



AN-NAJAH NATIONAL UNIVERSITY

FACULTY OF ENGINEERING & INFORMATION TECHNOLOGY

DEPARTMENT OF COMPUTER ENGINEERING

GRADUATION PROJECT I



Authors:

Eba Khalil & Samah Sheeha

Supervisor:

Dr. Aladdin Masri

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Acknowledgement

I begin with the help of Allah the almighty and the compassionate.

In this connection, we want to express our gratitude to the project for its success. It was not a very smooth ride, though by the grace of God and hard work, we were able to attain this feat. This success is also for us first of all, and it is also important not to forget the constant reinforcement that doctors, family, and friends have provided throughout the process. That they believed in us was a powerful force that would see one through equally challenging moments.

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We pray to God to gain from our learning and to pray that our graduation is the beginning of a shiny, bright future. and to assist us in being good indeed to our religion and our country as far as it meets His satisfaction.

Disclaimer

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Abstract

Sakni is an innovative web and mobile-based application designed to revolutionize the management and submission of student housing applications. This platform empowers students with a user-friendly interface to apply for housing, specify room preferences, and match with potential roommates seamlessly. Additionally, students can monitor the status of their applications in real-time, ensuring a transparent and efficient process.

Key features of Sakni include the electronic submission of housing requests, personalized room selection based on preferences and availability, and an integrated option to choose or match with roommates. Furthermore, the platform facilitates direct communication between students and the housing department, enabling easy inquiries and swift resolution of issues.

Sakni's importance lies in its ability to enhance the efficiency of student housing processes, significantly reducing the need for manual paperwork and improving transparency in application tracking. It addresses common challenges faced by students, such as insufficient information about room availability and difficulty in finding compatible roommates. With its user-centric design, Sakni streamlines housing management for both students and administrators, saving time and effort while offering a modern, adaptable solution accessible from any location.

1 Introduction

With the growing demand for effective housing solutions among university students, managing and applying for student housing has become a challenge for both students and administrators. Traditional systems often involve excessive paperwork, limited communication channels, and inefficiencies in room selection and roommate matching. In response to these challenges, "Sakni" emerges as an innovative web and mobile-based application designed to simplify and enhance the housing application process for university students.

The primary objective of Sakni is to provide a user-friendly platform where students can apply for housing, select room preferences, and match with potential roommates based on their compatibility. The application leverages modern technologies such as Flutter and Firebase to ensure a seamless and efficient experience for users. Furthermore, Sakni allows students to track the status of their applications in real time and facilitates direct communication with the housing department for inquiries and issue resolution.

One of the standout features of Sakni is its electronic submission system, which eliminates the need for manual paperwork. The platform also introduces advanced functionalities, such as personalized room selection based on availability and preferences, as well as an intuitive roommate matching system. These features aim to address common pain points, such as a lack of transparency and inefficiencies in the traditional housing allocation process.

Sakni brings significant benefits to both students and administrators. For students, it provides a centralized platform to manage all aspects of their housing applications, reducing the time and effort required to secure accommodations. For administrators, Sakni streamlines the management of housing requests, enhances communication with students, and offers insightful statistics for better decision-making.

The project is structured to address the constraints, challenges, and methodologies employed in developing the Sakni application. This report begins with an abstract and introduction, followed by a detailed description of the application's features and significance. It also explores the technologies and tools used, analyzes results from testing and implementation, and concludes with key findings and recommendations for future enhancements.

By addressing the inefficiencies in traditional housing management systems, Sakni not only improves the overall experience for students and administrators but also sets a benchmark for modern, tech-driven solutions in the education sector. Through its innovative approach, Sakni ensures that students can focus on their academic pursuits without the added stress of securing suitable accommodations.

2 Constraints & Earlier Coursework

2.1 Limitations & Constraints

2.1.1 Limited Time

Time constraints posed a significant challenge during the development of the Sakni project. Balancing academic responsibilities alongside the extensive requirements of the application demanded effective time management. Each feature, such as room selection, roommate matching, and real-time tracking, required thorough testing and precise execution. To address this, the team prioritized core functionalities and adopted an agile approach to ensure key objectives were met within the given timeline, while maintaining the system's usability and reliability.

2.1.2 Limited Resources

The development of Sakni was conducted under restricted access to certain resources, including advanced tools and external expert consultation. Despite this, the team utilized innovative problem-solving techniques and leveraged available technologies effectively. Drawing from user needs and current trends in student housing systems, Sakni was designed to deliver an efficient and user-friendly platform. The focus was on maximizing resource utility while developing a scalable and robust solution to accommodate various functionalities, such as electronic submissions and communication channels.

2.2 Earlier Coursework

University coursework significantly contributed to the foundational knowledge required to build Sakni. Subjects such as database management, web development, and software engineering provided the technical expertise to design and implement the platform. Practical experience with front-end development using Flutter and back-end frameworks equipped the team with the skills to develop a seamless user interface and ensure system stability.

Additionally, exposure to courses on algorithms, system analysis, and project management enabled the team to design efficient processes, such as real-time application tracking and compatibility-based roommate matching. The integration of academic learning with practical application in Sakni demonstrates the team's ability to apply theoretical knowledge to solve real-world challenges effectively.

3 Literature Review

The rapid integration of technology into various aspects of daily life has transformed traditional systems and introduced innovative solutions to persistent challenges. The student housing process, like many others, has long been plagued by inefficiencies, lack of transparency, and limited access to necessary information. This literature review explores technological advancements that have addressed similar issues, focusing on systems designed to enhance resource management, user interaction, and operational efficiency.

One prominent example is **Airbnb**, a platform that revolutionized short-term rental accommodations by creating a seamless interface for hosts and guests. A study by Zervas et al. (2017) highlights how Airbnb leverages technology to provide personalized recommendations, enhance user trust through reviews, and simplify booking processes. This model demonstrates the value of integrating user-centric design and real-time tracking to improve customer satisfaction.

Similarly, **University Housing Portals** have emerged as tools to streamline student housing applications. According to a study by McCarthy et al. (2019), these portals often rely on centralized databases and dynamic scheduling to manage housing assignments efficiently. However, many lack the features necessary to address personalized needs, such as roommate compatibility and real-time updates, leading to gaps in user satisfaction.

Drawing from these examples, Sakni builds upon proven methodologies while introducing unique features tailored to the challenges of student housing. Sakni incorporates real-time application tracking, compatibility-based roommate matching, and direct communication between students and the housing department. The use of **Flutter** for front-end development ensures a visually appealing and responsive interface, while back-end processes are powered by reliable frameworks to guarantee system stability and scalability.

Furthermore, Sakni distinguishes itself by addressing specific challenges identified in prior systems. The integration of preference-based room selection and transparent communication channels aligns with findings by Smith et al. (2020), which emphasize the importance of personalization and user feedback in enhancing system usability. By adopting a modern, user-centered approach, Sakni not only meets the practical needs of students but also fosters trust and engagement throughout the application process.

In conclusion, Sakni represents a significant advancement in the field of student housing management systems. By leveraging insights from successful platforms and addressing their limitations, Sakni provides a comprehensive solution that enhances efficiency, reduces administrative burdens, and ensures a seamless experience for both students and housing administrators.

4 Methodology

4.1 Development Tools and Technologies

4.1.1 Tools

- Visual Studio Code: Used as the primary development environment for both front-end and back-end, offering an integrated platform for coding, debugging, and managing the project.
- Firebase: Implemented for real-time database management and enabling key features like notifications and secure storage of user data, such as housing applications and related documents.
- Postman: Utilized for testing API requests and ensuring seamless communication between the front-end and back-end systems. It facilitated testing and debugging various functionalities of Sakni.
- Android Studio: Employed to test the mobile application on virtual devices, ensuring compatibility and functionality across different screen sizes and Android versions.
- GitHub: Used for version control, allowing efficient collaboration, code sharing, and tracking changes throughout the development process.

4.1.2 Programming Languages and Frameworks

Flutter was chosen as the core framework for front-end development due to its cross-platform capabilities, enabling Sakni to run seamlessly on mobile (iOS and Android) and web platforms. This ensures a consistent and visually appealing user interface across devices.

For the back-end, Node.js was selected to handle asynchronous tasks and ensure the scalability of the application. This allows Sakni to efficiently manage requests and interactions between users and the system, supporting real-time updates and dynamic data handling.

4.1.3 Database Design and Management

Sakni utilizes Firebase as its primary database solution. Firebase's real-time synchronization capabilities and scalability make it an ideal choice for storing and managing critical data, including user profiles, housing applications, and notifications.

In addition to Firebase, NoSQL databases were explored for their ability to handle unstructured data and adapt to the evolving needs of the application. These databases facilitate horizontal scaling, allowing Sakni to grow as the number of users and data volume increases without compromising performance.

This approach ensures a fast, reliable, and responsive user experience, as data is instantly accessible and updated in real-time. By leveraging Firebase for key functionalities like notifications and roommate preferences, Sakni delivers a dynamic and efficient platform tailored to meet the demands of student housing.

4.1.4 Database Design and Management

Database Tables

- **Users Table:** This table stores data about all users, including their role (e.g., student or administrator), name, email, password, contact number, and profile picture URL.
- **Housing Applications Table:** This table manages the details of housing applications submitted by students. It includes application ID, student ID (linked to the Users table), application status (e.g., Pending, Approved, Rejected), room preference, and submission date.
- **Rooms Table:** The Rooms table contains data about the available rooms in student housing. It includes room ID, room type (single or shared), capacity, availability status, and features (e.g., Wi-Fi, private bathroom).
- **Roommates Table:** This table manages roommate preferences and compatibility data. It includes student IDs of paired roommates, compatibility scores, and any additional notes on preferences (e.g., quiet roommate, similar schedule).
- **Notifications Table:** This table tracks notifications sent to users. It includes notification ID, user ID (linked to the Users table), message content, timestamp, and notification status (read/unread).
- **Feedback Table:** Stores feedback provided by students about their housing experience. It includes feedback ID, user ID, feedback content, rating, and submission date.
- **Chats Table:** For managing communication between students and administrators or between potential roommates, this table stores chat messages, including sender ID, receiver ID, message content, and timestamp. The chat data is stored in Firebase for real-time communication.
- **Logs Table:** This table tracks all user activities, such as logging in, submitting applications, and updates to profiles. It includes log ID, user ID, action type, timestamp, and additional notes.

Firestore Integration

The chat and notification systems for **Sakni** rely on Firestore for real-time updates. Firestore is used to store:

- **Chat messages:** Ensuring quick and seamless communication between users.

-
- **Notifications:** Allowing instant updates on application status, room availability, and system messages.

This database design ensures smooth data handling, efficient query execution, and scalability to support a growing number of users while maintaining a responsive and reliable experience.

4.2 Mobile App System Features

This section highlights the main features of the Sakni mobile application, accompanied by screenshots of the user interface. The app's design ensures a seamless user experience with a clean and modern interface.

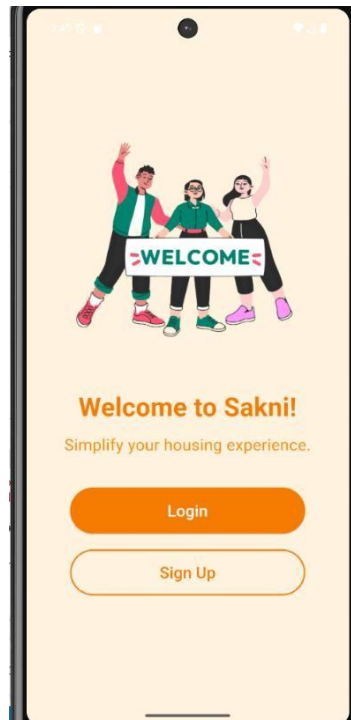


Figure 4.1: Welcome Page

Welcome Page

- **Description:**
The Welcome Page serves as the entry point for users, showcasing the app's branding and providing navigation options to either log in or sign up. The design focuses on simplicity, with a warm greeting and an overview of the app's purpose.
- **Features:**
 - Buttons for navigating to the **Login** and **Sign-Up** pages.
 - Introduction to the app with brief text.
 - A visually appealing background or app logo for branding.

4.2.1 Sign-Up Process

- **Description:**

The Sign-Up Process allows new users to join the platform by selecting their role and creating a personalized account. Users can either sign up as a Student to apply for housing or as a Room Owner to list and manage rooms for rent.

- **Features:**

- **Choose Your Role:**

- **Student:** Apply for housing, manage applications, and personalize your profile with interests.
 - **Room Owner:** List rooms for rent and handle tenant requests efficiently.

- **Sign-Up for Students:**

- Upload a profile photo.
 - Provide personal details such as: Full Name, Email, Phone Number, Address, Age.
 - Select interests (e.g., Sports, Music, Art, Gaming).
 - Set a secure **Password** and confirm it.

- **Sign-Up for Room Owners:**

- Upload a profile photo.
 - Provide necessary details: as Full Name and Email
 - Set and confirm a secure Password.

- **User Convenience:**

- **Create Account:** A simple button to finalize the registration process.
 - **Login Option:** Direct link for returning users to access their account.

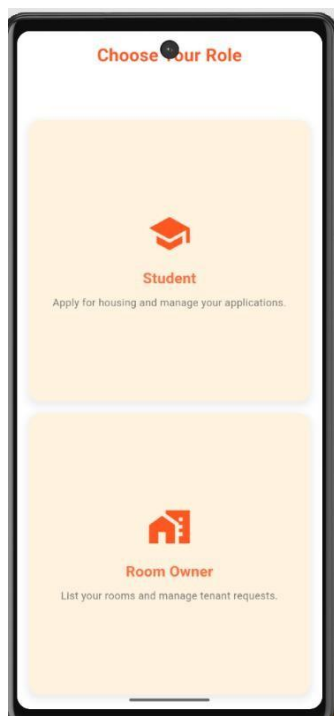


Figure 4.2: Sign Up

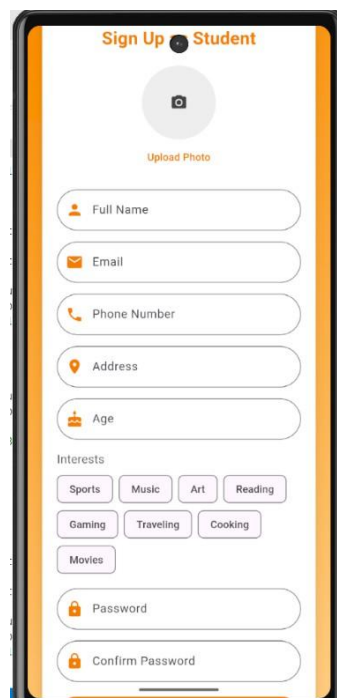


Figure 4.3: Sign Up as Owner

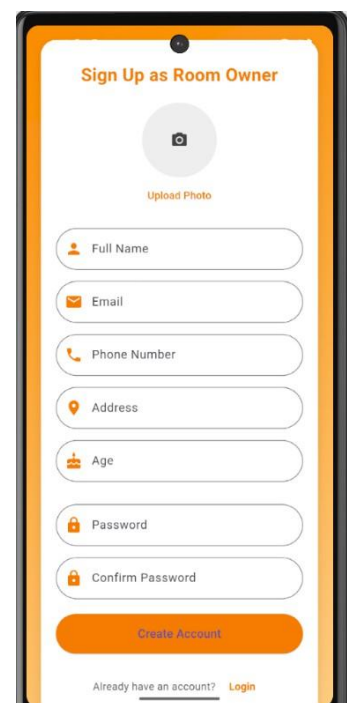


Figure 4.4: Sign Up as student

4.2.2 Login Process

- **Description:**

The Login Page allows existing users to access their accounts by entering their credentials (email and password).

- **Features:**

- Input fields for email and password.
- "Login" button to submit credentials.
- Links for "Sign-Up" and "Forgot Password".

