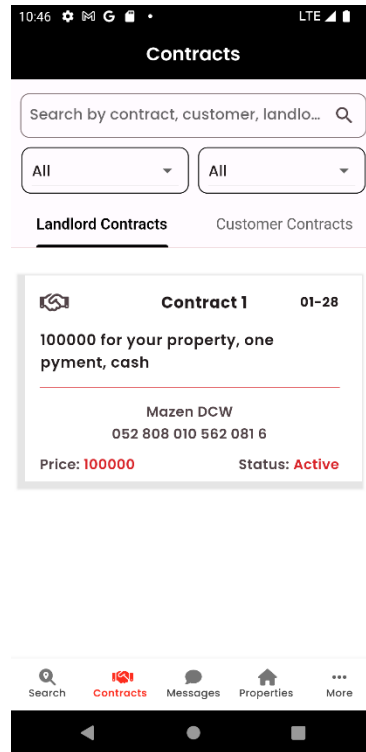
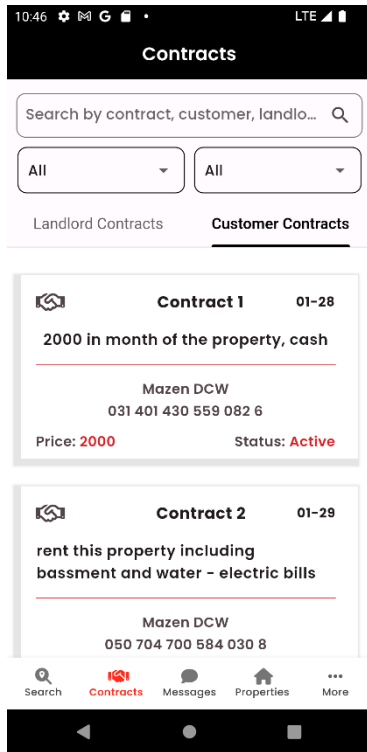
To book a property, users need to go through a 4-step process:

- Select available days.
- Pay the price for the booking days.
- Confirm the booking.
- Once the booking is created, background processes will monitor booking days and validate the booking code based on the current day.



- **Contracts:**

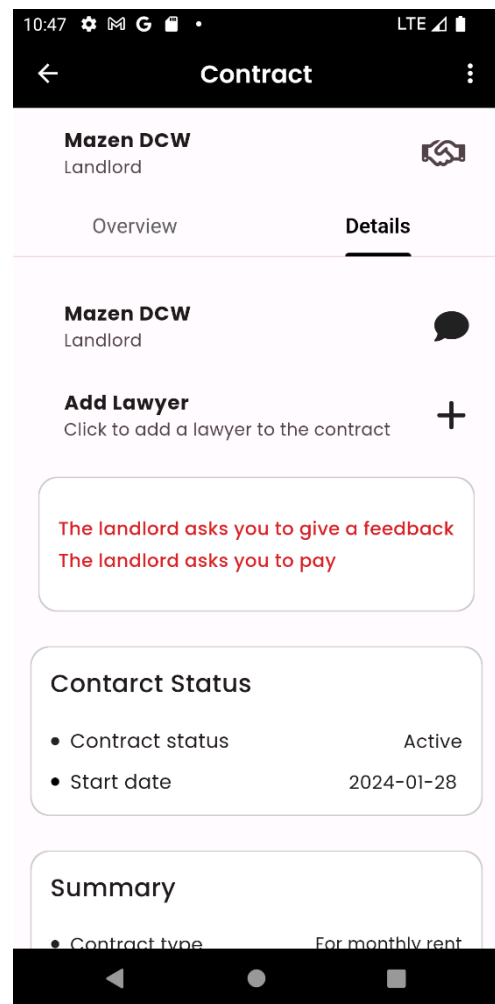
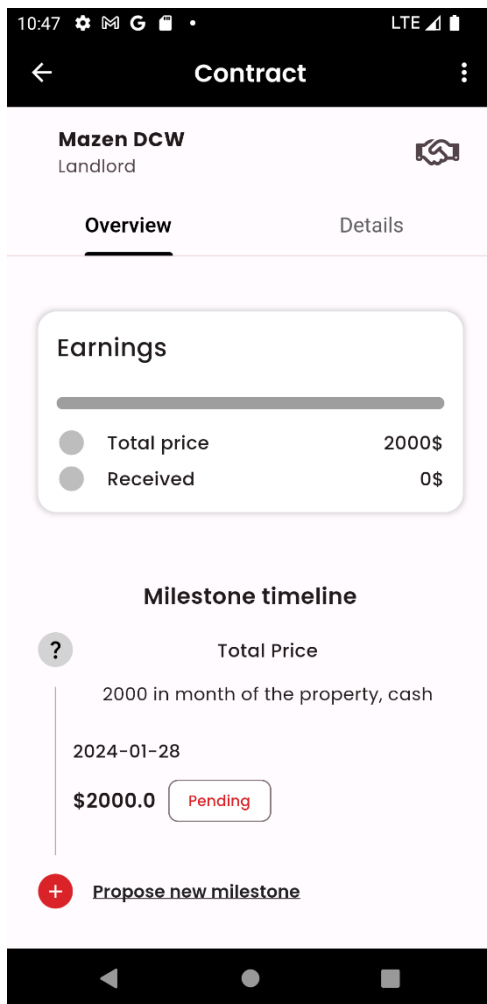
In the Contracts page, there are two main tabs: Landlord contracts, which display the contracts in which the user, signed into this account, plays the role of the landlord, and Customer contracts, which show the contracts in which the user, signed into this account, plays the role of the customer in the contract.



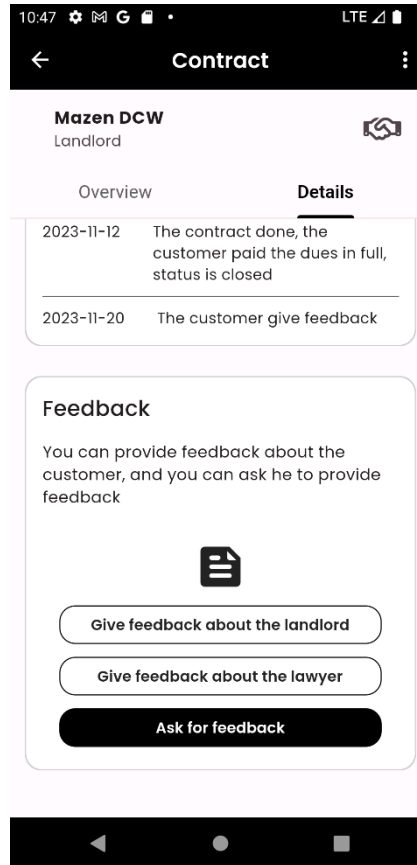
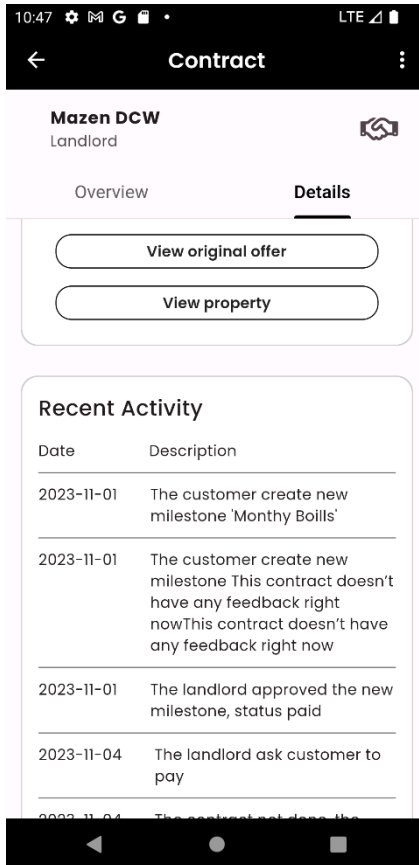
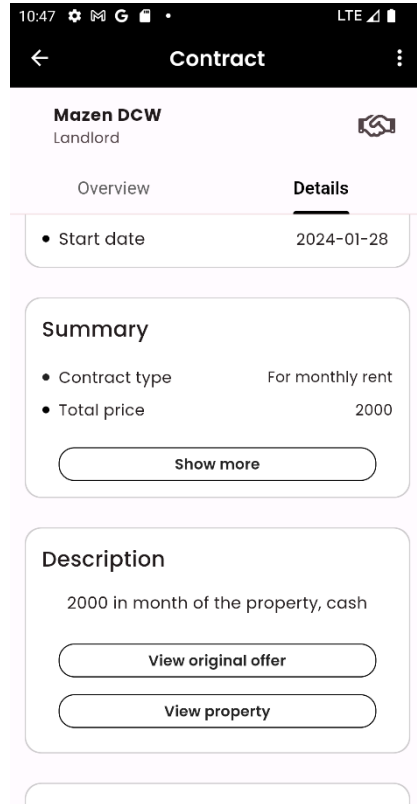
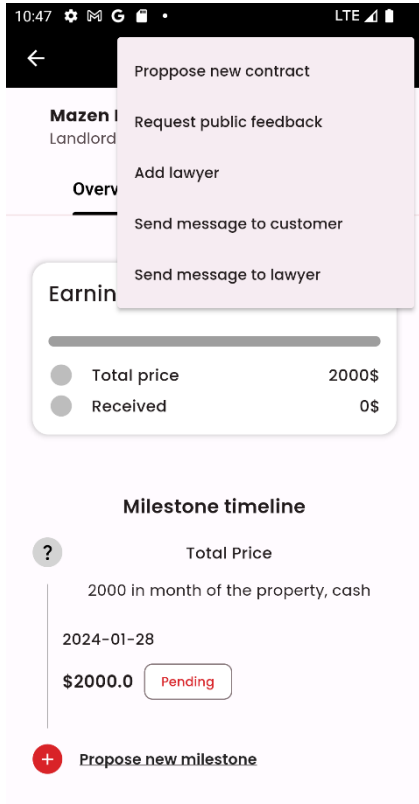
- **Customer contract Details**

Here, on the customer contract side, the user will see the landlord's name and some details about the contract, such as the price (total or monthly based on the type of contract) and the user's progress in payments. Below this valuable information, milestones (payments) will be displayed, and the user (customer) can create a new milestone. Once this milestone is paid, the landlord will approve it.