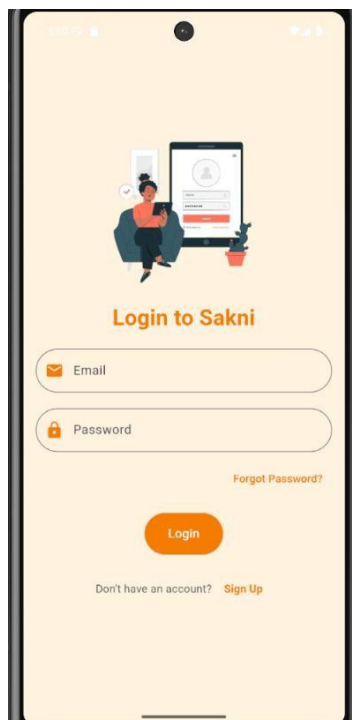


Figure 4.5: Login

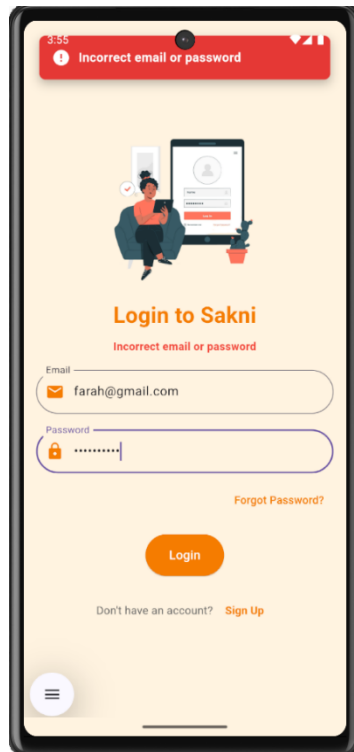


Figure 4.6: Failed to Login

- **Description:**

The login interface of Sakni provides a secure and user-friendly experience for accessing the platform. It allows users to enter their credentials, and if incorrect details are provided, a clear notification alerts them to recheck their email or password.

- **Features:**

- Error Notification: Displays "Incorrect email or password" for invalid login attempts, ensuring clarity.

4.2.3 Forget Password Process

- **Description:**

This page is designed for users who cannot access their accounts. By entering their registered email, they can initiate the password recovery process.

- **Features:**

- Input field for the registered email address.
- "Send Reset code" button.
- Navigation back to the Login page.

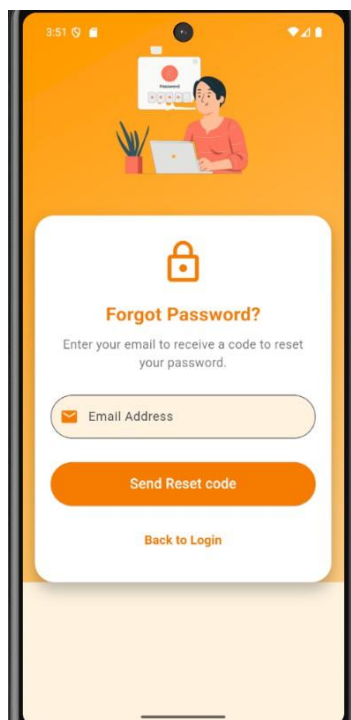


Figure 4.7: Forget Password

4.2.4 Reset Password Confirmation Process

- **Description:**

This page is designed for users to verify their identity before resetting their password. A reset code is sent to the user's registered email address, and they need to enter the code in the provided field to proceed. Once the correct code is entered, the system verifies it and allows the user to move to the next step of resetting their password.

- **Features:**

- Reset Code Input Field: A single input field for users to enter the reset code they received via email.
- Instruction Text: Clear instructions are displayed, such as: "A reset code has been sent to the email. Enter the code below to proceed."
- Verify Code Button: A button labeled "Verify Code" that validates the entered reset code.

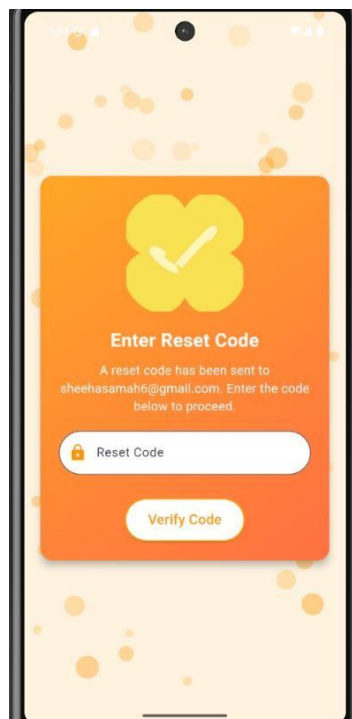


Figure 4.8: Reset Password Confirmation

4.2.5 Reset Password Process

- **Description:**

This page enables users to set a new password in case they forgot their previous one. Users are required to enter their new password and confirm it to ensure accuracy. Once completed, they can click the Reset Password button to save the changes.

- **Features:**

- Input field for the **new password**.
- Input field for **confirming the new password**.
- "Reset Password" button to submit the new credentials.

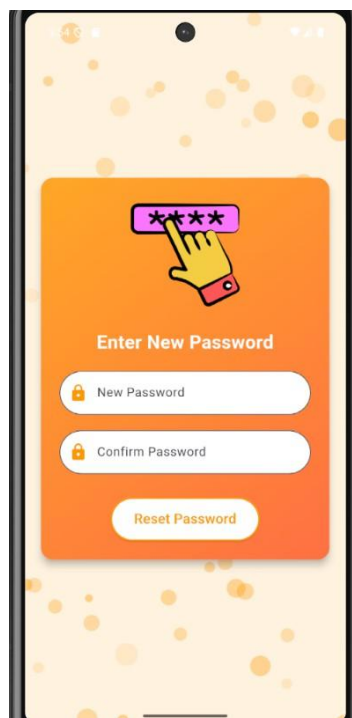


Figure 4.9: Reset Password

4.2.6 User Dashboard Side

- **Description:**

The Dashboard Page is the central hub for the user, displaying their account details, navigation options, and access to key features. It greets the user by their name and provides an overview of essential sections they can interact with.

- **Features:**

- **Welcome Section:**
Displays the user's name and email
- **Navigation Links:**
Provides quick access to the following sections:
 - **Profile:** View and edit user details.
 - **Applications:** View job applications the user has submitted.
 - **Track Applications:** Monitor the status of applications.
 - **Notifications:** Check updates and system alerts.
 - **Messages:** Access the messaging system for communication.
 - **Support:** Contact support for help or inquiries.

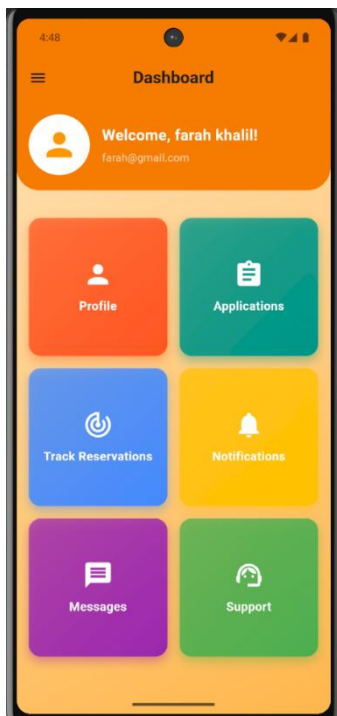


Figure 4.10: Dashboard

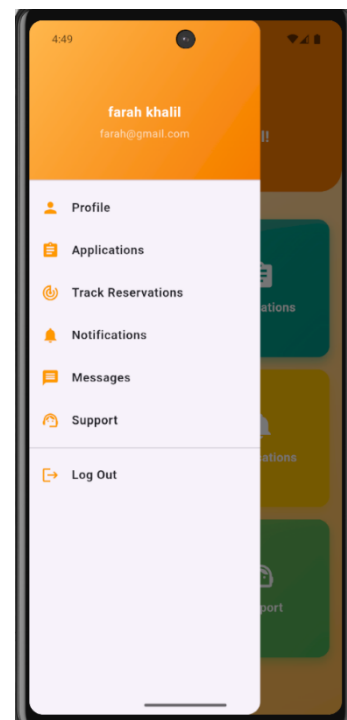


Figure 4.11: Dashboard

For Figure 4.11 :

- **Description:**
Similar to the first dashboard but includes an additional option to log out. This page provides a more comprehensive menu for user interaction.
- **Features:**
 - Welcome Section: Same as in user_dashboard, showing the user's name and email.
 - Navigation Links:
Includes all the links from the previous page (Profile, Applications, Track Applications, Notifications, Messages, and Support) with the addition of a Log Out button.
 - Log Out Button:
Positioned at the bottom of the menu to allow users to securely log out of their accounts.

Profile Process

- **Description:**
The Profile Page allows users to view their personal information and access options to update their profile details or change their password.
- **Features:**
 - **Profile Overview:**
Displays the following user details:
Name, Email, Phone, Address.
 - **Edit Profile Button:**
Allows the user to update their profile information, such as name, phone, or address.
 - **Change Password Button:**
Navigates to the Change Password page for updating login credentials.

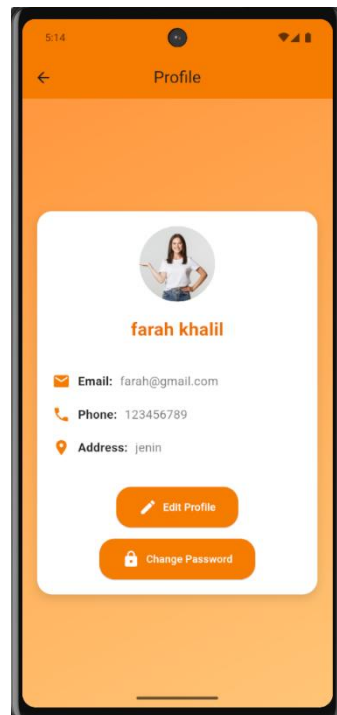


Figure 4.12: Profile Page

Edit Profile Process

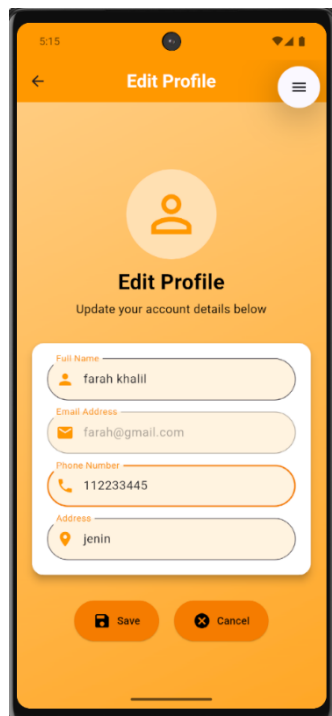


Figure 4.13: Edit Profile

- **Description:**
The Edit Profile Page allows users to update their personal account details, such as name, email, phone number, and address.
- **Features:**
 - **Page Title:** "Edit Profile"
 - **Instructions:**
A short text prompting the user to update their account details: "Update your account details below."
 - **Editable Fields:**
 - **Full Name:** Displays the current full name and allows edits.
 - **Email Address:** Displays the current email for updates if needed.
 - **Phone Number:** Displays the current phone number
 - **Address:** Displays the current address
 - **Save Button:**
Updates and saves the new information entered by the user.
 - **Cancel Button:**
Discards any changes and redirects back to the **Profile Page**.

Change Password Process

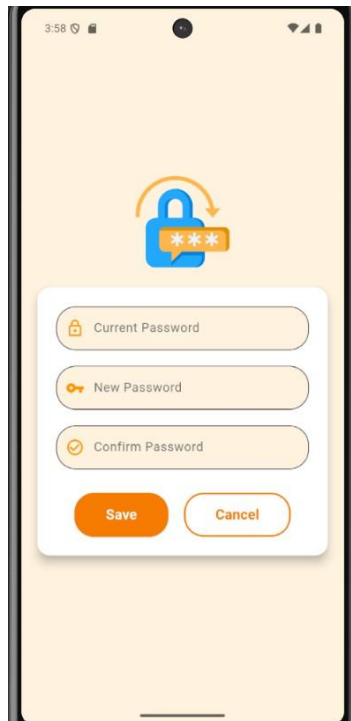


Figure 4.14: Change Password

- **Description:**
The Change Password Page allows users to securely update their password by entering their current password and setting a new one.
- **Features:**
 - **Current Password Field:**
Requires the user to input their existing password for verification.
 - **New Password Field:**
Allows the user to enter their desired password.
 - **Confirm Password Field:**
Ensures the new password is correctly entered by requiring re-entry for confirmation.
 - **Save Button:**
Submits the password update.
 - **Cancel Button:**
Discards any changes and redirects the user back to the Profile Page.

Application :- Housing Guidelines Process

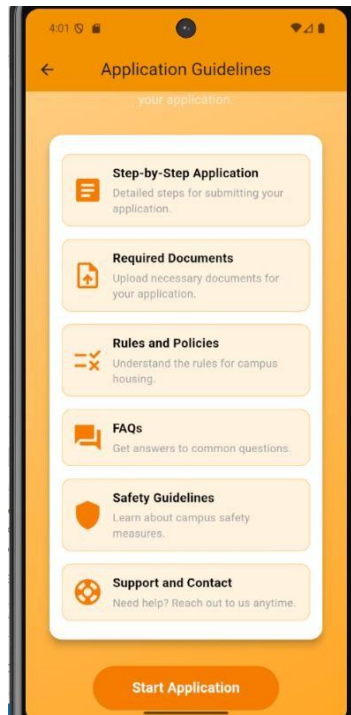


Figure 4.15: Housing Guidelines

- **Description:**
Provides guidelines and resources for completing the housing application.
- **Sections:**
 - Step-by-Step Application
 - Required Documents
 - Rules and Policies
 - FAQs
 - Safety Guidelines
 - Support and Contact
- **Action Button:**
 - Start Application: Begins the housing application process.

Upload Documents Process

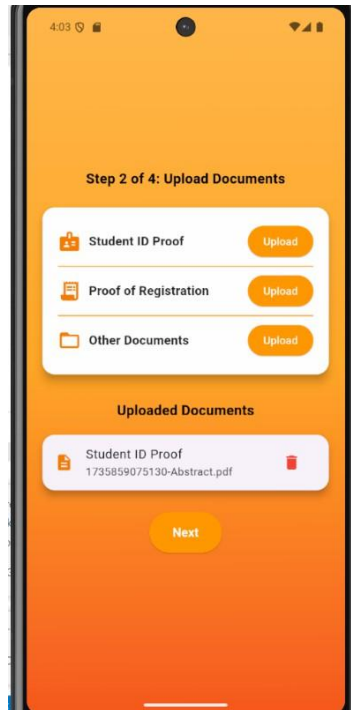


Figure 4.16: Upload Documents

- **Description:**
Users upload required documents for their housing application.
- **Features:**
 - Document Upload Fields:
 - Student ID Proof
 - Proof of Registration
 - Other Documents
 - Uploaded Documents Section: Displays uploaded files
 - Next button: Moves to the next step of the application.

Home Page Process

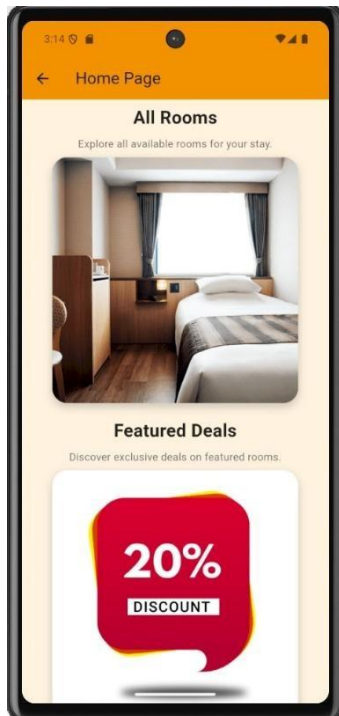


Figure 4.17: Home Page

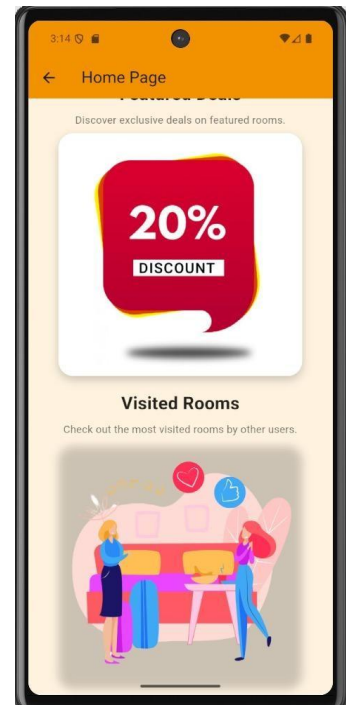


Figure 4.18: Home Page

- **Description:**

The Home Page provides users with an intuitive starting point to explore room options based on their preferences. Users can view all available rooms, find exclusive discounted deals, or check the most popular rooms visited by others.
- **Features:**
 - **All Rooms:**
 - View the complete list of available rooms for booking.
 - Navigate to the full room catalog with detailed descriptions, prices, and availability.
 - **Featured Deals (20% Discount):**
 - Discover rooms with special discounts of 20%.
 - Filter rooms specifically categorized under promotions to save money.
 - **Visited Rooms:**
 - Explore the most visited and highly recommended rooms by other users.
 - Gain insights into popular choices based on user activity.

Rooms Selection Process

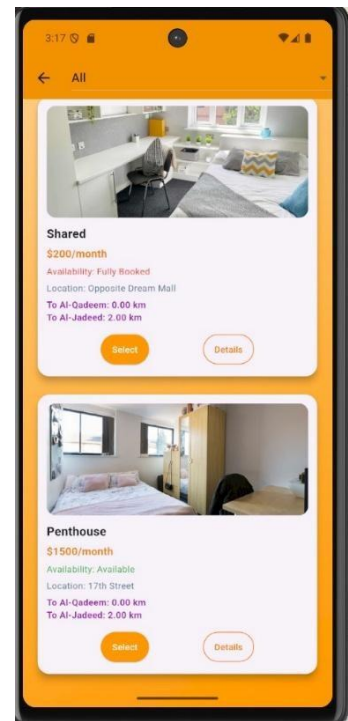
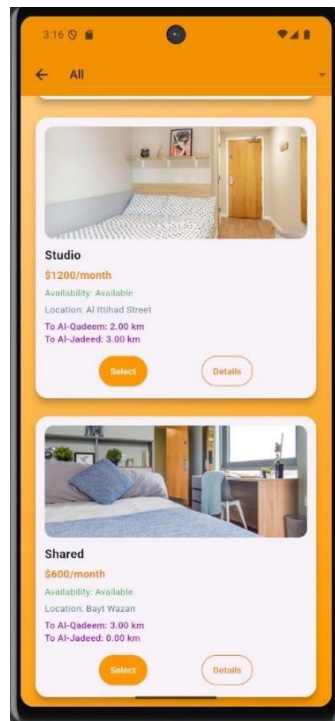
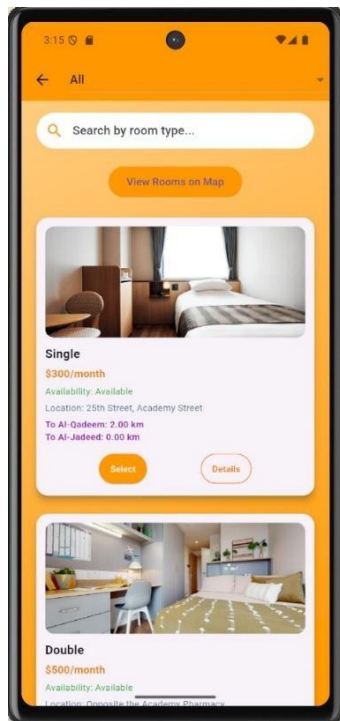


Figure 4.19: based on All Rooms Figure 4.20: based on All Rooms Figure 4.21: based on Featured Deals

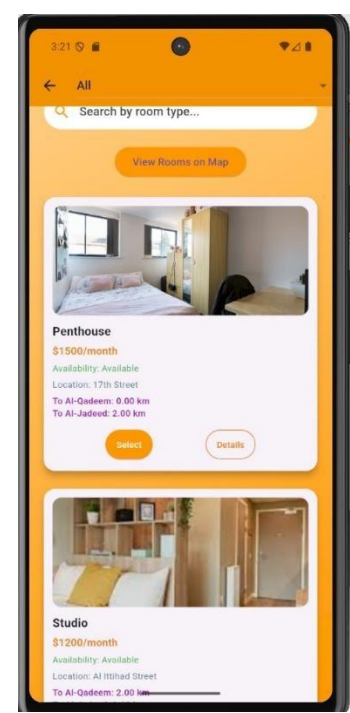


Figure 4.22: Room Selection based on Visited Rooms on Visited Rooms

Figure 4.23: Room Selection based on Visited Rooms

- **Description:**

This page provides a list of available rooms with filtering, sorting, and searching functionality.

- **Features:**

- Search Bar: Search for rooms by type.
- Sort Options:
 - All
 - Closest to An-Najah University Old Campus
 - Closest to An-Najah University New Campus
 - Cheapest
- Room Cards:

Each room card displays:

 - Room Type (e.g., "Single Room")
 - Price (e.g., "\$300/month")
 - Availability (e.g., "Available" or "Only 1 left")
 - Location (e.g., "Near Haram Al-Qadeem")
 - Distances to both campuses.
- **Select button:** Reserves the room.
- **Details button:** Displays detailed information about the room.

Room Details Process

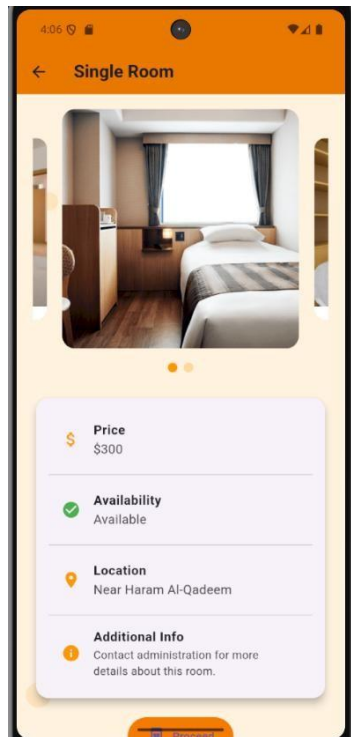


Figure 4.24: Room Details

- **Description:**
Displays detailed information about a specific room.
- **Features:**
 - Room Details:
 - Price
 - Availability
 - Location
 - Additional Info (e.g., "Contact administration for more details about this room").
 - Uploaded Documents Section: Displays uploaded files
 - Proceed button: Moves to the reservation process.

Room Map Process

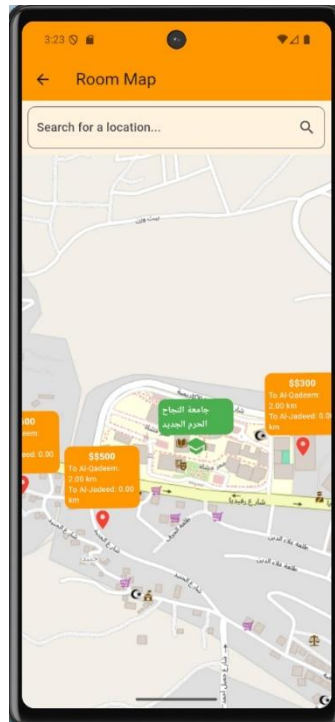


Figure 4.25: Room Map

- **Description:**

This page displays an interactive map showing room locations. Users can select a specific housing location to see its distance from:

 - An-Najah University Old Campus
 - An-Najah University New Campus
- **Features:**
 - Interactive map with clickable housing markers.
 - Distance displayed in kilometers from both campuses.
 - Zoom and pan functionality for exploring the map.

Confirm Reservation Process

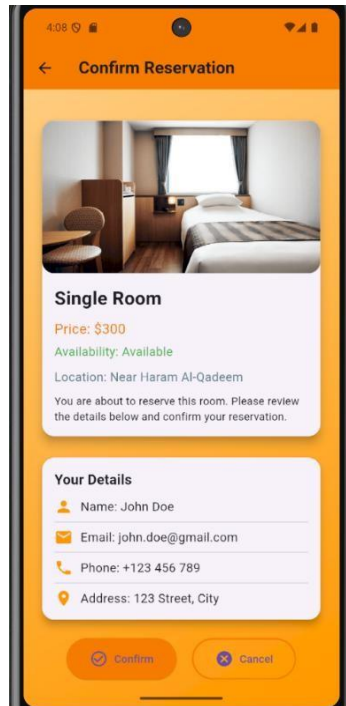


Figure 4.26: Confirm Reservation

- **Description:**
This page allows the user to confirm a selected room reservation by reviewing the room's details and their personal information.
- **Features:**
 - **Room Details:**
 - Room Type
 - Price
 - Availability
 - Location
 - **User Details:**
 - Name
 - Email
 - Phone
 - Address
 - **Confirm button:** Finalizes the reservation.
 - **Cancel button:** Cancels the process and redirects back.

Roommate Matching Process

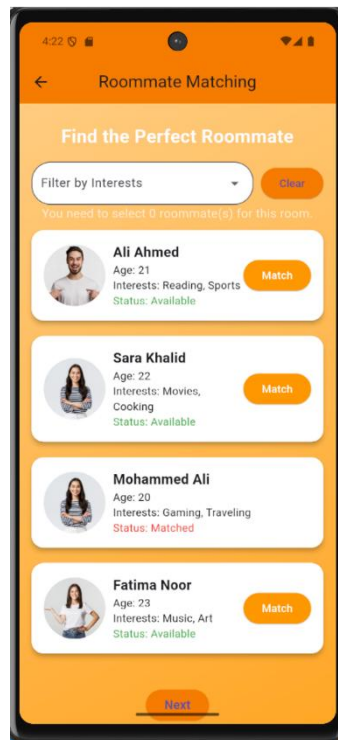


Figure 4.27: Roommate Matching

- **Description:**
Helps users find suitable roommates for shared rooms based on interests.
- **Features:**
 - Filters: Allows filtering by interests.
 - Roommate Cards:
Each card includes:
 - Name
 - Age
 - Status
 - Interests
 - Match button: Selects a roommate.
 - Clear Button: Removes a selected roommate.
 - Next Button: Proceeds to the next step.

Confirmation Process

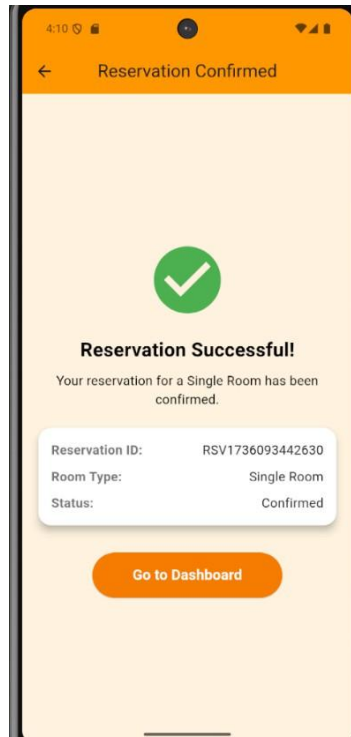


Figure 4.28: Reservation Confirmed

- **Description:**
Displays the confirmation of a successfully reserved room.
- **Details:**
 - Reservation ID
 - Room Type
 - Status
- **Action Button:**
 - **Go to Dashboard:** Redirects to the user's dashboard.

Messages :-

Chat Users

- **Description:**

The Chat Users feature in Sakni allows students to find and connect with other users for seamless communication. The interface is simple, intuitive, and provides quick access to chat with any user.
- **Features:**
 - **User List:** Displays a list of all users with a "Chat" button for easy access.
 - **Search and Filter:** Users can search for others or filter by specific interests to find relevant connections.
 - **Clear Filter:** Option to reset filters and view all users.

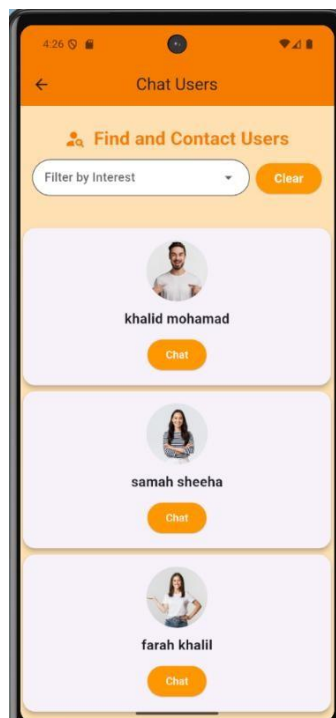


Figure 4.29: Chat Users

Chat with a User Process

- **Description:**
The one-on-one chat feature facilitates private communication between users. It offers a clean interface to send, receive, search, and delete messages.
- **Features:**
 - **Real-Time Messaging:** Send and receive messages instantly.
 - **Search in Chat:** Quickly find specific messages within the conversation.
 - **Delete Chat:** Option to delete the chat history for privacy or convenience.

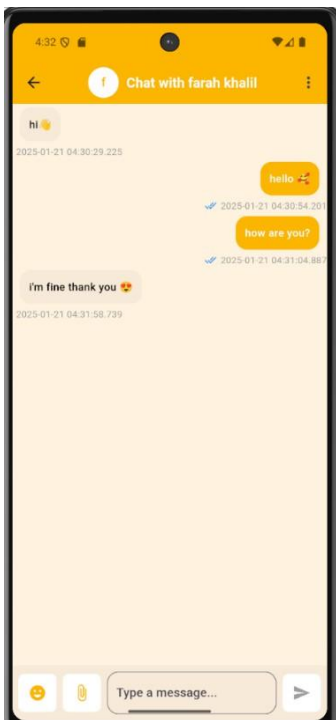


Figure 4.30: Chat with a User

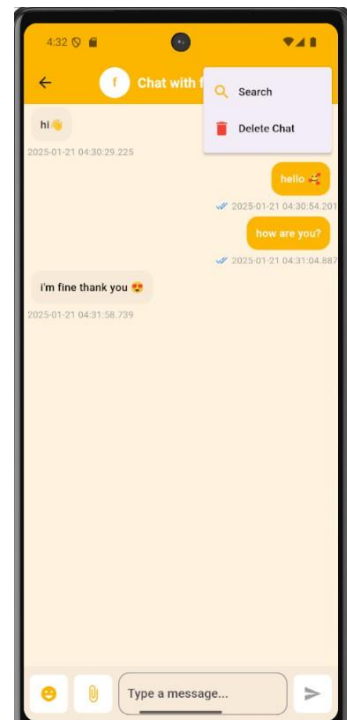


Figure 4.31: Chat Features

Chat Bot Process

- **Description:**
The Chat Bot in Sakni provides automated support to users, offering quick answers to common questions and enabling communication with the admin when necessary.
- **Features:**
 - **Instant Assistance:** Answers frequently asked questions such as password reset or required documents.
 - **Admin Support:** Redirects users to the admin for issues that require further assistance.
 - **User-Friendly Interface:** Simple and intuitive design for quick and easy interaction.

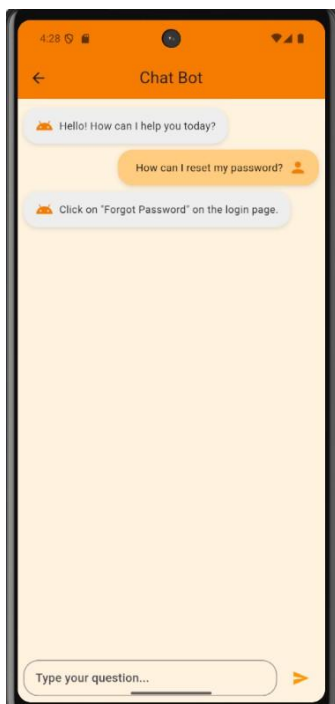


Figure 4.32: Chat Bot

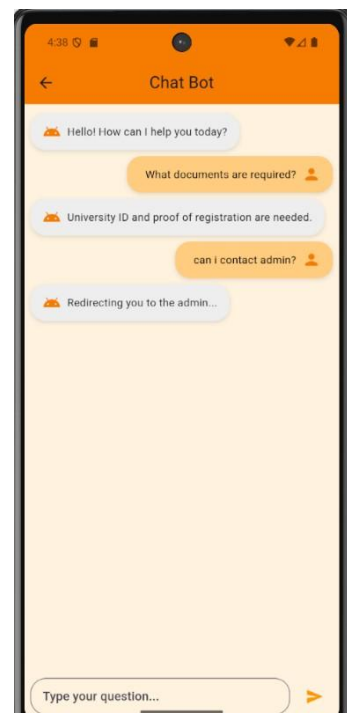


Figure 4.33: Chat Bot contact admin

Track Applications :-

Track Reservations Process

- **Description:**

The Track Reservations feature in Sakni allows users to monitor and manage their housing reservations with ease. It provides a comprehensive view of reservation details, ensuring users stay informed about their requests.
- **Features:**
 - **Reservation Overview:** Displays a list of all reservations with unique IDs and dates for quick reference.
 - **Status Updates:** Enables users to track the current status (e.g., pending, approved) of their reservations in real-time.
 - **Organized Display:** Neatly arranges information for easy navigation and review.