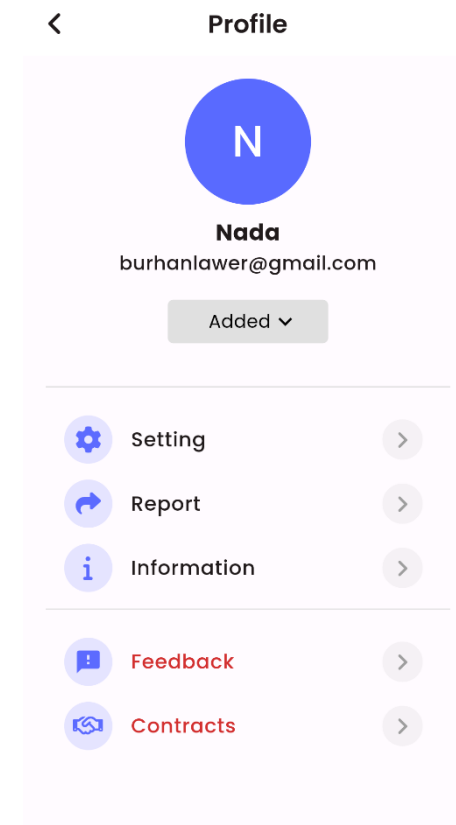
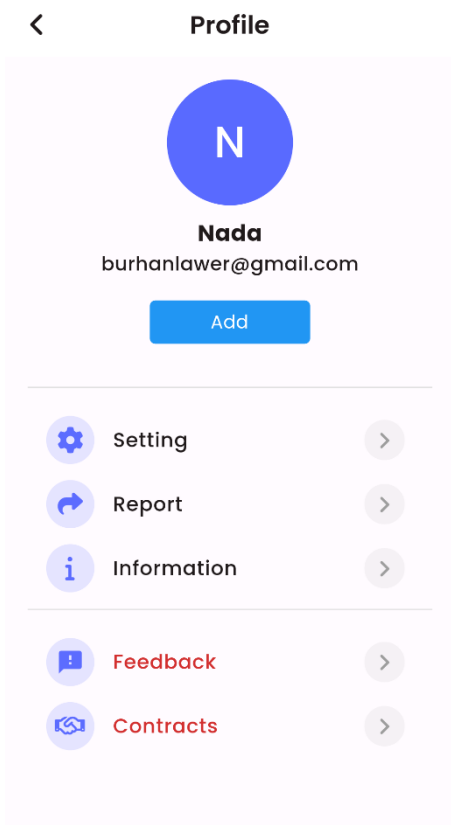
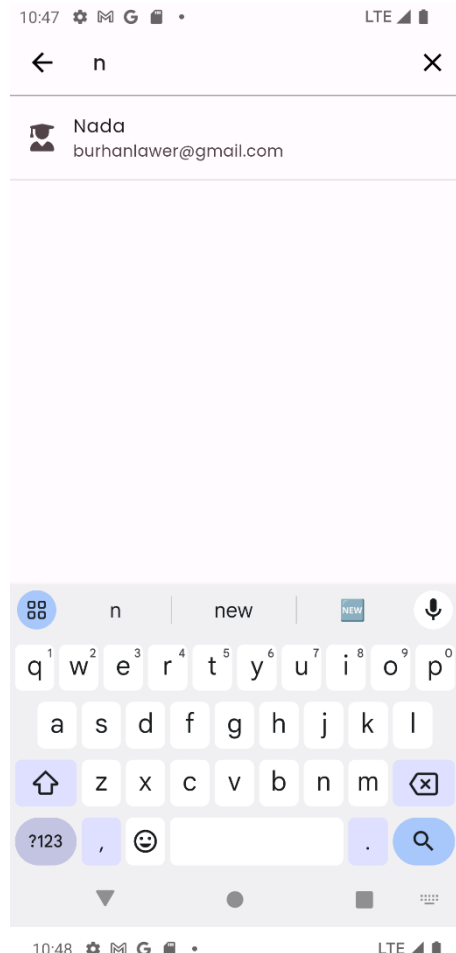
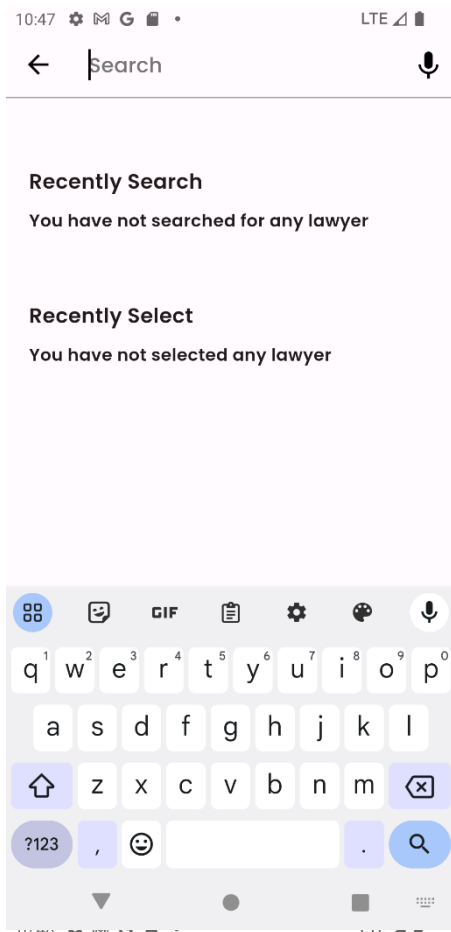
In the details tab, contacts (customer and lawyer if added) will be shown, and one of the contract members can add a lawyer to monitor the contract.



- **Customer contract Details**

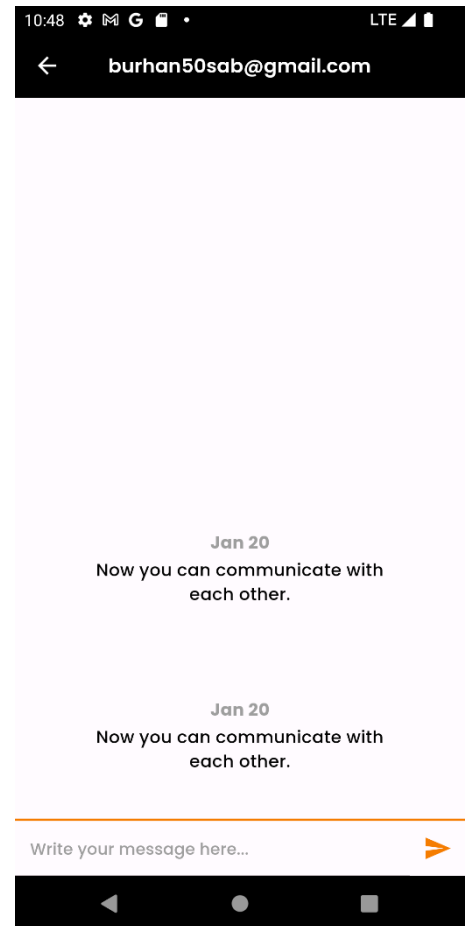
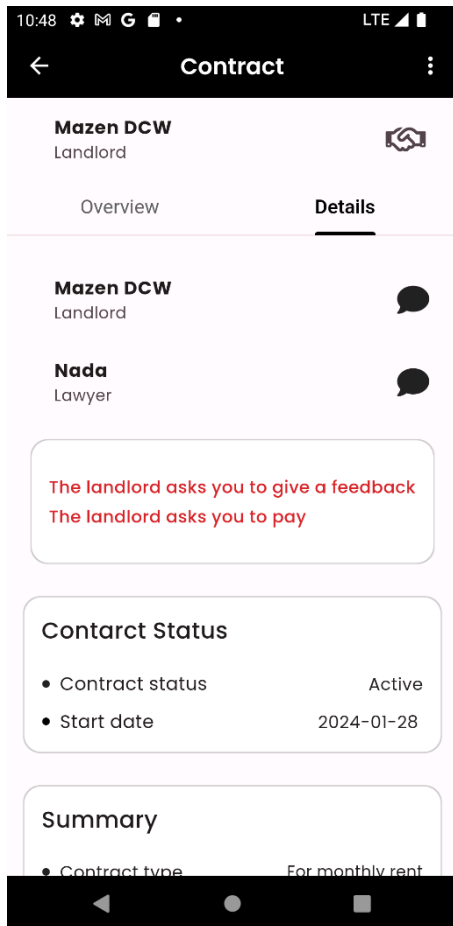


- **Add lawyer to contract**



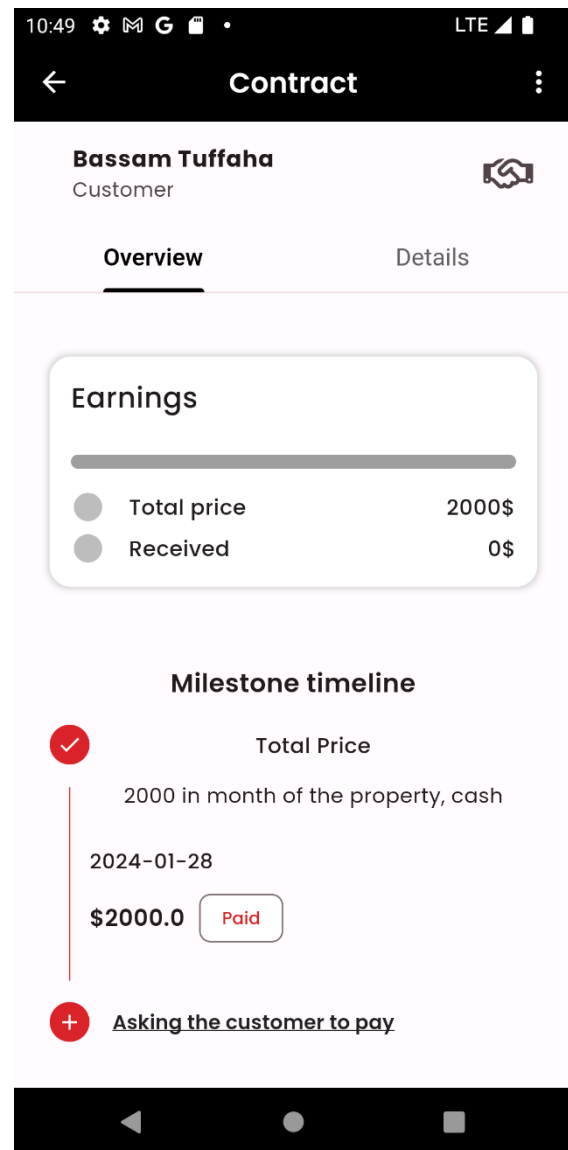
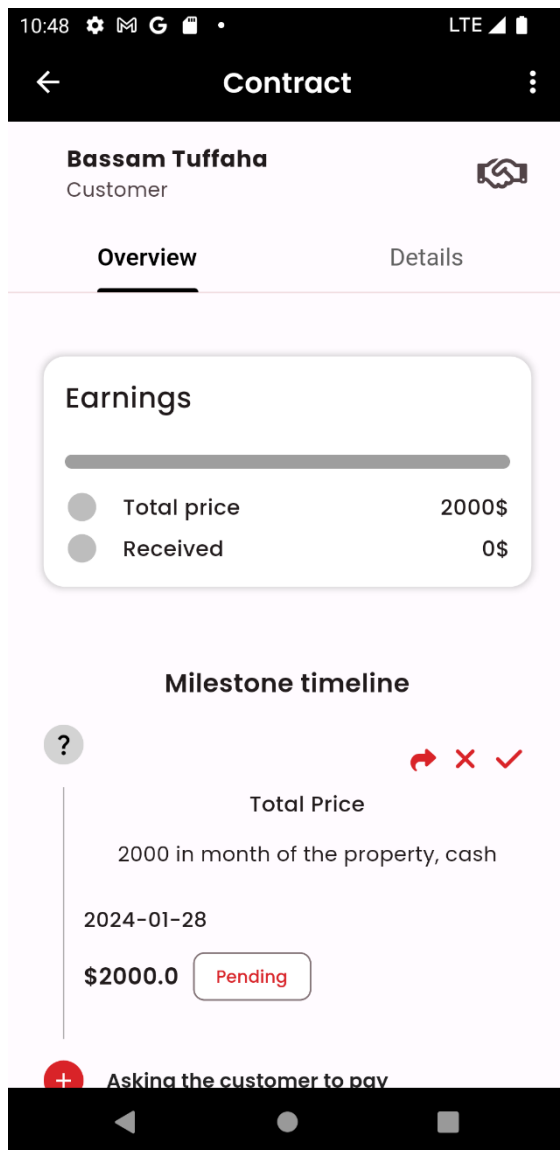
- **After adding lawyer to contract**

Once a lawyer is added to the contract, the lawyer can monitor and view this contract. Additionally, users in this contract will be able to contact each other using the chat feature.