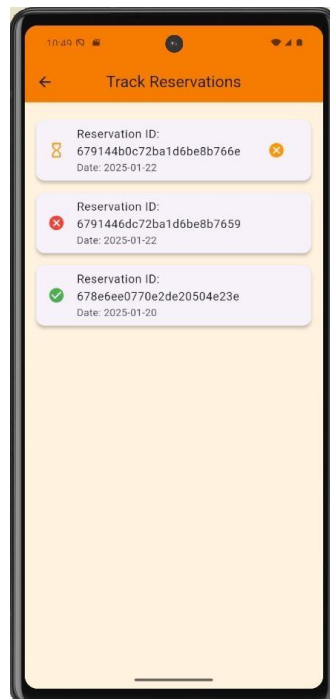


Figure 4.34: Track Reservations

Reservations Details Process

- **Description:**
The Reservation Details page provides detailed information about a specific reservation, offering users a clear view of their request and its current status.
- **Features:**
 - **Detailed Information:** Includes the reservation ID, date, status, and room details such as type, cost, availability, and location.
 - **Navigation Options:** Easily return to the main reservation list for further tracking.
 - **Status Clarity:** Clearly shows whether a reservation is pending, confirmed, or canceled, ensuring transparency.

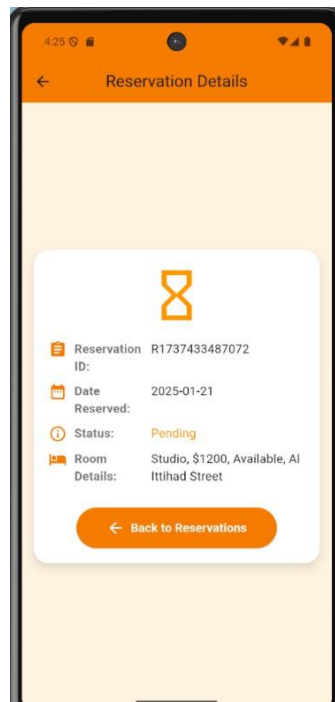


Figure 4.35: Reservations Details

Notifications :-

- **Description:**

The Notifications feature in Sakni keeps users informed about important updates, such as reservation status changes, in real-time. Users can view a summary of updates on the main page and click on any notification for detailed information.

- **Features:**

- **Real-Time Updates:** Instant notifications for reservation status changes.
- **Detailed View:** Clickable notifications provide full details, including timestamps.
- **Reservation Tracking:** Updates on approval, rejection, or pending status.
- **Clear Communication:** Ensures transparency and reduces manual inquiries.
- **User-Friendly:** Easy navigation between the notification list and details.



Figure 4.36: Notification

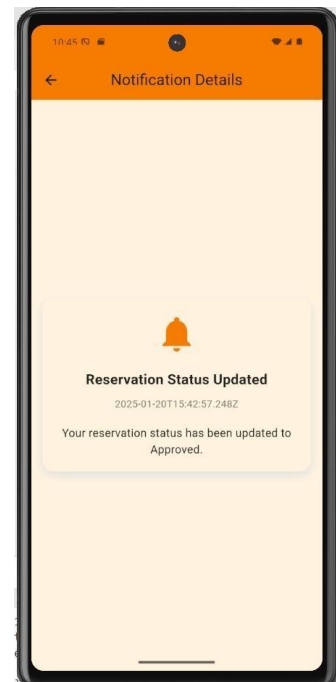


Figure 4.37: Notification Details

4.2.7 Admin Dashboard Side

- **Description:**

The Admin Dashboard is a centralized platform for managing all aspects of the application, including users, rooms, reservations, messages, and statistical reports. It provides a seamless interface for administrators to efficiently perform their tasks and monitor system activity.

- **Features:**

- **Manage Requests:** Approve or reject room reservations.
- **Manage Rooms:** Add, edit, or delete room details and monitor availability.
- **Manage Students:** View and manage student accounts.
- **Messages:** Communicate with students and other stakeholders.
- **Reports & Statistics:** Access detailed insights into reservations, rooms, and user activity.
- **Manage Room Owners:** Handle room owner accounts and updates.

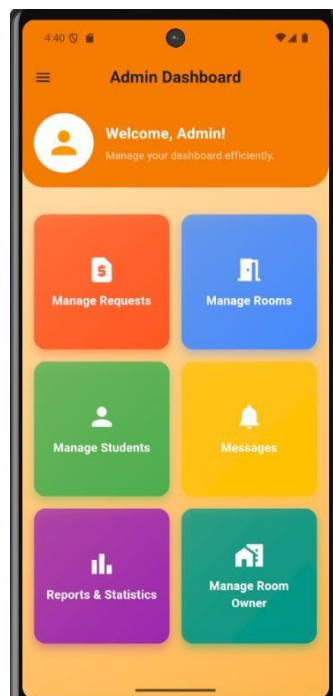


Figure 4.38: Admin Dashboard

Manage Requests Process

- **Description:**

The Manage Requests page allows admins to process and manage room reservations efficiently. Admins can search for reservations using the reservation ID or user information and approve or reject pending requests.
- **Features:**
 - **Search Functionality:** Search for requests by ID or user information.
 - **Reservation Details:** View reservation ID, status, and associated user details.
 - **Request Status Management:** Approve or reject pending reservation requests.

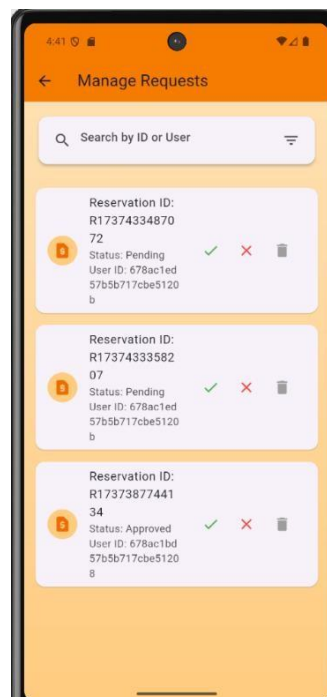


Figure 4.39: Manage Requests

Manage Rooms Process

- **Description:**
The Manage Rooms page enables admins to monitor room availability and details. Admins can search, edit, and update room information, ensuring accurate and up-to-date listings.
- **Features:**
 - **Search Rooms:** Quickly locate rooms by type or address.
 - **Room Details:** View and manage room type, price, availability, and location.
 - **Room Updates:** Add new rooms or modify existing room details.

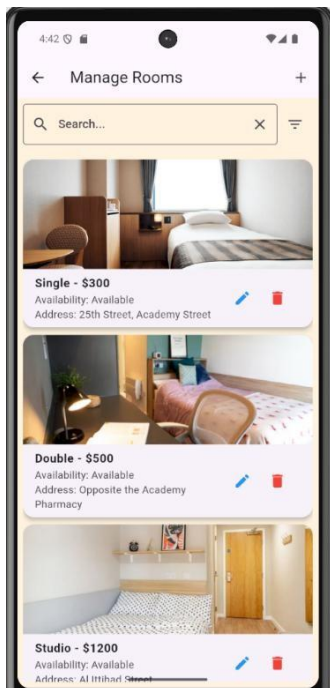


Figure 4.40: Manage Rooms

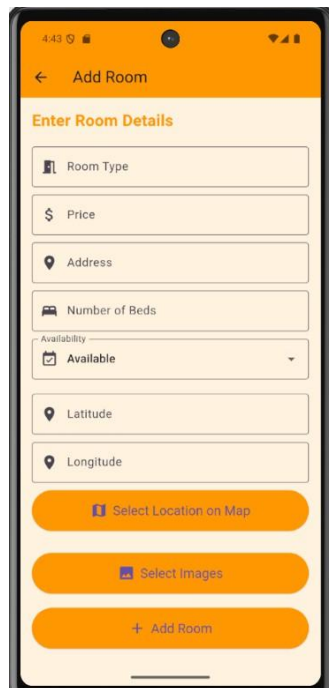


Figure 4.41: Add Rooms

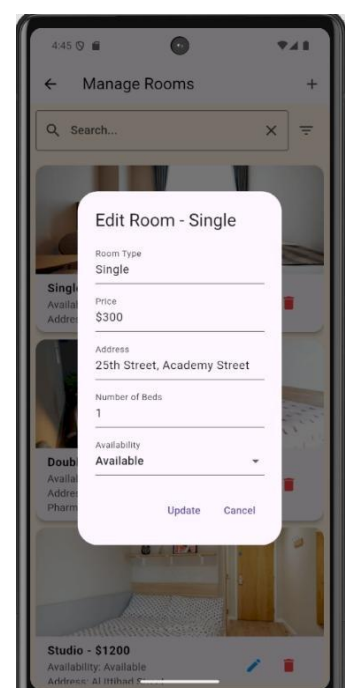


Figure 4.42: Edit Rooms



Figure 4.43: Select Location Rooms

Manage Students Process

- **Description:**
The Manage Students page provides an organized list of registered students, allowing admins to search for specific students and view their details, such as name and email.
- **Features:**
 - **Search Functionality:** Locate students using their name or email.
 - **Student Details:** View and manage student profiles.

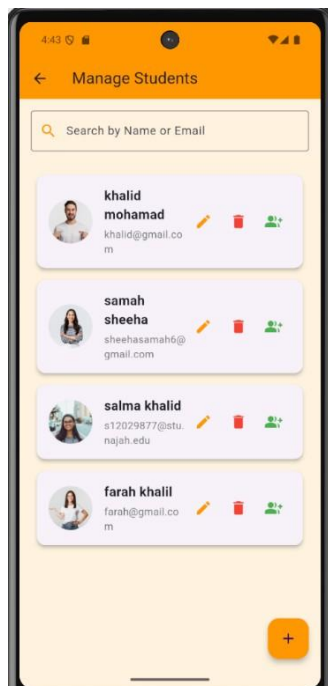


Figure 4.44: Manage Students

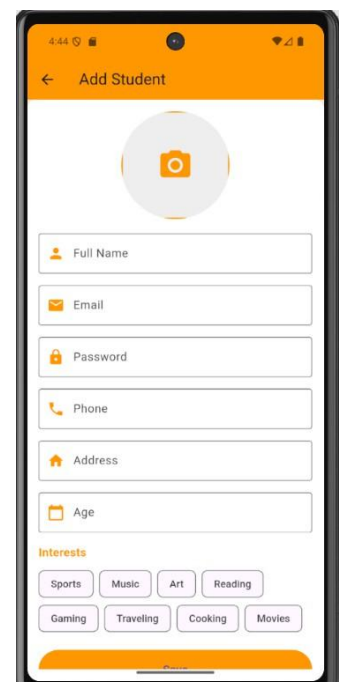


Figure 4.45: Add Students

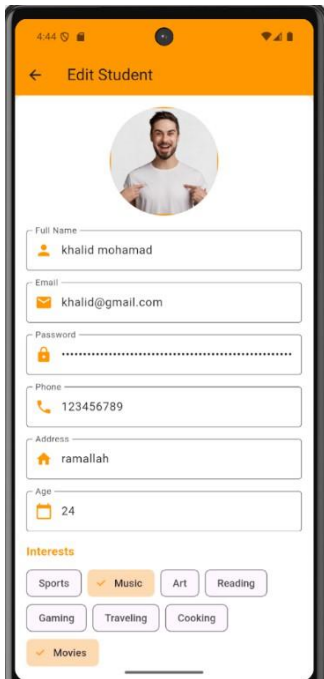


Figure 4.45: Manage Students

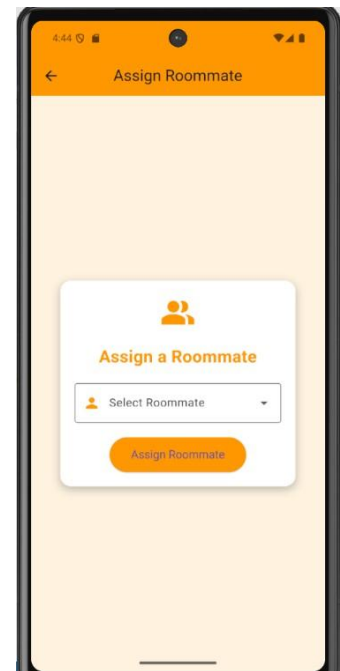


Figure 4.46: Assign Roommate

- **Description:**
The Manage Students section in Sakni enables administrators to efficiently manage student information and housing preferences. It includes features to add new students, edit existing details, and assign roommates, ensuring smooth operations and accurate record-keeping.
- **Features:**
 - **Add Student:**
 - **Form Inputs:** Add full details such as name, email, password, phone, address, age, and personal interests.
 - **Interests Selection:** Checkboxes for interests like Sports, Music, Art, Reading, and more, helping in roommate matching.
 - **Edit Student:**
 - **Editable Fields:** Modify existing student information (e.g., name, email, phone, address, and age).
 - **Interest Updates:** Update students' preferences to reflect changes.
 - **Assign Roommate:**
 - **Roommate Selection:** Select and assign a compatible roommate from the list of students.
 - **Streamlined Process:** A simple dropdown or selection method to ensure efficiency.

Student Details Process

- **Description:**

The Student Details page provides comprehensive information about a specific student, including their personal details, interests, and uploaded documents. This page is designed to give admins or room owners a clear overview of the student and facilitate efficient management of their profiles. Additionally, it allows the student to upload essential documents directly.

- **Features:**

- Personal Information Display
- Status
- Interests
- Documents Section: Displays uploaded documents with file names and descriptions:

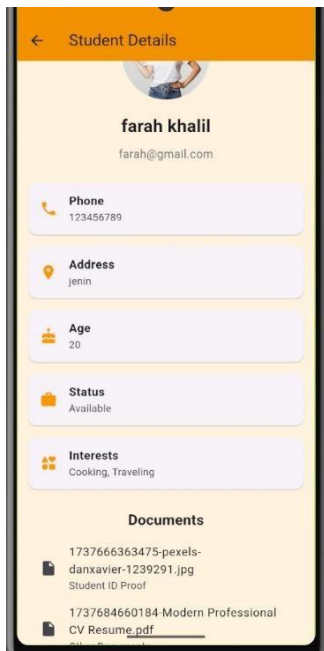


Figure 4.47: Student Details



Figure 4.48: Image upload by a student

Admin Messages Process

- **Description:**
The Admin Messages page facilitates communication between admins and users, such as students and room owners. Admins can view and respond to messages efficiently.
- **Features:**
 - **User Messages:** View messages sent by students or room owners.
 - **Categorization:** Distinguish between student and room owner messages.



Figure 4.49: Admin Messages

Manage Room Owners Process

- **Description:**
The Manage Room Owners page enables admins to handle room owner accounts, ensuring their details are accurate and updated.
- **Features:**
 - **Search Room Owners:** Find room owners using their name or email.
 - **Owner Details:** View and update owner contact information.

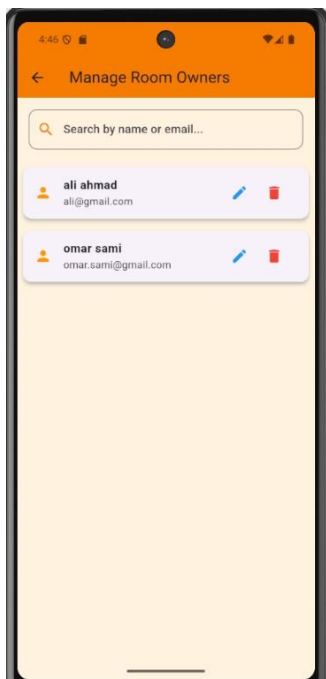


Figure 4.50: Manage Room Owners

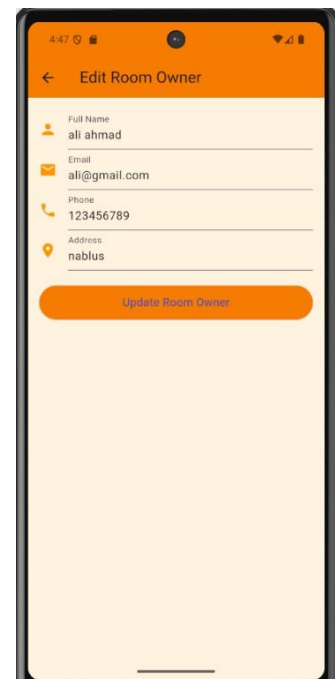


Figure 4.51: Edit Room Owners

Reports & Statistics Process

- **Description:**

The Reports & Statistics page provides detailed insights into the system's performance, user activity, room availability, and reservation statistics. It serves as a valuable tool for data-driven decision-making.

- **Features:**

- **User Statistics:** View the total number of users, including students, room owners, and admins.
- **Room Statistics:** Monitor room availability and occupancy rates.
- **Reservation Statistics:** Analyze total reservations, pending requests, confirmed bookings, and cancellations.
- **Visual Representation:** Access graphs and summaries for easier data interpretation.



Figure 4.52: Reports & Statistics

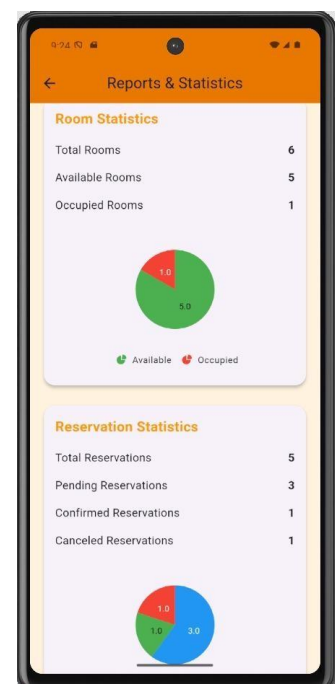


Figure 4.53: Reports & Statistics

4.2.8 Room Owner Dashboard Side

- **Description:**

The Room Owner Dashboard serves as the main hub for room owners, providing quick access to essential management tools, including rooms, reservations, and profile updates. The dashboard ensures efficient navigation and user-friendly interactions.

- **Features:**

- **Welcome Section:** Personalized greeting with the room owner's name.
- **Manage Rooms Button:** Redirects to a page displaying room details and management options.
- **Manage Reservations Button:** Takes the owner to a list of reservation requests with filtering options.
- **Edit Profile Button:** Navigates to the profile editing page for updating personal details.

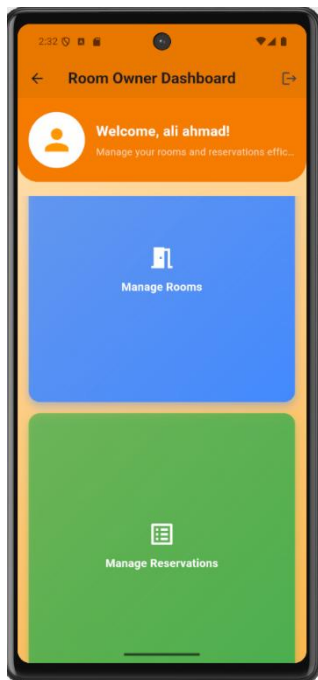


Figure 4.54:Room Owner Dashboard

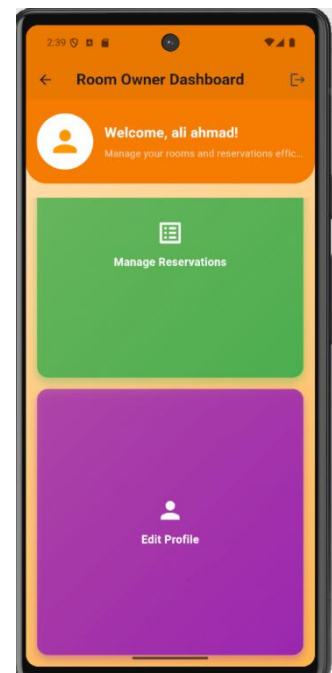


Figure 4.55:Room Owner Dashboard

Manage Rooms Process

- **Description:**
This page allows room owners to view and manage all their listed rooms, providing details on availability, type, and location.
- **Features:**
 - **Room List:** Displays room details.
 - **Search Functionality:** Allows owners to search for specific rooms by type or location.

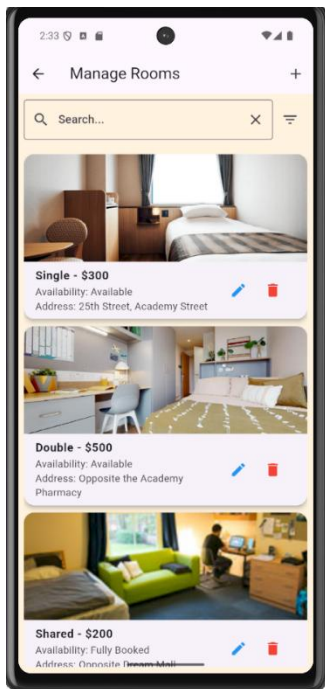


Figure 4.56: Manage Rooms

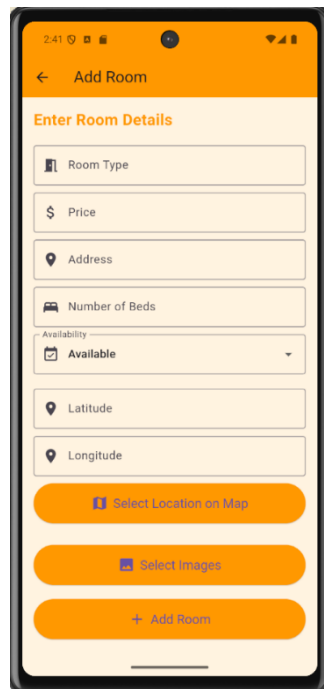


Figure 4.57: Add Rooms

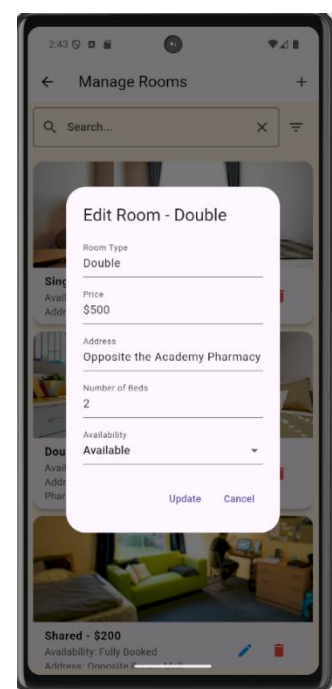


Figure 4.58: Edit Rooms



Figure 4.59: Select Location

Manage Reservations Process

- **Description:**
This page is designed to help room owners review and manage reservation requests. Owners can view detailed information about each request and take appropriate actions.
- **Features:**
 - **Reservation List:** Displays requests with the details
 - **Search Bar:** Enables searching for reservations by ID or user details for better organization.

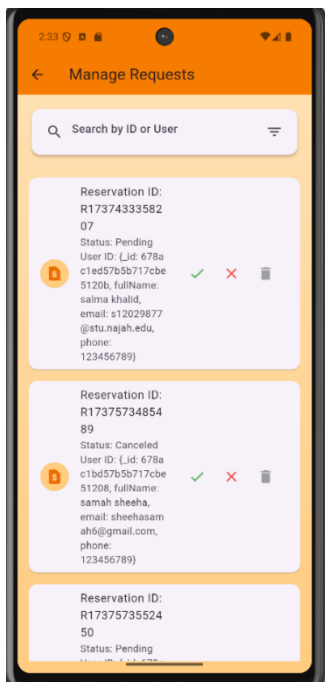


Figure 4.60: Manage Reservations

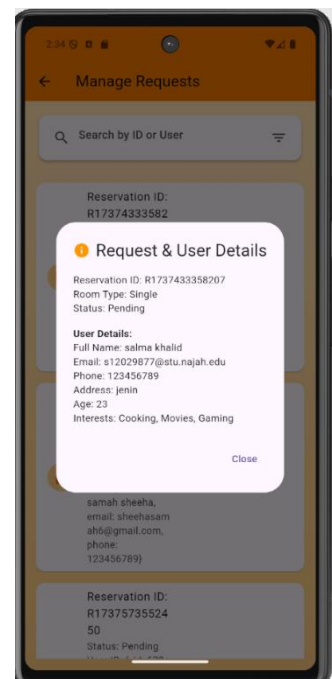


Figure 4.61: Reservations Details

Edit Room Owner Process

- **Description:**
This page allows room owners to update their personal information, ensuring their profile remains accurate and up to date.
- **Features:**
 - **Editable Fields:** as Full Name and Email.
 - **Update Button:** Saves the changes and updates the profile information.

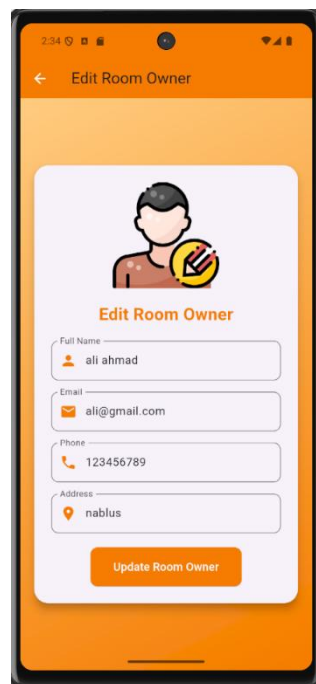


Figure 4.62: Edit Room Owner

5 Results and Analysis

5.1 Results Overview

We have strategically designed Sakni to modernize and streamline the student housing process, addressing challenges faced by students, housing administrators, and room owners. The platform offers core functionalities such as electronic submission of housing applications, room selection based on personal preferences, and real-time tracking of application status.

One of Sakni's standout features is its **roommate matching system**, which analyzes student profiles to suggest compatible roommates, fostering a harmonious living environment. Additionally, the platform provides housing administrators with tools to manage housing requests, monitor room availability, and generate insightful reports.

The user-friendly interface simplifies the process for students by offering categorized room options such as single, double, and studio apartments, each detailed with pricing, location, and availability. This structure allows students to make informed decisions while saving time and effort.

For room owners, Sakni ensures seamless collaboration by offering tools to manage their listings, update availability, and communicate directly with administrators and students.

5.2 Analysis

Sakni effectively addresses the key challenges in managing student housing by introducing several innovative features:

1. **Streamlined Application Process:** By digitizing the housing application, students can apply easily, reducing paperwork and improving efficiency for housing departments.
2. **Roommate Matching:** The compatibility-based roommate matching system ensures that students are paired with individuals who share similar preferences, minimizing potential conflicts.
3. **Enhanced Transparency:** Real-time application status tracking keeps students informed, ensuring clarity and reducing inquiries to administrators.
4. **Room Categorization:** By categorizing rooms (e.g., single, double, and studio) and including details like pricing and location, Sakni simplifies the decision-making process for students.

-
5. **Admin and Room Owner Tools:** Housing administrators and room owners benefit from centralized tools for managing requests, monitoring room availability, and generating statistical reports.
 6. **Reports and Analytics:** Sakni provides insightful statistics about room availability, occupancy rates, and student applications, allowing for data-driven decision-making and improved operational efficiency.

Through its innovative features and efficient processes, Sakni has proven to be a transformative solution, bridging the gap between students, housing administrators, and room owners, and significantly improving the housing experience for all stakeholders.

6 Conclusion and Future Work

The "Sakni" application offers an innovative and streamlined solution to the challenges of student housing management. By providing a platform that combines room selection, roommate matching, and application tracking, Sakni simplifies the housing application process for students while ensuring efficiency and transparency for administrators. With features like real-time application tracking, seamless document submission, and personalized room preferences, the application enhances the overall housing experience, saving time and effort for both students and housing departments.

6.1 Future Work

As part of Sakni's future development, our vision includes expanding its capabilities and integrating additional features to further enhance the user experience and operational efficiency. The following outlines our plans for the future:

- **Advanced Data Analytics and Reporting:** Introducing tools for advanced analytics to provide housing administrators with insights into application trends, room preferences, and occupancy rates. These analytics will support better decision-making and efficient resource allocation.

- **Enhanced User Personalization:** Developing personalized dashboards for students, showcasing tailored recommendations for rooms and potential roommates based on preferences, location, and previous interactions within the app. Expanding integration with electronic payment systems: Adding support for additional electronic payment systems is essential to simplify financial transactions between companies and engineers using EngTrack. By facilitating seamless payment processes, we enhance user satisfaction and operational efficiency. This integration will contribute to smoother interactions and improved financial management within project environments.

- **Integration with Payment Gateways:** Adding support for secure electronic payment systems to enable seamless online transactions for room reservations. This will simplify financial processes and improve user satisfaction by allowing students to pay fees directly through the app.

- **Real-Time Communication Tools:** Implementing features such as in-app messaging and notifications to facilitate communication between students and housing administrators. These tools will enhance collaboration, transparency, and the overall housing process.

- **Roommate Compatibility Assessment:** Expanding the roommate matching system with AI-driven compatibility tools that consider personality traits, study habits, and lifestyle preferences, ensuring an improved living experience for students.

- **Multi-Language Support:** Extending the application to support multiple languages, ensuring accessibility for international students and accommodating a diverse user base.

- **Educational Resources and Guidelines:** Developing a knowledge base with step-by-step tutorials, FAQs, and safety guidelines to educate students about the housing process and best practices.

These future enhancements will position Sakni as a comprehensive solution for student housing management, ensuring that it evolves to meet the changing needs of its users while maintaining its core mission of efficiency, transparency, and user satisfaction.