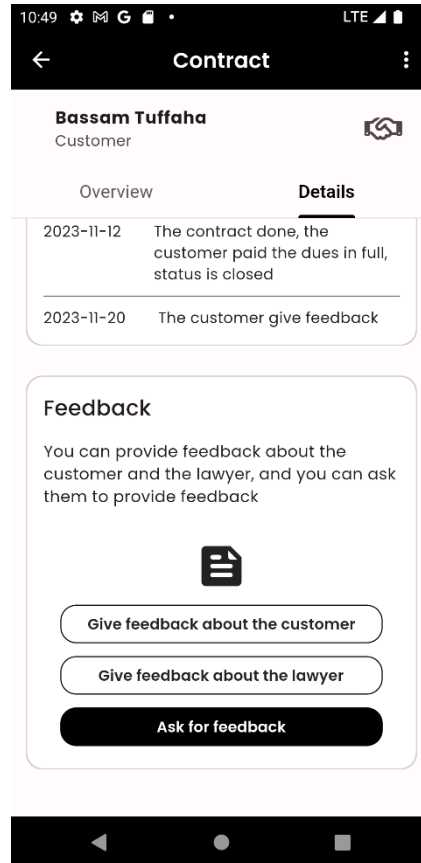
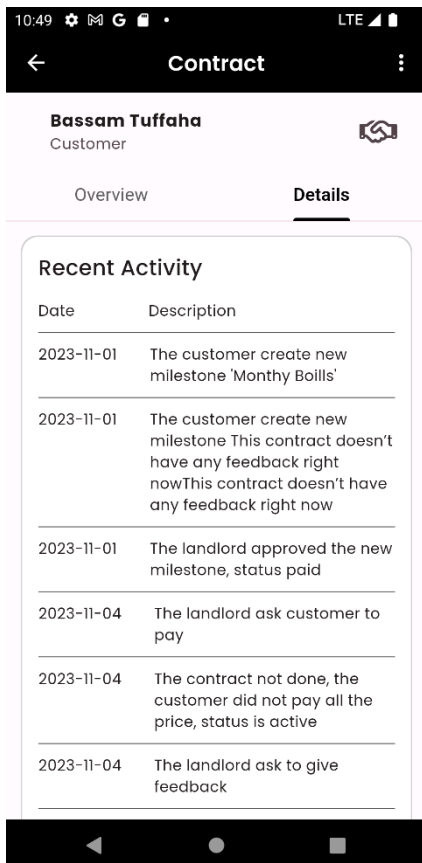
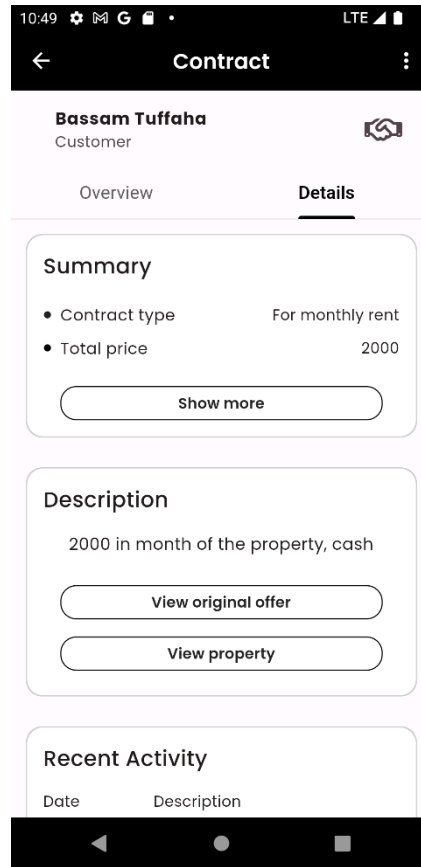
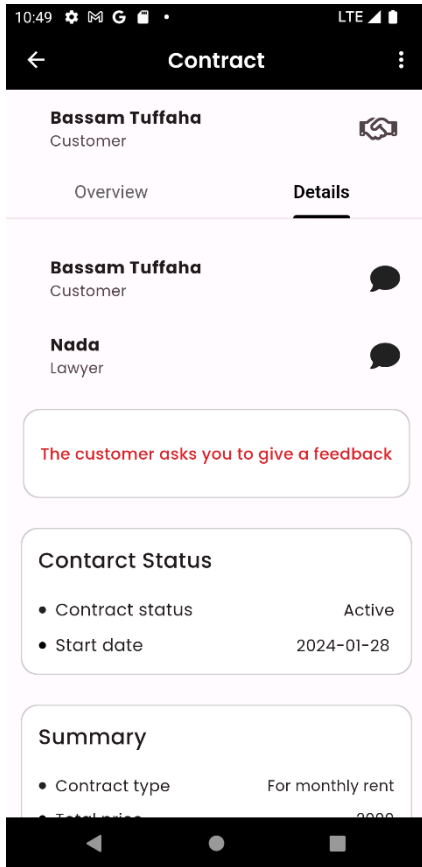


• **Landlord Contract:**

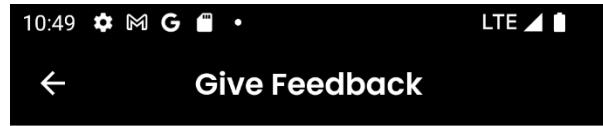
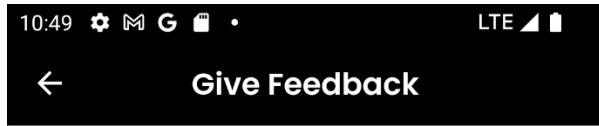
On the landlord contract side, the user will be able to see customer and contract details, payment progress, and the features that were explained before in the customer contract. The key difference is that here the landlord won't be able to propose milestones; they can only approve when they receive payment.



• Landlord Contract Details:



- **User History Feedback**



- **User History Feedback**

←

BA

Burhan Azem
burhan12sab@gmail.com

Follow

This account has 3 contracts that have been agreed upon

Whether this account is an landlord or a customer in the contract

You can see all the ratings and reviews for every contract made by this account

The data was taken after the contract was concluded between the two parties

3.67

★★★★★

5 ██████████

4 ██████████

3 ██████████

2 ██████████

1 ██████████

AT Amjad T
customer

★★★★★ 01/29/24

The product exceeded my expectations, and the customer support was phenomenal. Highly recommended!

Was this review helpful?

This contract was made on this property

BA Burhan Azem
landlord

★★★☆☆ 01/29/24

Reliable and customer-friendly – this business consistently delivers quality products/services with a smile.

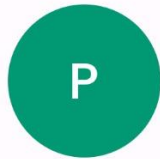
AT Amjad T
customer

★★★★★ 01/29/24

Reliable and customer-friendly – this business consistently delivers quality products/services with a smile.

Was this review helpful?

- Property History



Property

ZIP code: 443 456 583 914

Follow

This account has 2 contracts that have been agreed upon

Whether this account is an landlord or a customer in the contract

You can see all the ratings and reviews for every contract made by this account

The data was taken after the contract was concluded between the two parties



The data was taken after the contract was concluded between the two parties



This contract was made on this property

Burhan Azem
landlord



★★★★★ 01/29/24

The owner's commitment to quality shines through, creating a welcoming environment and fostering a sense of trust.

Amjad T
customer

★★★★★ 01/29/24

The product exceeded my expectations, and the customer support was phenomenal. Highly recommended!

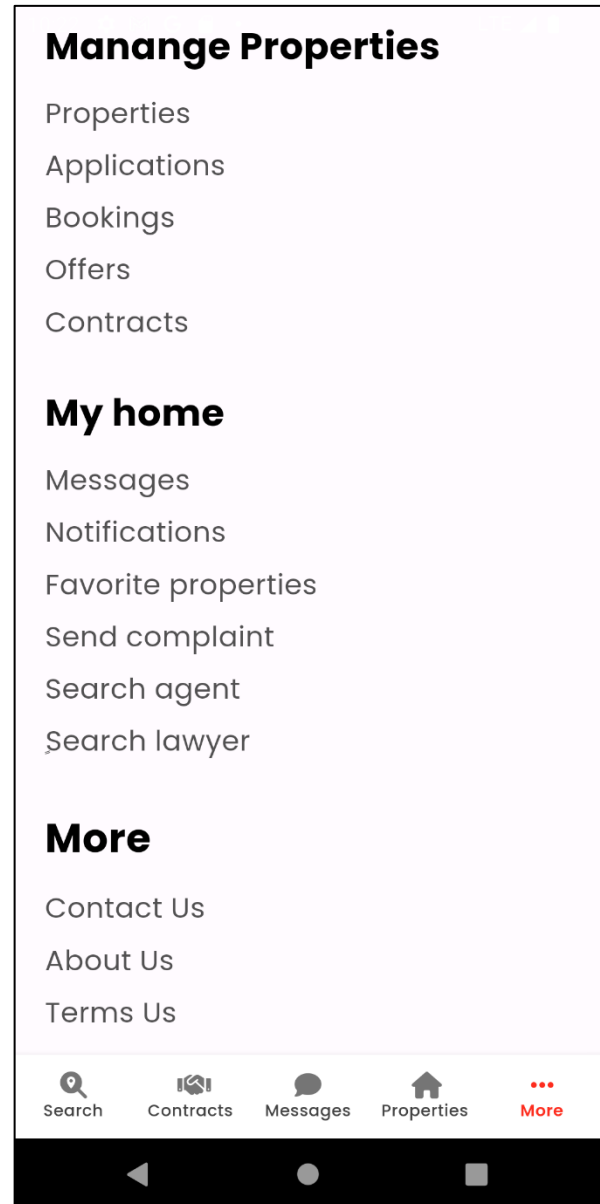
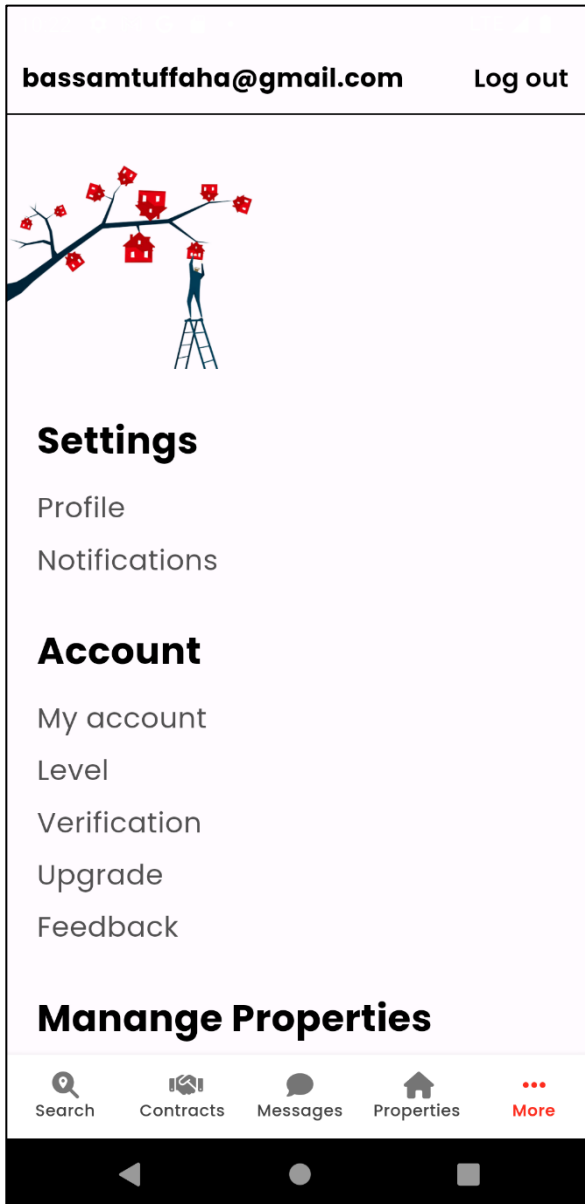
Was this review helpful?

Yes

No

- **More Page:**

From the more page user can navigate to all functionality in the app like user profile, send complaint, upgrade user level notification settings, message...



- **Notifications settings:**



- Push notifications >
- Notifications tab >
- Email >



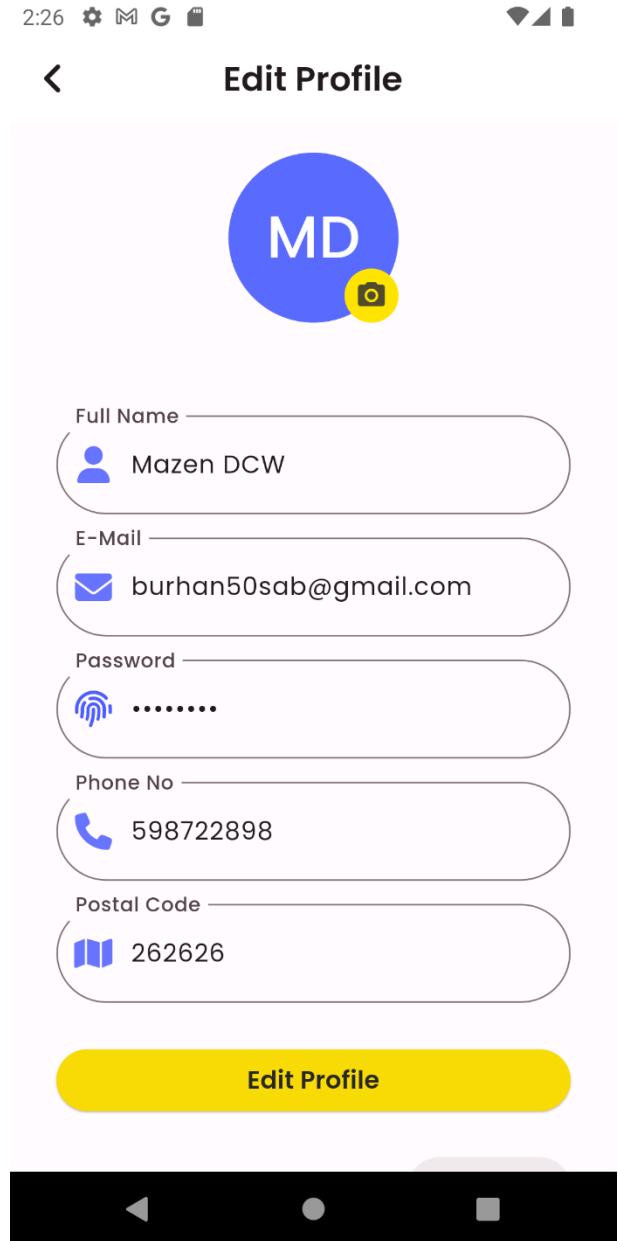
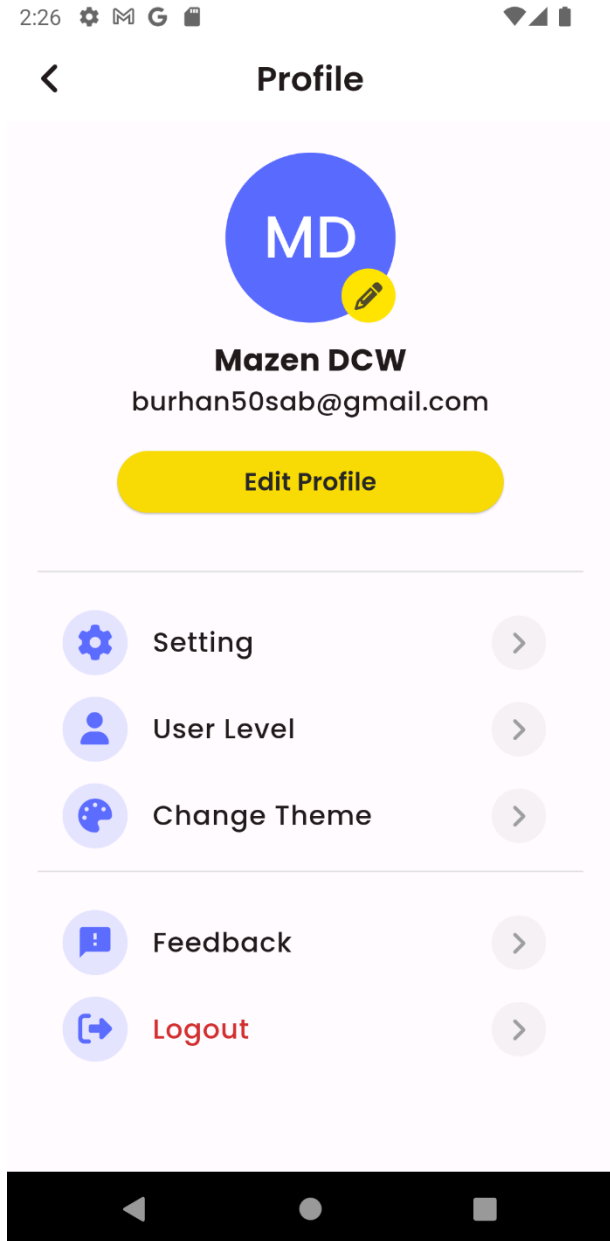
- Property updates**
You can change which homes you get alerted about in your saved homes and saved searches
- Right away
 - Once a day
 - None



- Property updates**
You can change which homes you get alerted about in your saved homes and saved searches
- New listings
 - Price changes
 - Open houses
 - Status changes

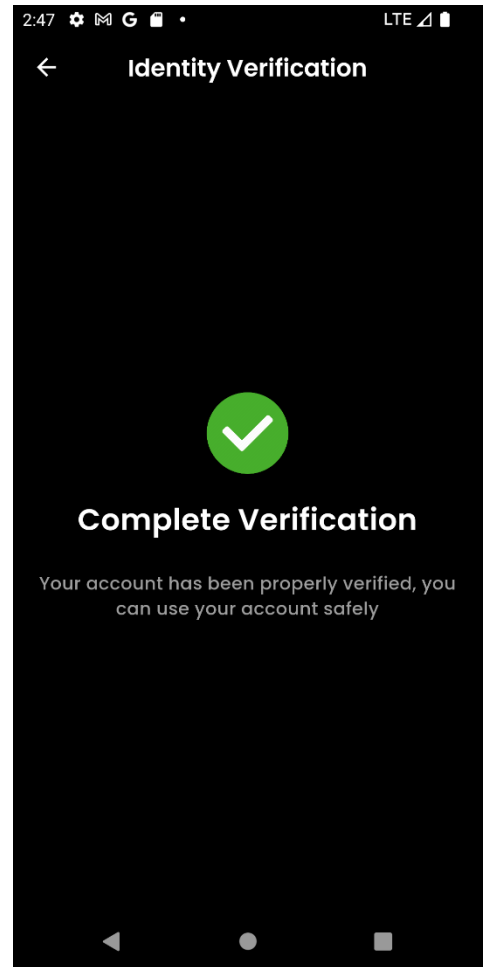
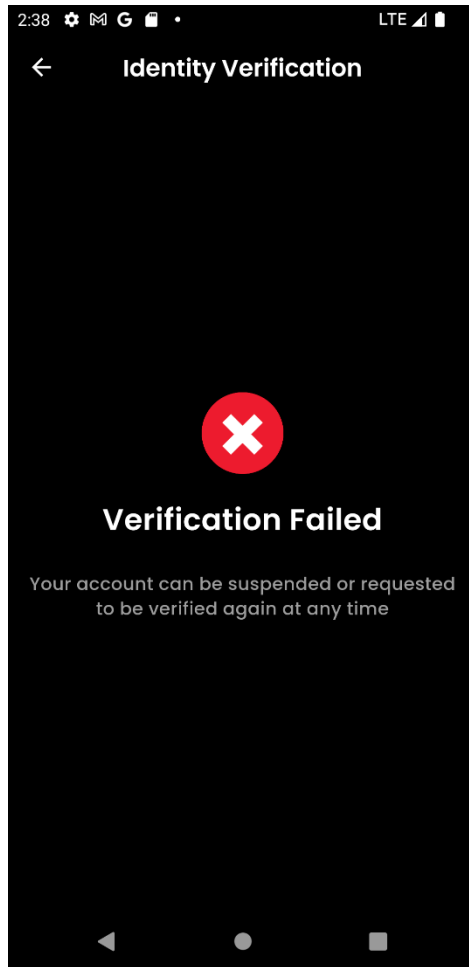
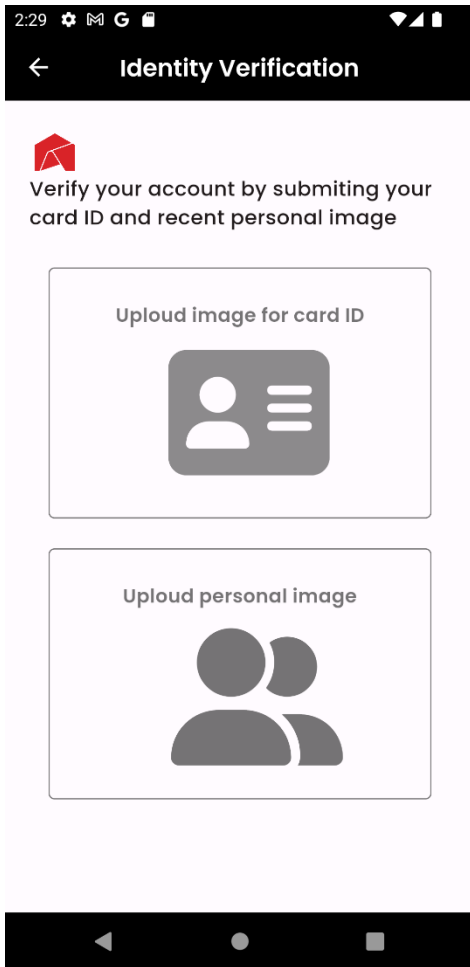


- **User Profile:**



- **Identity Verification:**

When the user logs in for the first time, they will not be able to perform significant actions such as adding a property or making rental or purchase applications until their identity is verified.