7 Website Screenshots

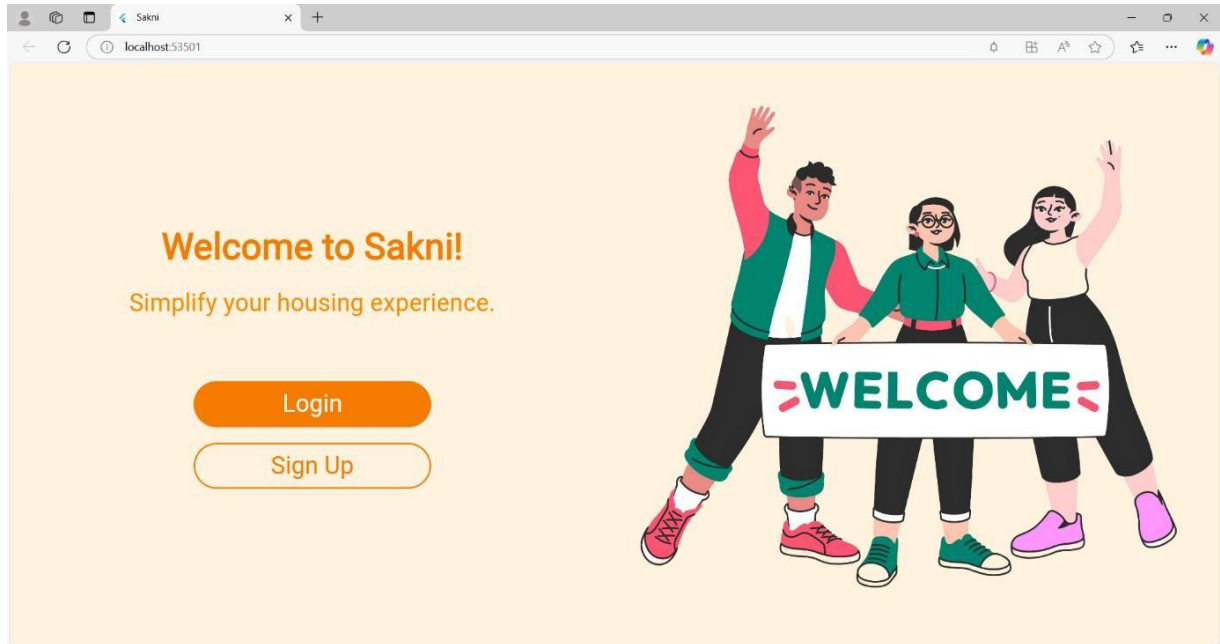


Figure 7.1: Welcome page

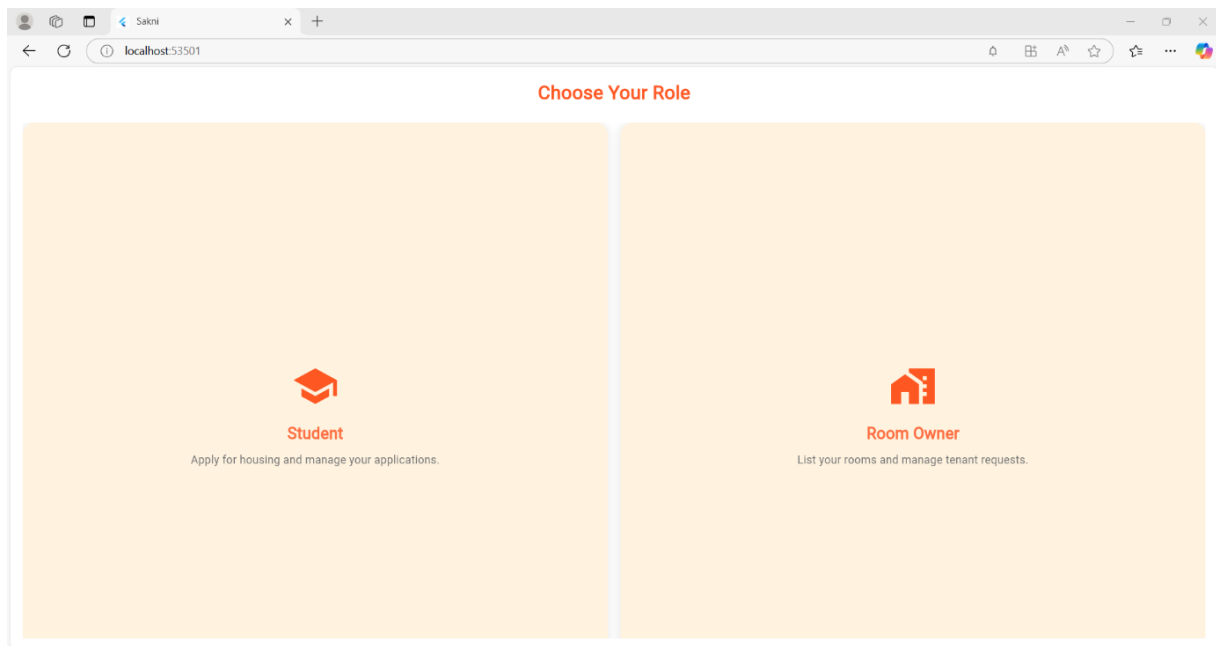


Figure 7.2: Sign Up

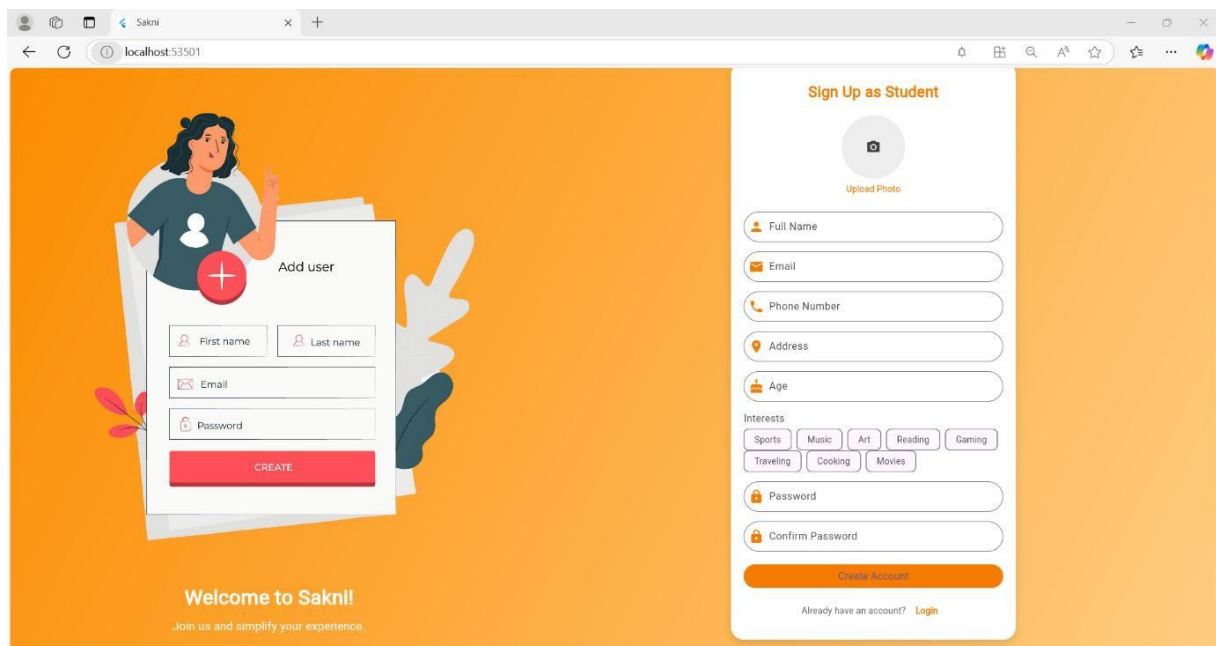


Figure 7.3: Sign Up as Student

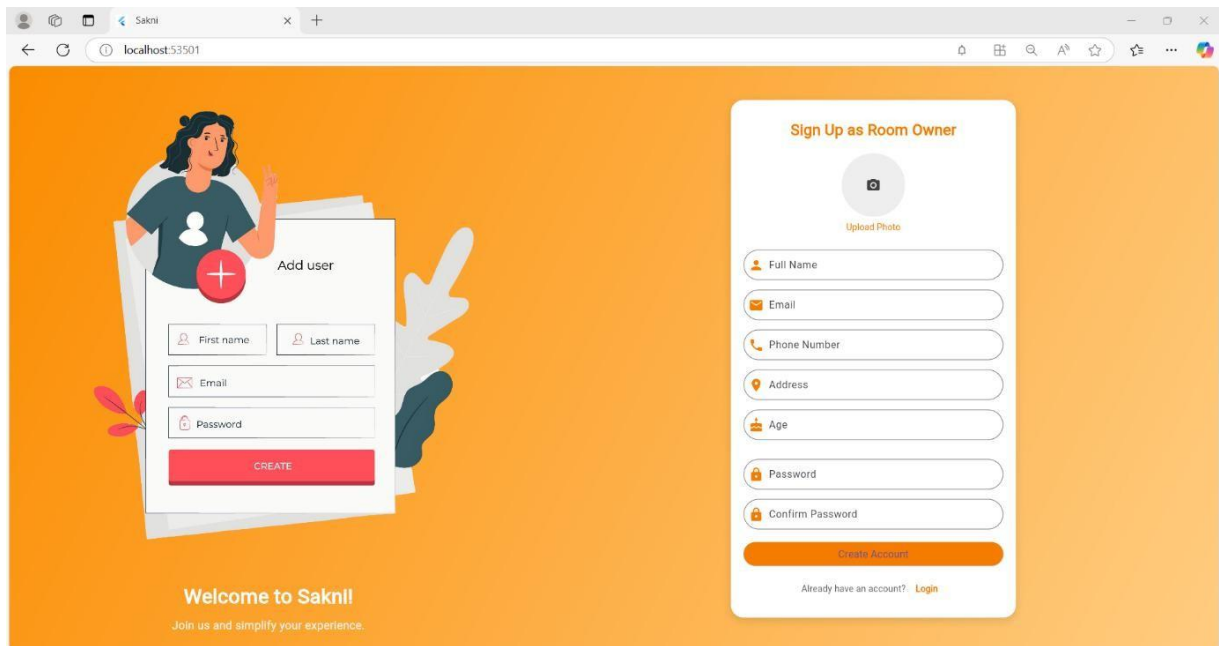


Figure 7.4: Sign Up as Owner

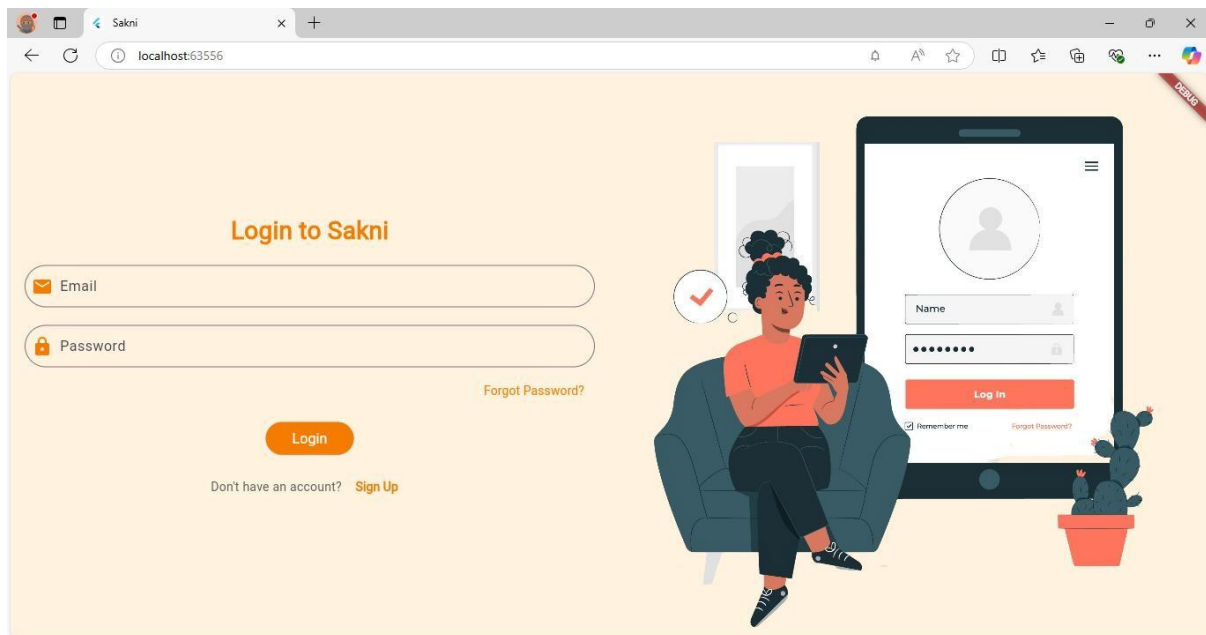


Figure 7.5: Login

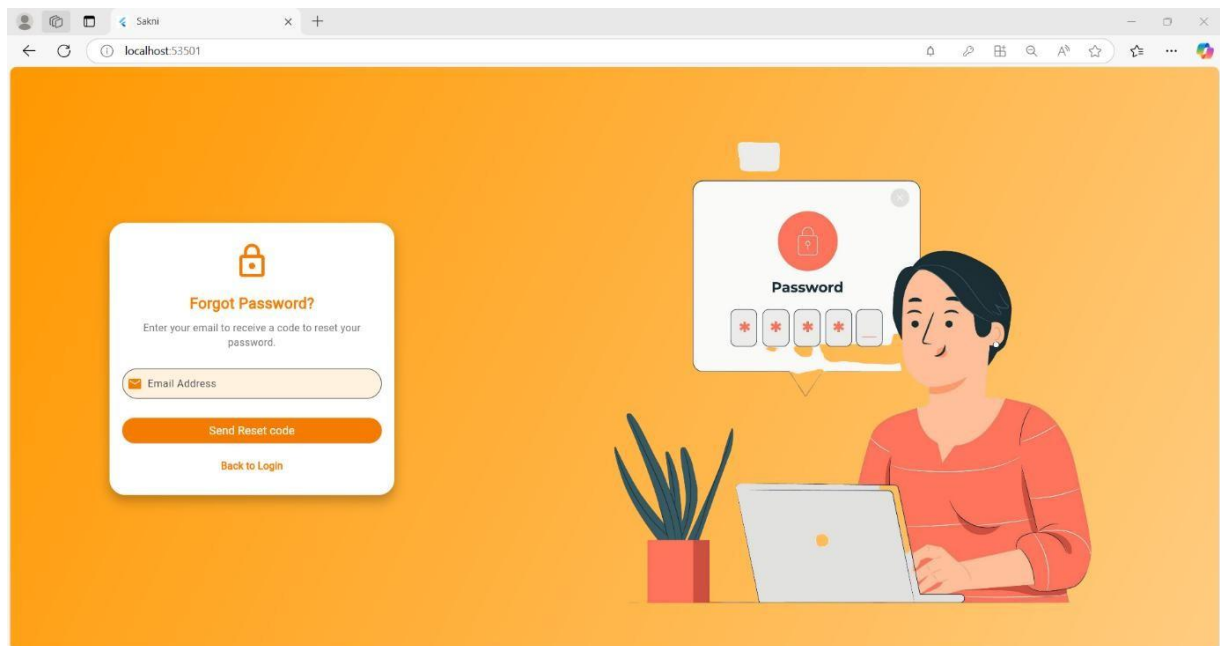


Figure 7.6: Forget Password

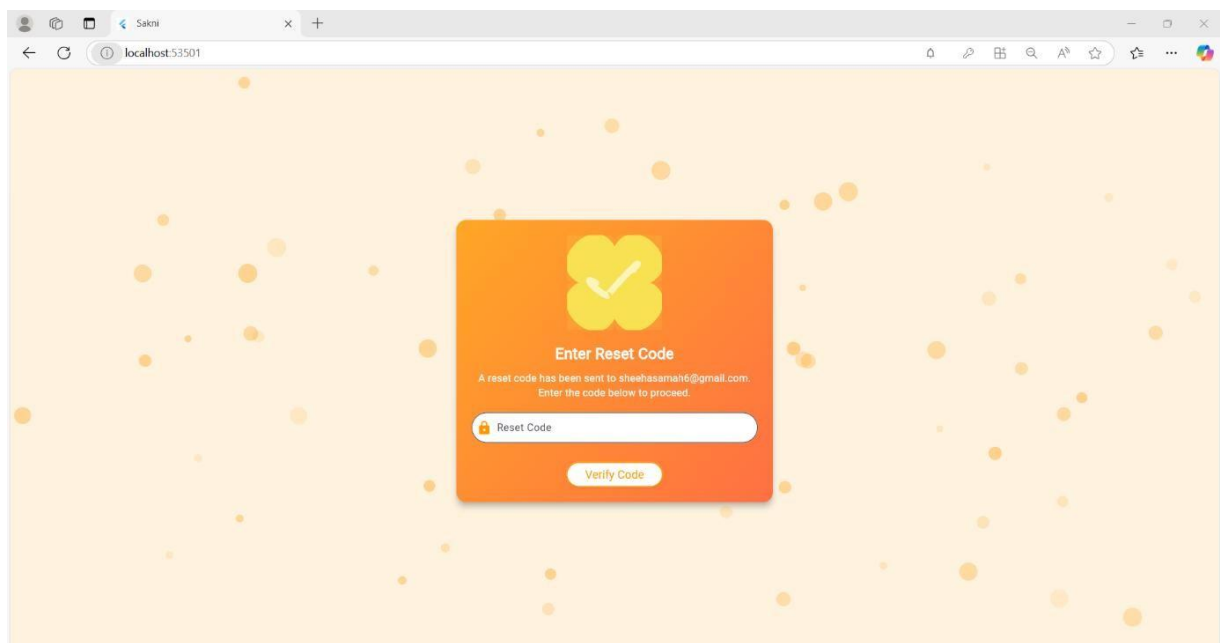


Figure 7.7: Reset Password Confirmation