- **Send Complaint:**

The screenshot shows a mobile application interface for sending a complaint. At the top, a black status bar displays the time 2:29, a settings gear icon, a mail icon, a Google 'G' logo, a battery icon, and signal strength indicators. Below this is a black header bar with a white back arrow on the left and the text 'Send Complaint' in white. The main content area is white and contains three sections: 1. 'Name' with a white rounded rectangular input field and a person icon on the right. 2. 'Email' with a white rounded rectangular input field and an envelope icon on the right. 3. 'Compline description' with a white rounded rectangular text area containing the example text: 'Example: New house in the center of the city, there is close school and very beautiful view'. At the bottom of the form is a black rounded rectangular button with the white text 'Send'. The very bottom of the screen shows a black navigation bar with a white back arrow, a home circle, and a recent apps square.

Upgrade User Level:

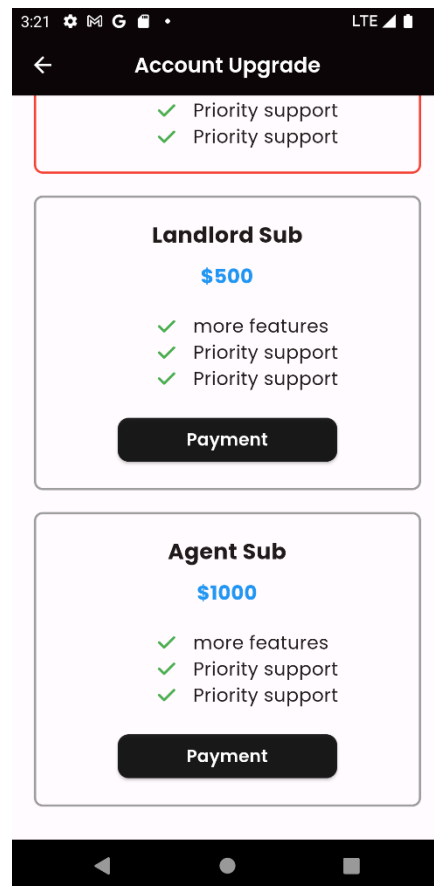
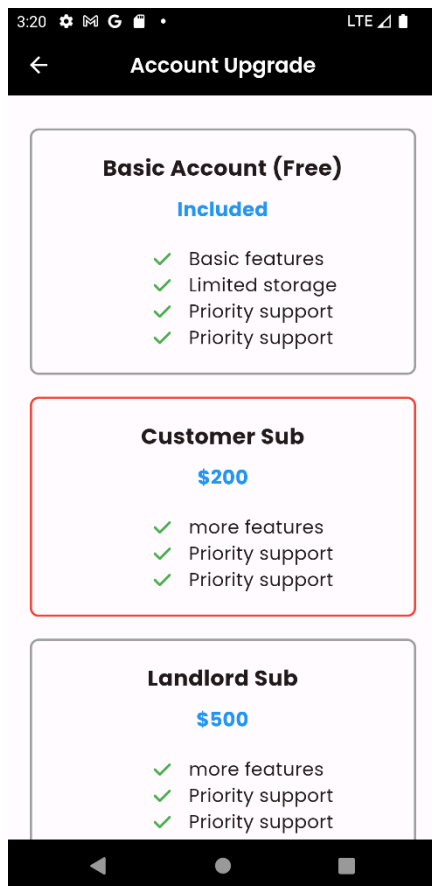
Under normal circumstances, a user's level will be upgraded based on their actions within the system. When creating a new account, users have two choices: a lawyer account (to be discussed later) or a basic user account. The upgrade to higher account levels occurs automatically without any billing, depending on the type of operations the user performs. The upgrade scenarios are as follows:

If a user buys or rents more than 5 properties, they will be upgraded to a Customer account.

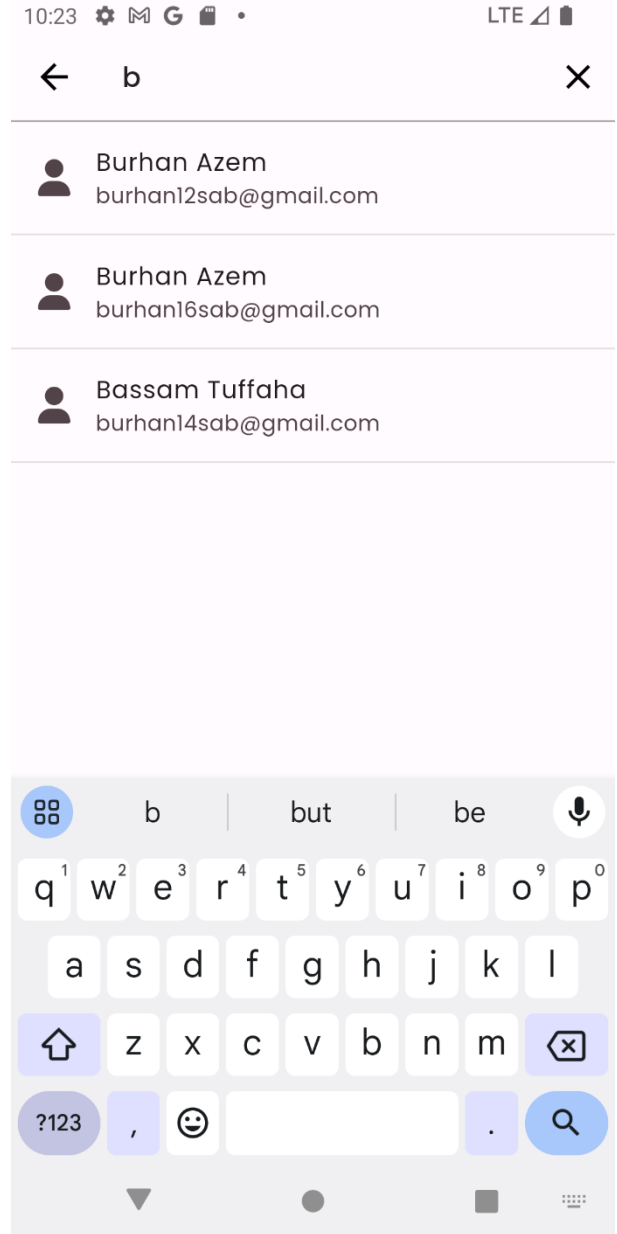
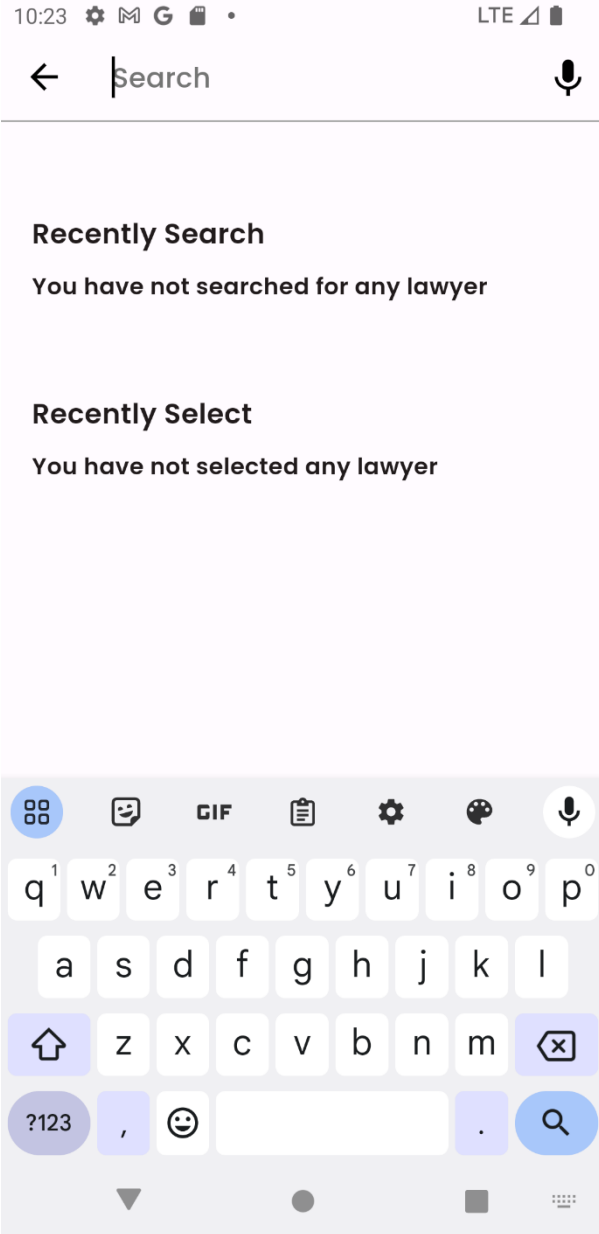
If a user sells or rents out more than 5 properties, they will automatically be upgraded to a Landlord account.

In a third scenario, if a user both buys/rents and sells/rents more than 5 properties, they will be automatically upgraded to a Broker (Agent) account.

Users also have the flexibility to bypass this automated process and manually select any user level they desire without being restricted by the predefined flow.



- Search about agent



User Level:

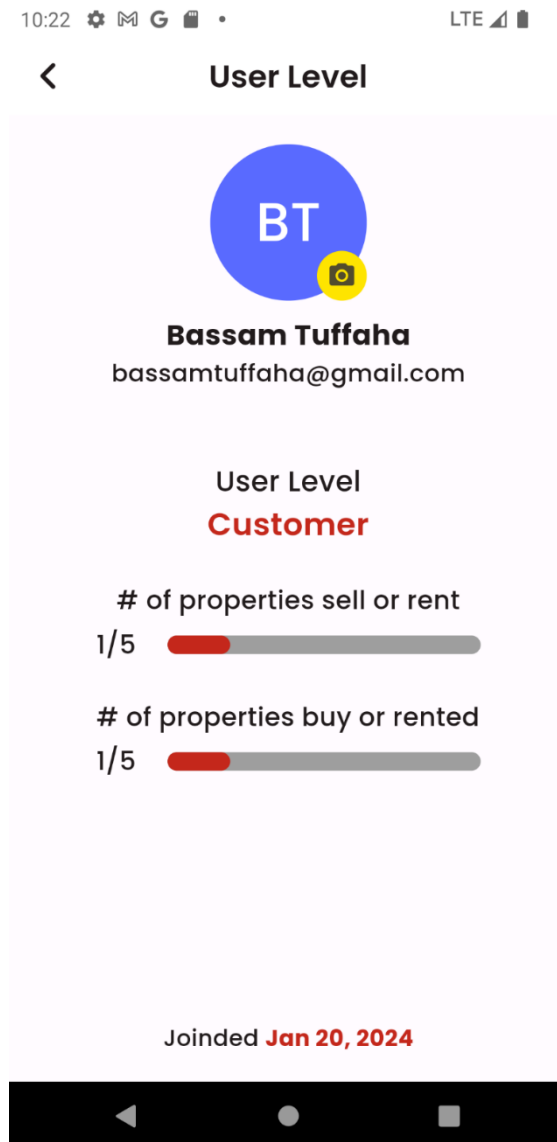
Under normal circumstances, a user's level will be upgraded based on their actions within the system. When creating a new account, users have two choices: a lawyer account (to be discussed later) or a basic user account. The upgrade to higher account levels occurs automatically without any billing, depending on the type of operations the user performs. The upgrade scenarios are as follows:

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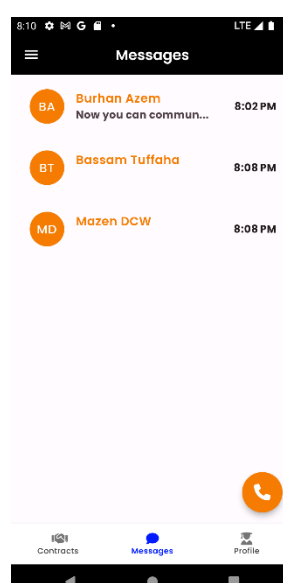
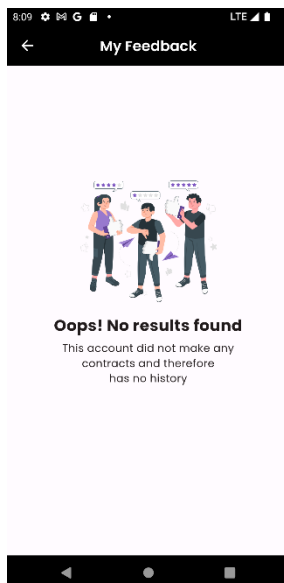
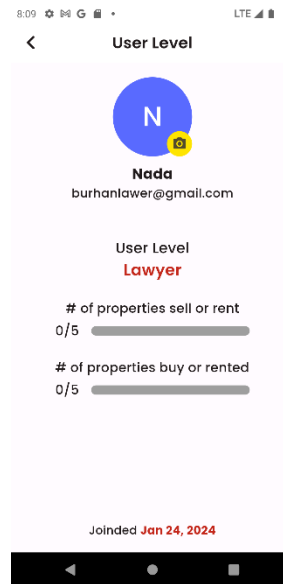
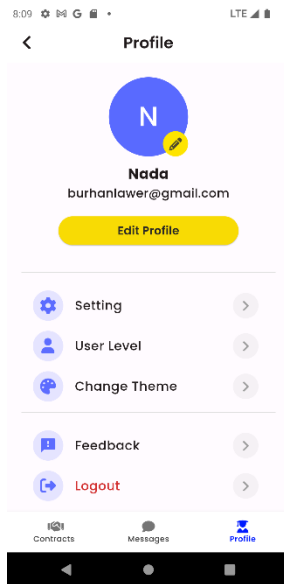
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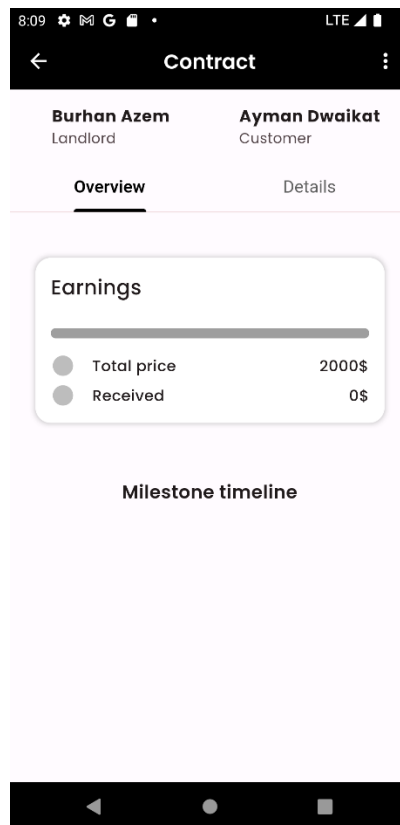
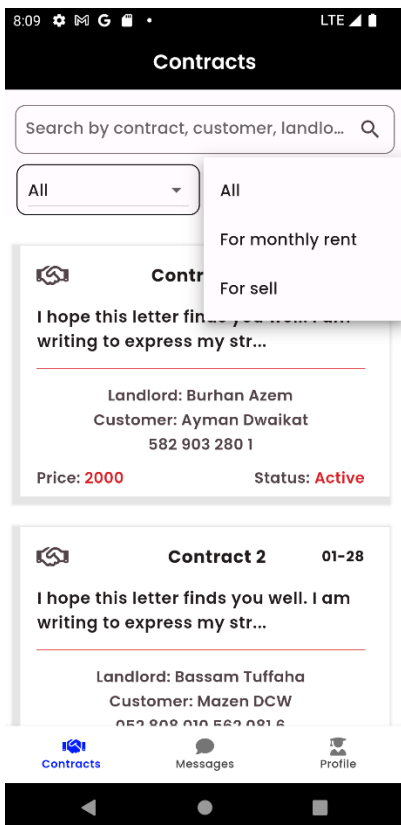
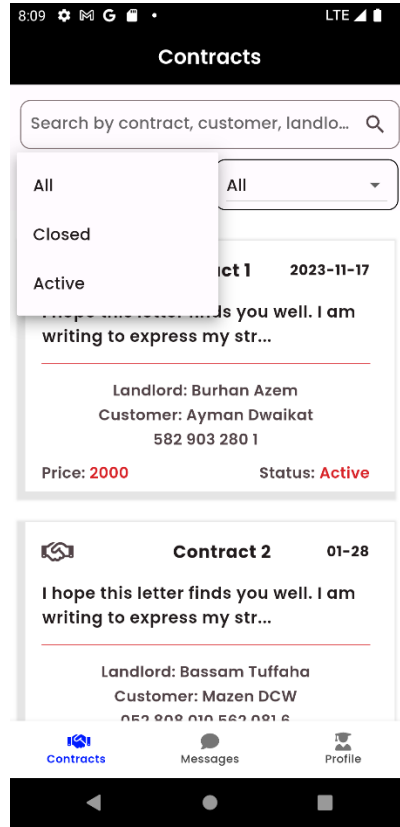
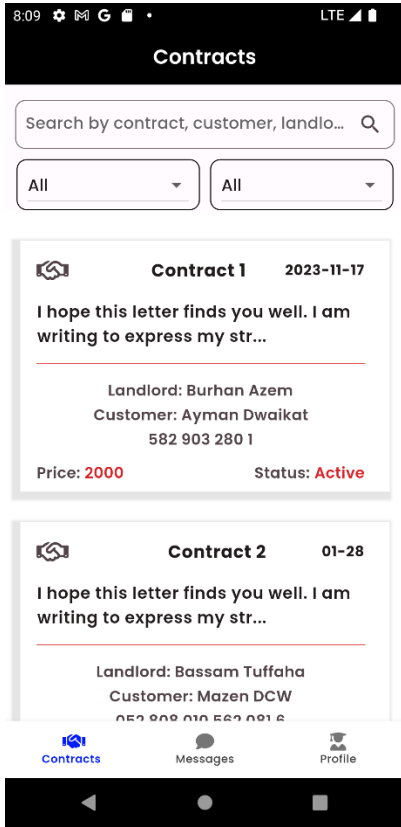
- **Lawyer Page**

On the Lawyer Page, there will be a message tab that allows lawyers to contact users who are interested in contracting their services. This feature facilitates direct communication between lawyers and potential clients.

Additionally, the Lawyer contracts Page will enable lawyers to view and monitor contracts that have been added to their profiles. This feature allows lawyers to keep track of existing contracts, providing a convenient way to oversee and manage their professional engagements.



- Lawyer page

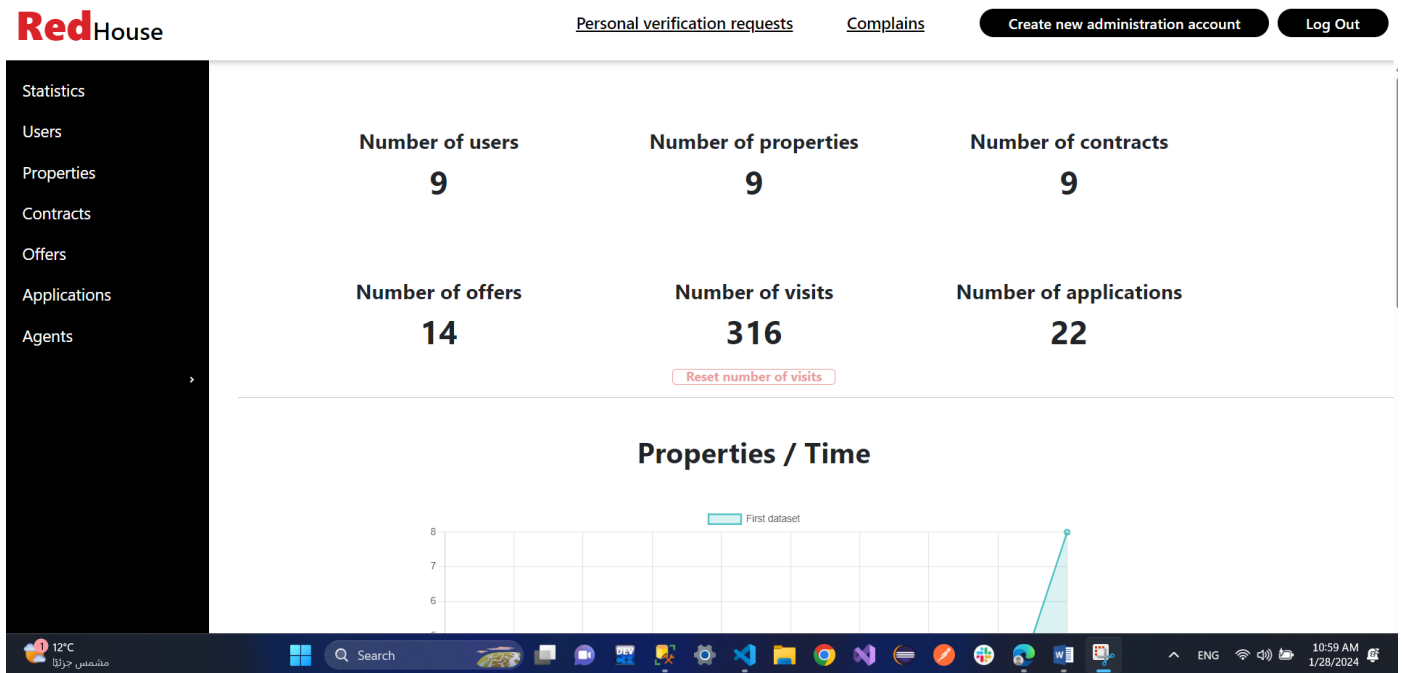


- **Control Panel:**

The control panel contains all the necessary tools for administrators to monitor and control various aspects of the system, including statistics, properties, users, contracts, offers, applications, verification requests, and complaints.