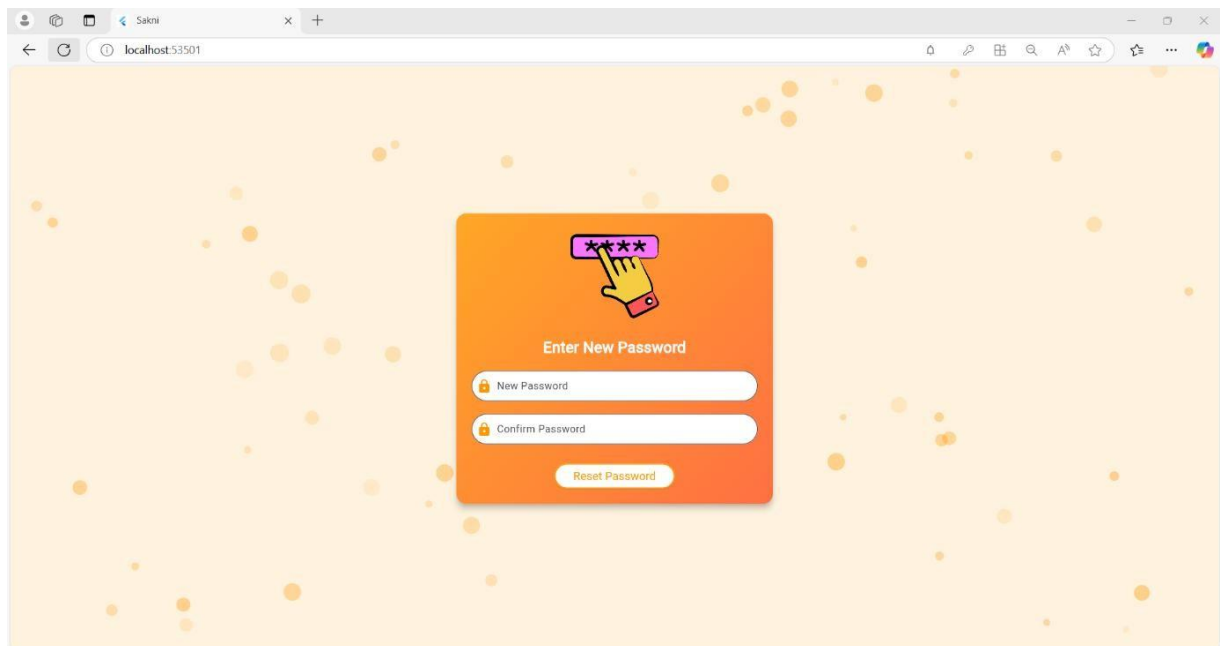


Figure 7.8: Reset Password

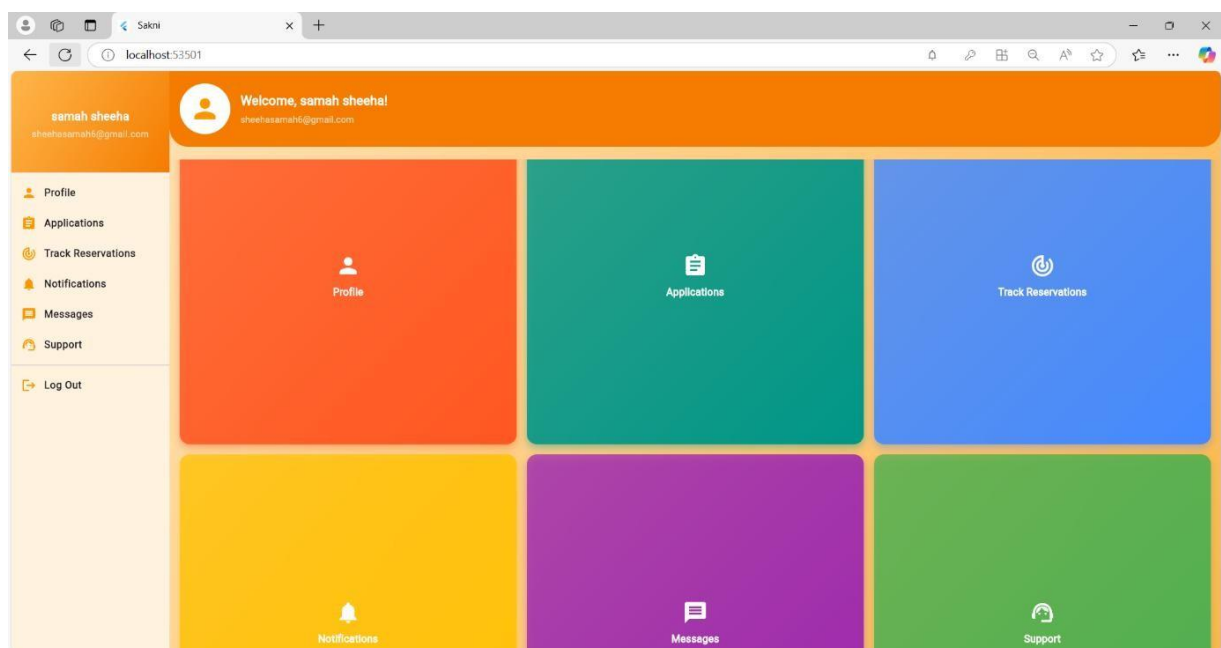


Figure 7.9: User Dashboard

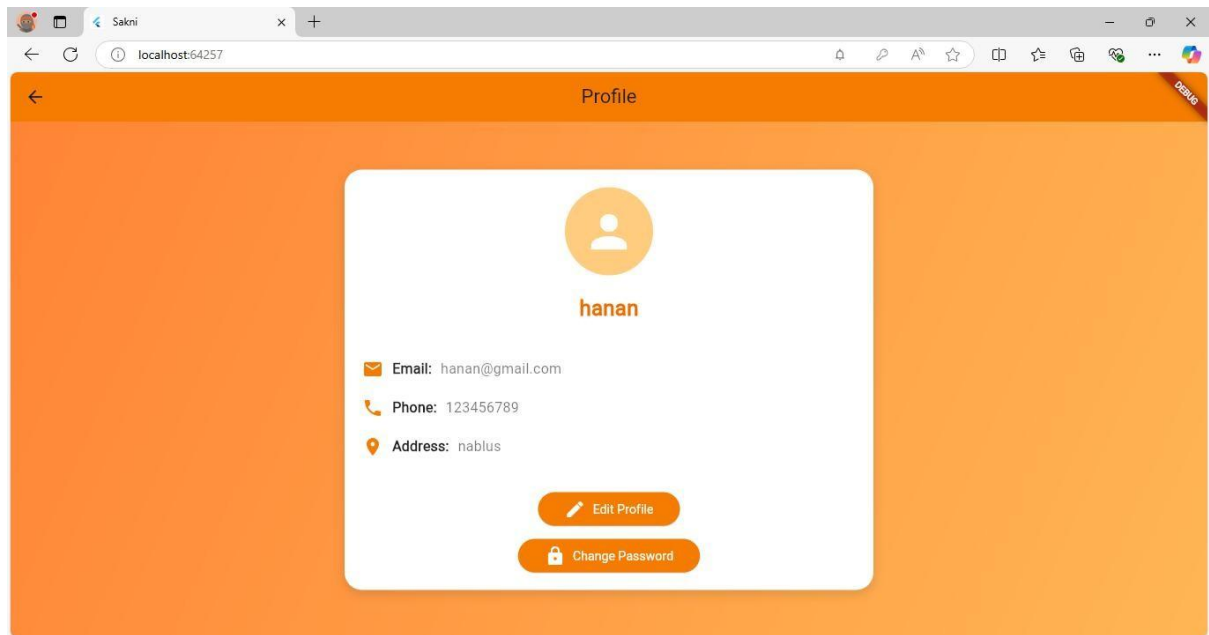


Figure 7.10: Profile page

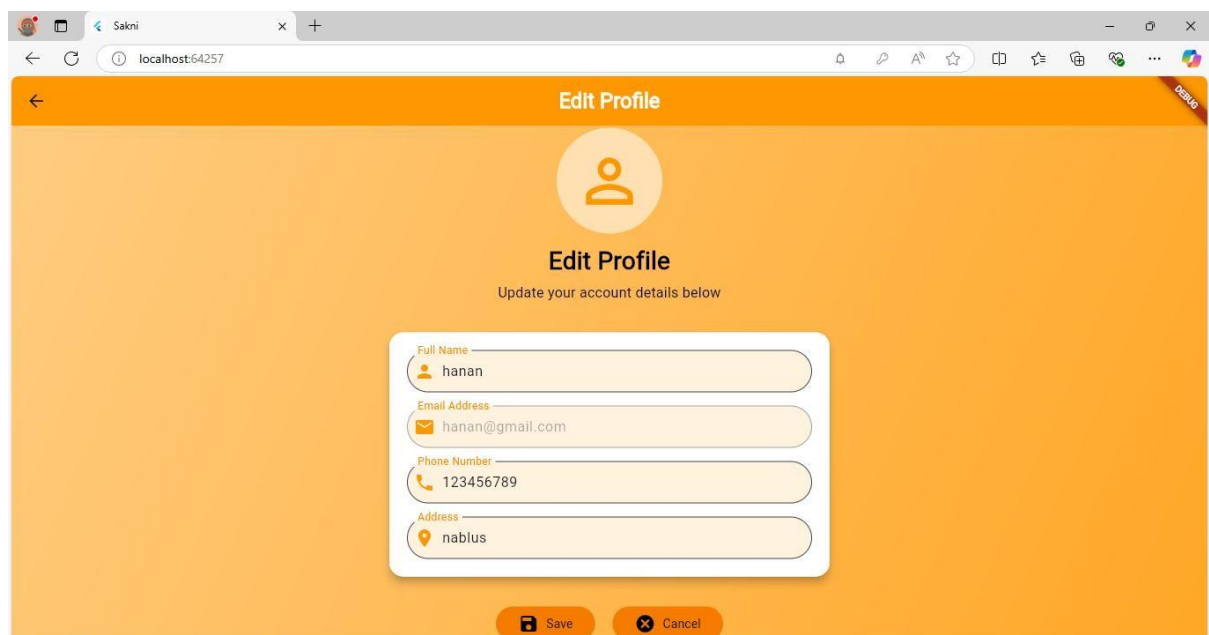


Figure 7.11: Edit Profile

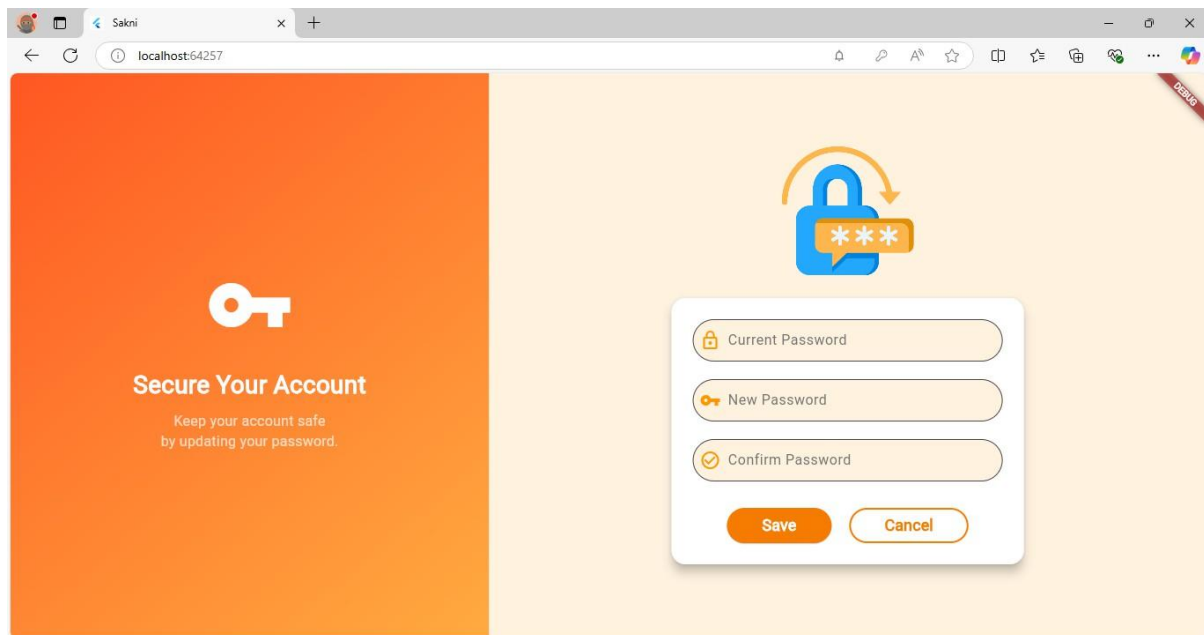


Figure 7.12: Change Password

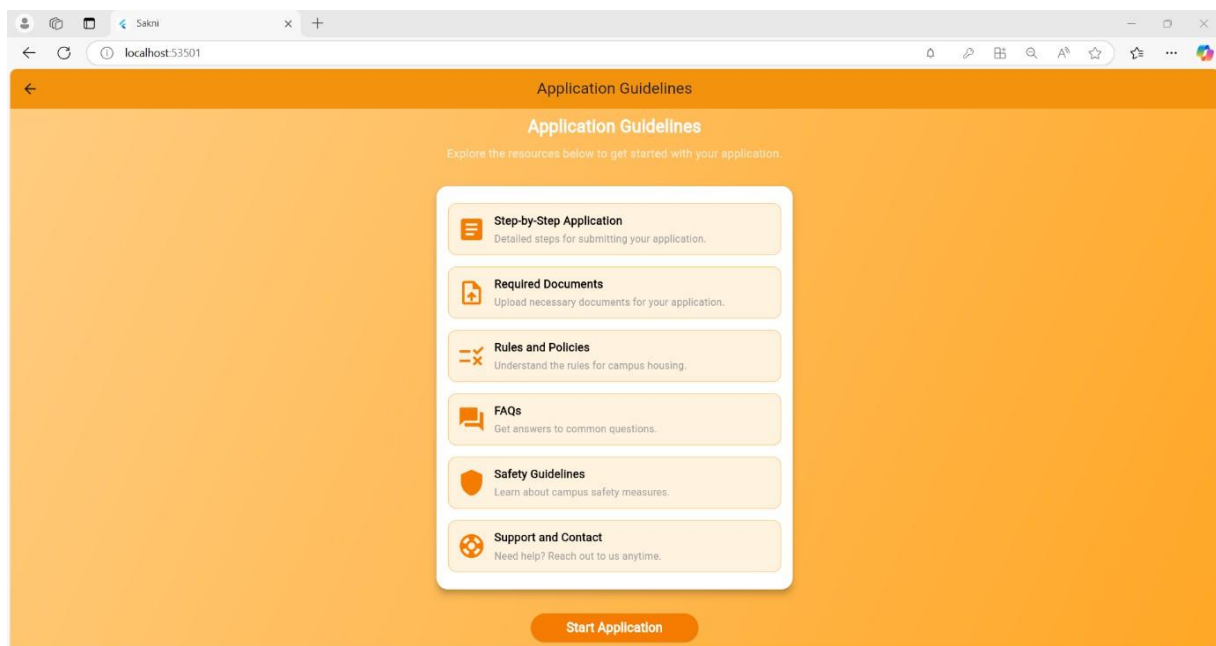


Figure 7.13: Housing Guidelines

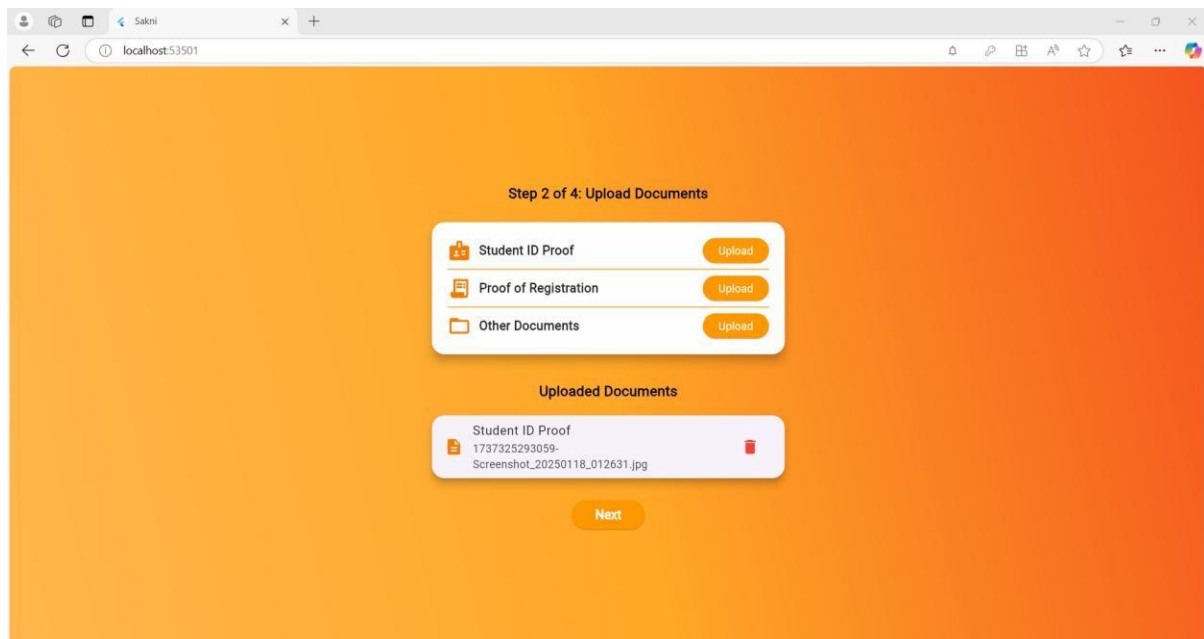