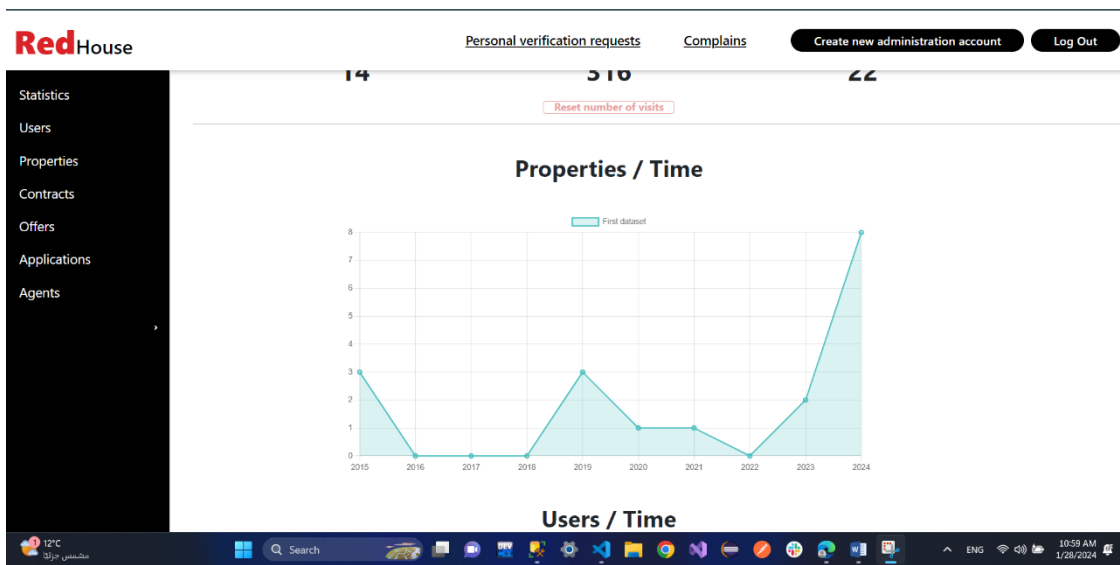
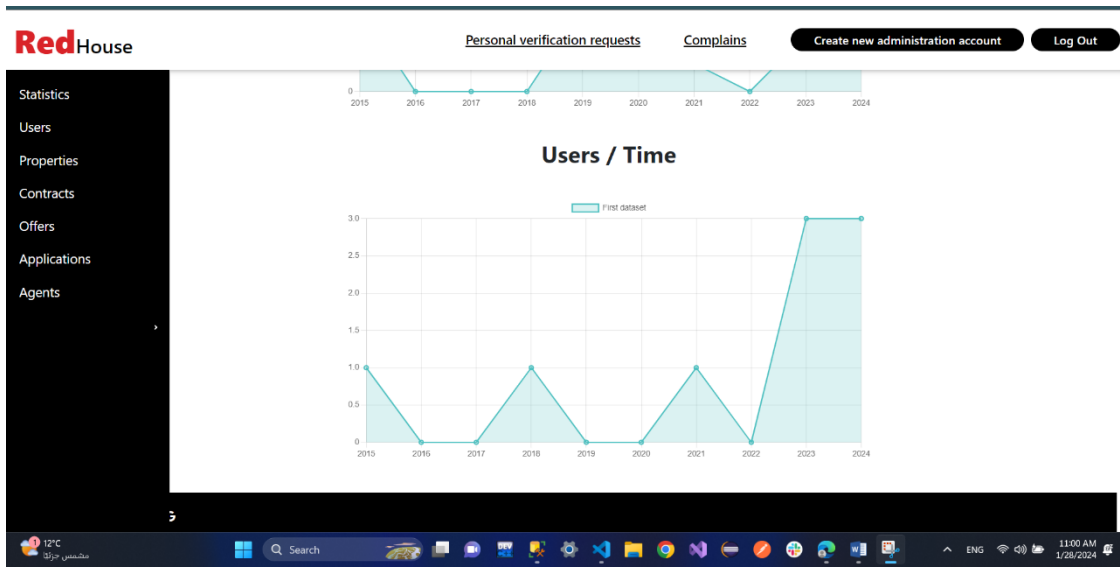
- **Statistics**

Number of properties, users, contracts, offers, application visits



- **Control Panel:**

Number of users and properties every year for last ten years



- **Users:**

All users in the system with capability to search about any user (retrieve data using pagination technique)

The screenshot shows the RedHouse application interface. On the left is a dark sidebar with navigation options: Statistics, Users, Properties, Contracts, Offers, Applications, and Agents. The main content area displays a table of users. At the top right, there are links for 'Personal verification requests', 'Complains', 'Create new administration account', and 'Log Out'. The table lists 9 users with columns for Name, Email, User Role, and Postal code, each with a 'Delete' button. Below the table, it says 'Total Users: 9 Page: 1 of 1' and has 'Prev', '1', and 'Next' buttons. The Windows taskbar at the bottom shows the time as 2:41 PM on 1/28/2024.

Name	Email	User Role	Postal code	Action
Burhan Azem	burhan12sab@gmail.com	Agent	p444	Delete
Burhan Azem	burhan16sab@gmail.com	Agent	p444	Delete
Ayman Dwaikat	burhan17sab@gmail.com	Landlord	p444	Delete
Bassam Tuffaha	burhan14sab@gmail.com	Agent	p444	Delete
Sami Mahmoud	burhan13sab@gmail.com	Landlord	p444	Delete
Amjad T	burhan15sab@gmail.com	Customer	p444	Delete
Mazen DCW	burhan50sab@gmail.com	Customer	P444	Delete
Bassam Tuffaha	bassamtuftaha@gmail.com	Customer	p432	Delete
Nada	burhaniaver@gmail.com	Lawer	p444	Delete

The screenshot shows the RedHouse application interface with a search feature. The sidebar is the same as in the previous screenshot. The main content area is titled 'Search about users'. Below the title is a search input field with a magnifying glass icon. A hint text says: 'To achieve the best results, search by keywords in the property location, property code, and property description...'. Below the search field is a table of users, identical to the one in the previous screenshot. The Windows taskbar at the bottom shows the time as 11:00 AM on 1/28/2024.

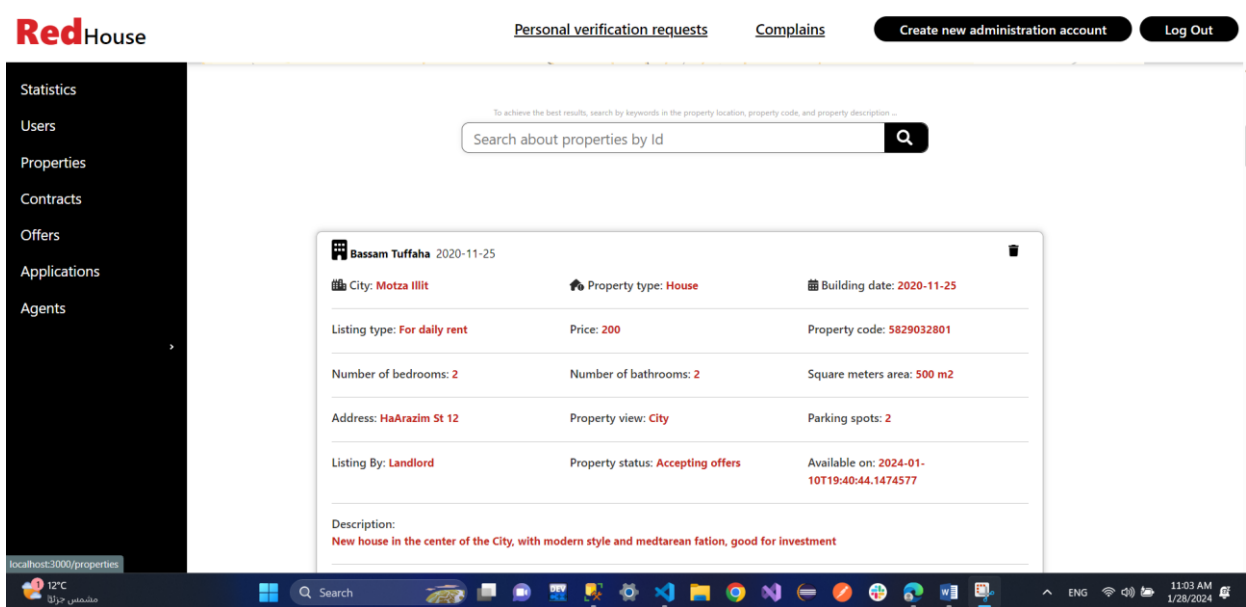
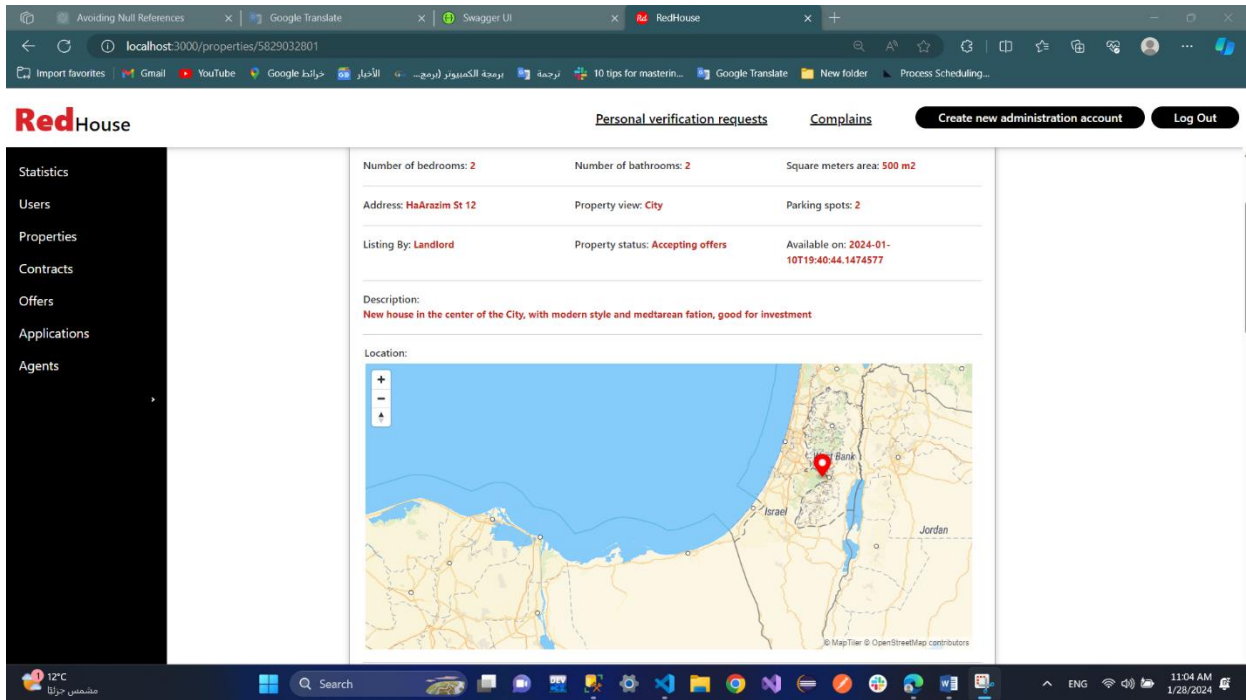
- Users details:

The screenshot shows the RedHouse web application interface. At the top left is the RedHouse logo. To the right are navigation links: "Personal verification requests", "Complains", "Create new administration account", and "Log Out". A dark sidebar on the left contains menu items: "Statistics", "Users", "Properties", "Contracts", "Offers", "Applications", and "Agents". The main content area displays a user profile card for "Burhan Azem". The card includes a profile icon, the name "Burhan Azem", and the following details: "User Role (level): Agent", "Customer Score : 0", "Landlord Score : 0", "Email: burhan16sab@gmail.com", "Phone Number: 598722898", "IsVerified: No", "Created Date: 2023-01-01T00:00:00", and "User Location (Postal Code): p444". At the bottom of the card are "Update" and "Delete" buttons. The Windows taskbar at the bottom shows the date as 1/28/2024 and time as 11:01 AM.

This screenshot shows the same RedHouse interface as above, but with an edit form overlay. The form contains the following fields: "Name" (Burhan Azem), "Email" (burhan16sab@gmail.com), "User Role (level)" (Agent), "Customer Score" (0), "Landlord Score" (0), "Phone Number" (598722898), "IsVerified" (No), and "User Location (Postal Code)" (p444). A "SAVE" button is located at the bottom of the form. The background shows the same navigation and sidebar elements as the previous screenshot. The Windows taskbar at the bottom shows the date as 1/28/2024 and time as 11:02 AM.

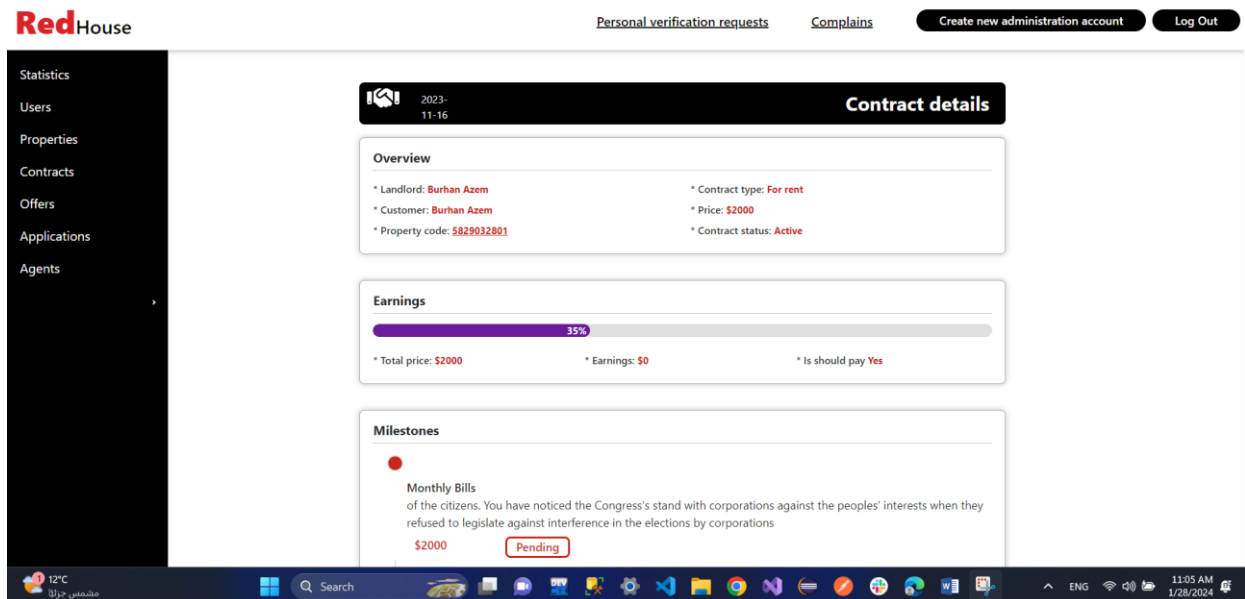
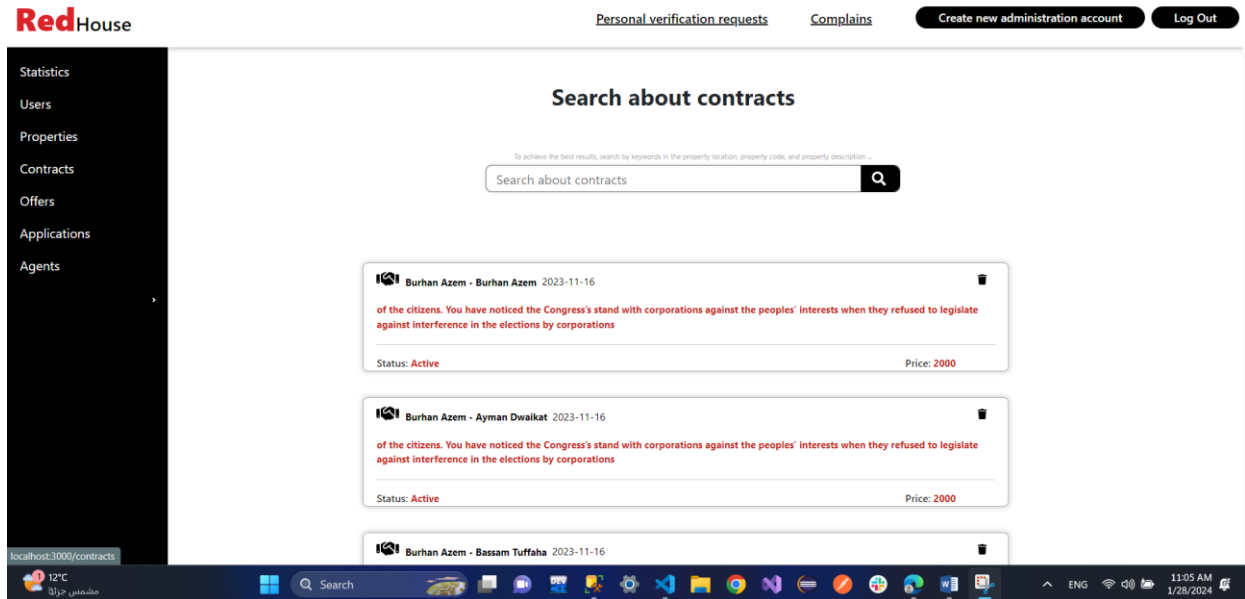
- **Properties:**

All Properties in the system with capability to search about any property (retrieve data using pagination technique)



- **Contracts:**

The Contracts section displays all contracts in the system, allowing users to search for any contract using landlords' and customers' names (utilizing pagination for data retrieval). It also provides details related to the contract, including milestones, the original offer, earnings, and



outstanding payments.

• Milestones:

The screenshot shows a web application interface for 'RedHouse'. The top navigation bar includes 'Personal verification requests', 'Complains', 'Create new administration account', and 'Log Out'. A dark sidebar on the left contains menu items: 'Statistics', 'Users', 'Properties', 'Contracts', 'Offers', 'Applications', and 'Agents'. The main content area is titled 'Milestones' and displays a vertical timeline with three entries. Each entry consists of a red dot, the text 'Monthly Bills of the citizens. You have noticed the Congress's stand with corporations against the peoples' interests when they refused to legislate against interference in the elections by corporations', the amount '\$2000', and a 'Pending' status label.

RedHouse Personal verification requests Complains Create new administration account Log Out

Statistics
Users
Properties
Contracts
Offers
Applications
Agents

Milestones

- Monthly Bills of the citizens. You have noticed the Congress's stand with corporations against the peoples' interests when they refused to legislate against interference in the elections by corporations
\$2000 Pending
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\$2000 Pending
- Monthly Bills of the citizens. You have noticed the Congress's stand with corporations against the peoples' interests when they refused to legislate against interference in the elections by corporations
\$2000 Pending

12°C 11:06 AM 1/28/2024


- Verifications requests

RedHouse [Personal verification requests](#) [Complains](#) [Create new administration account](#) [Log Out](#)

Statistics
Users
Properties
Contracts
Offers
Applications
Agents

Mazen DCW
Card ID
Personal pic
[Approve](#) [Reject](#)

Mazen DCW
Card ID



12°C
1/28/2024 12:03 PM

- **Users Complaints**

Here will return complaints for each date

The screenshot shows the RedHouse dashboard with a sidebar on the left containing menu items: Statistics, Users, Properties, Contracts, Offers, Applications, and Agents. The main content area is titled 'Users Complaints' and features a table with the following data:

Picture	Date	Number of complaints
	2023-12-04	7
	2023-12-03	30
	2023-12-02	4
	2023-12-01	6
	2023-11-29	1

Below the table, it indicates 'Total Users: 5 Page: 1 of 1' and includes 'Prev' and 'Next' navigation buttons.

The screenshot shows the RedHouse dashboard with a sidebar on the left containing menu items: Statistics, Users, Properties, Contracts, Offers, Applications, and Agents. The main content area is titled 'Complaints for 2023-12-04' and displays a list of four complaint entries. Each entry includes a user profile icon, the name 'Ayman Dwalkat', the date '2023-12-04', a 'Solved' status badge, and a truncated text description with a 'Read more...' link.

Chapter 5: Result and Discussion

Result:

Our real estate management system aims to serve as a comprehensive platform covering all operations and processes for both customers and landlords. It offers a range of options, including buying, selling, leasing, and monthly or daily rentals of properties. The system enhances user decision-making abilities by providing comprehensive information about user and property history. Additionally, it facilitates management services throughout the entire life cycle of buying or renting, including services such as offers and contracts, milestone-based payment management, and the incorporation of lawyers into contracts.

Discussion:

It is important to highlight that our graduation project focuses on addressing the need for a comprehensive and user-friendly real estate management system that caters to diverse users and processes. The system accommodates various user types, starting with two primary account types: Basic users and lawyers. The user hierarchy reflects different professional roles, ensuring a tailored experience for each user. The processes are efficiently designed to offer the best user experience, starting with property addition for landlords and property searches for customers.

Customers can submit applications for properties that meet their needs, which are then conveyed to the respective landlords. The decision-making process for landlords involves evaluating customer history, recommendations, and system-provided information to determine whether to accept the application. Upon acceptance, communication channels open between the customer and landlord. Both parties have the ability to create offers, specifying prices, and accept or reject each other's offers.

If an offer is accepted, a contract is generated based on the agreed-upon price and initial milestones for payment actions. Users have the flexibility to reschedule milestones based on their needs. This streamlined approach aims to simplify system users' operations and enhance their overall client experience.

In summary, our graduation project provides a comprehensive and user-friendly solution for both customers and property owners. The platform's scalability and customization features make it adaptable to the specific needs of various property operations. With its comprehensive features and user-friendly interface, our application has the potential to revolutionize the management of real estate systems and improve overall user experiences.

Chapter 6: Conclusions and Recommendation

In conclusion, we see our system it's crucial to real estate field because the system make it easy for both landlords and customers to buy and sell, rent and renting (dail and monthly), and this system solve weakness of the existing systems in the market. Also We learned a lot skills in this project, we learned new programing skills ,we learned the programming of mobile that we expected to be difficult because we did not deal with it before, also we learned how to work as a team and be complementary to each other.

Based on our project, we have several recommendations for future development and research. we recommend expanding the posting the property to include more advanced way to present the property like virtual reality. also, we recommend further testing and development of the system's machine-learning capabilities, to provide more accurate and personalized workout information and recommendations for users. Finally, we recommend exploring potential partnerships with agents and brokers to implement our system and gather feedback on its effectiveness in a real-world setting.

References

- <https://docs.flutter.dev/>
- <https://dotnet.microsoft.com/>
- stackoverflow