Figure 7.14: Upload Documents

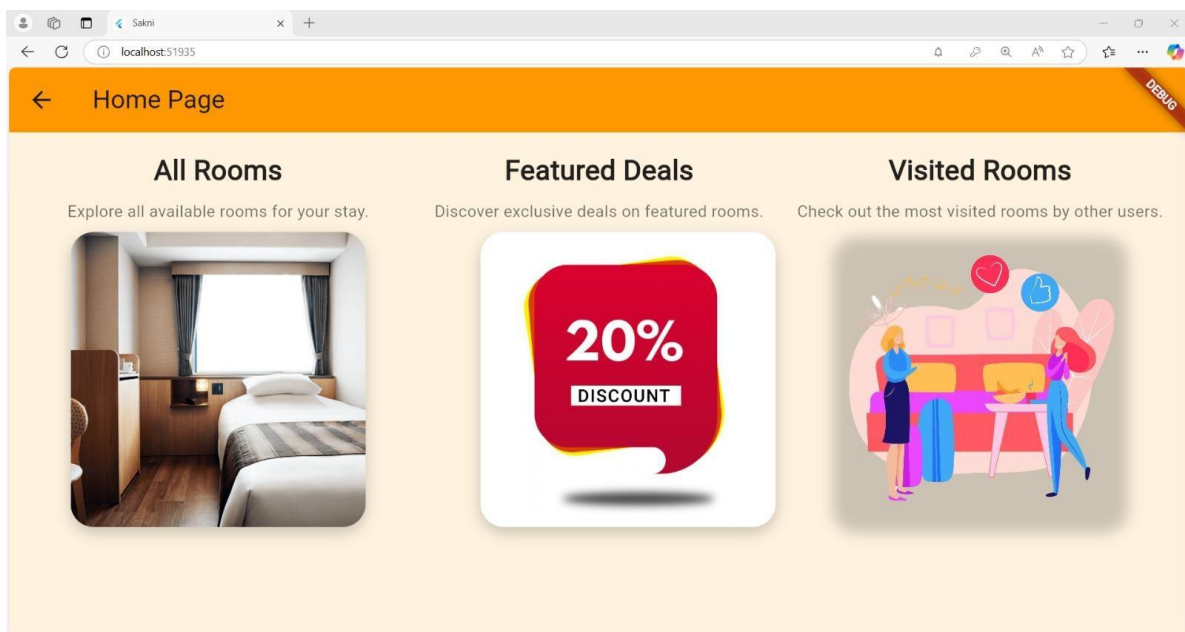


Figure 7.15: Home Page

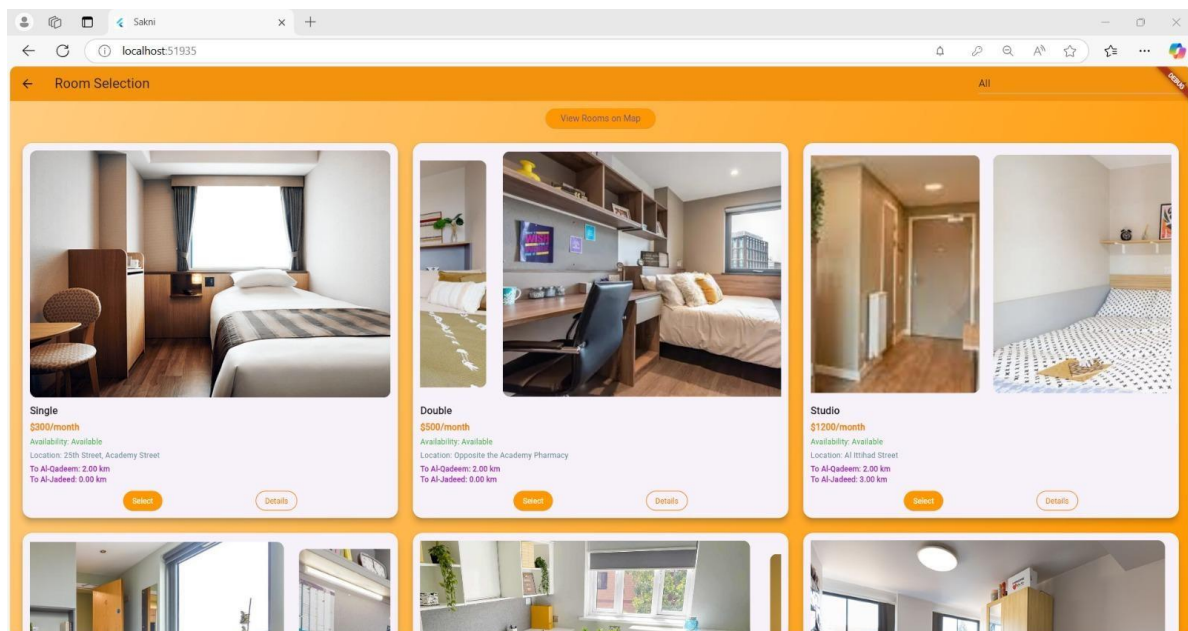


Figure 7.16: Room Selection based on All Rooms

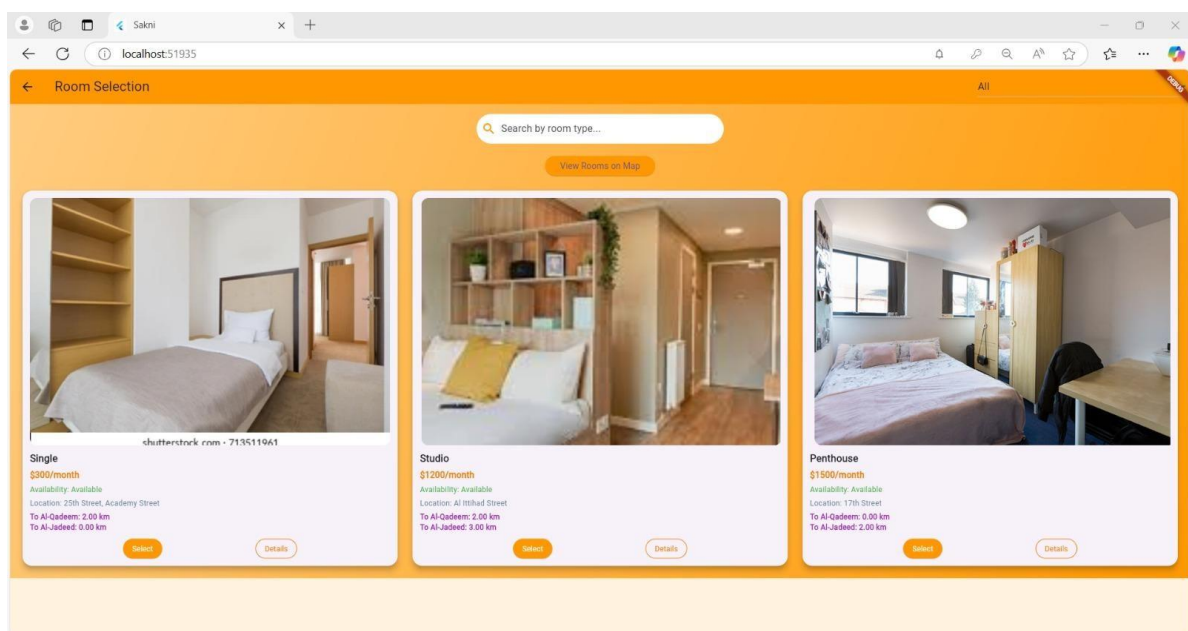


Figure 7.17: Room Selection based on Featured Deals

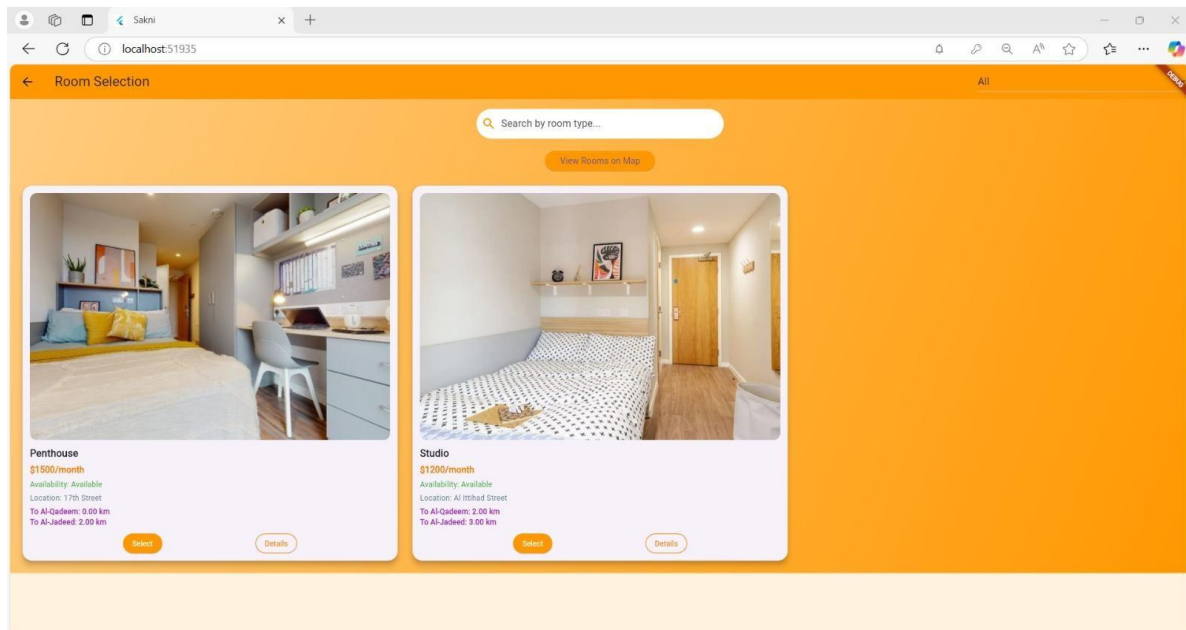


Figure 7.18: Room Selection based on Visited Rooms

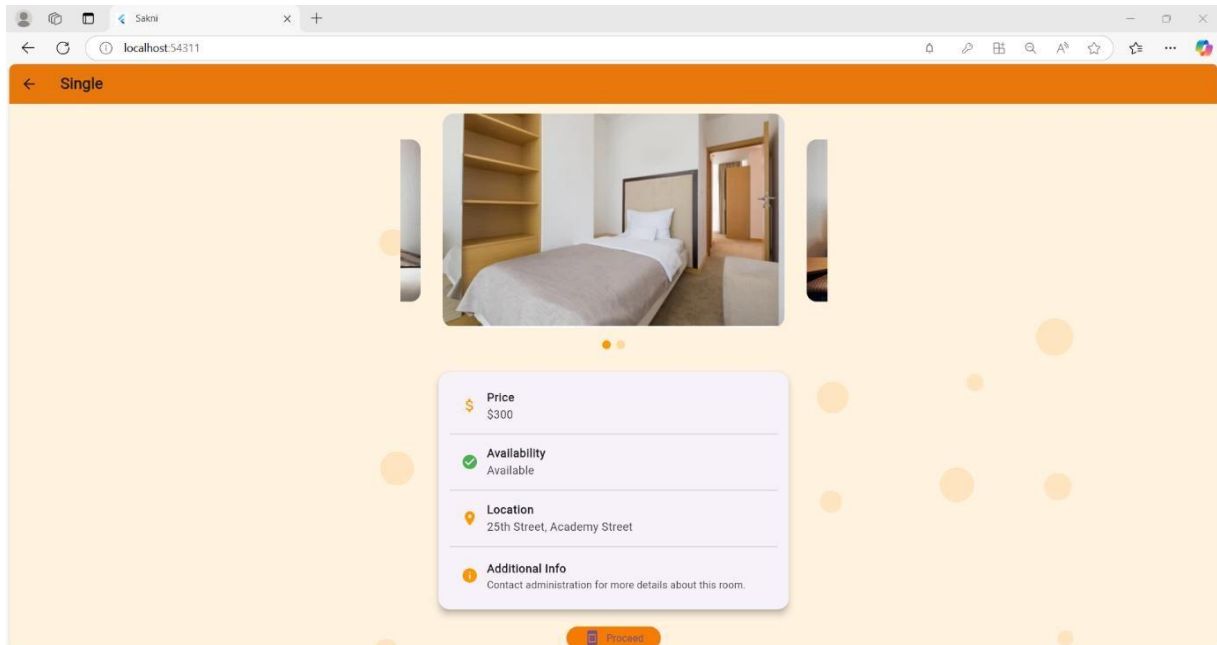


Figure 7.19: Room Details

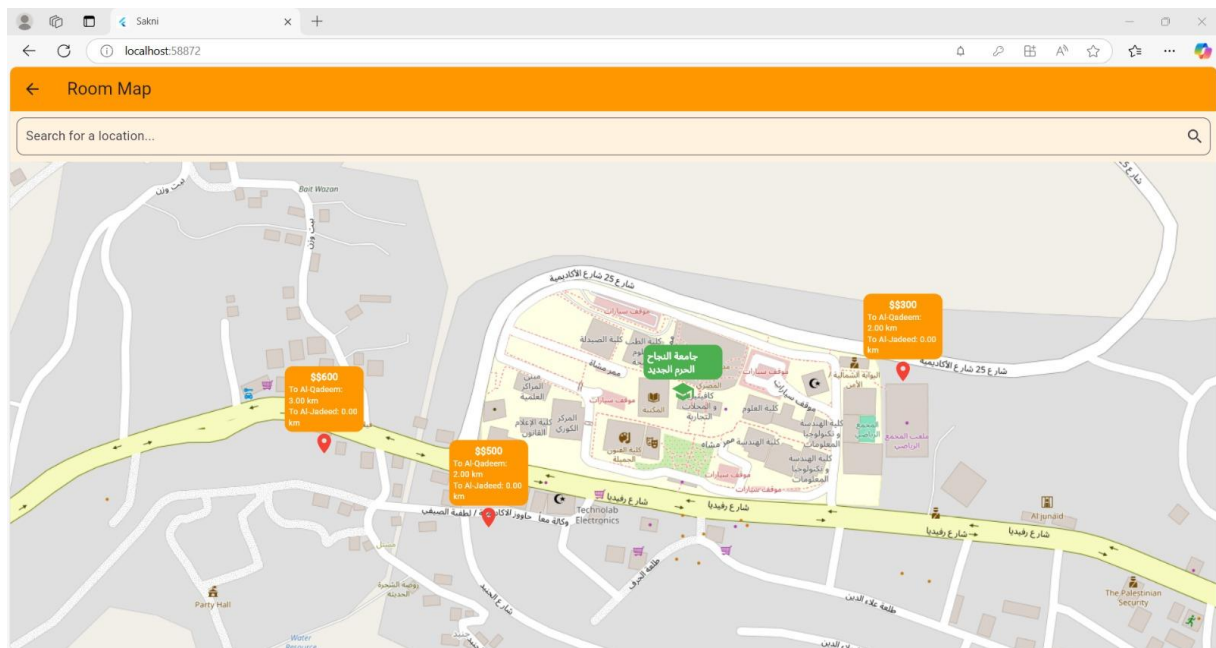


Figure 7.20: Room Map

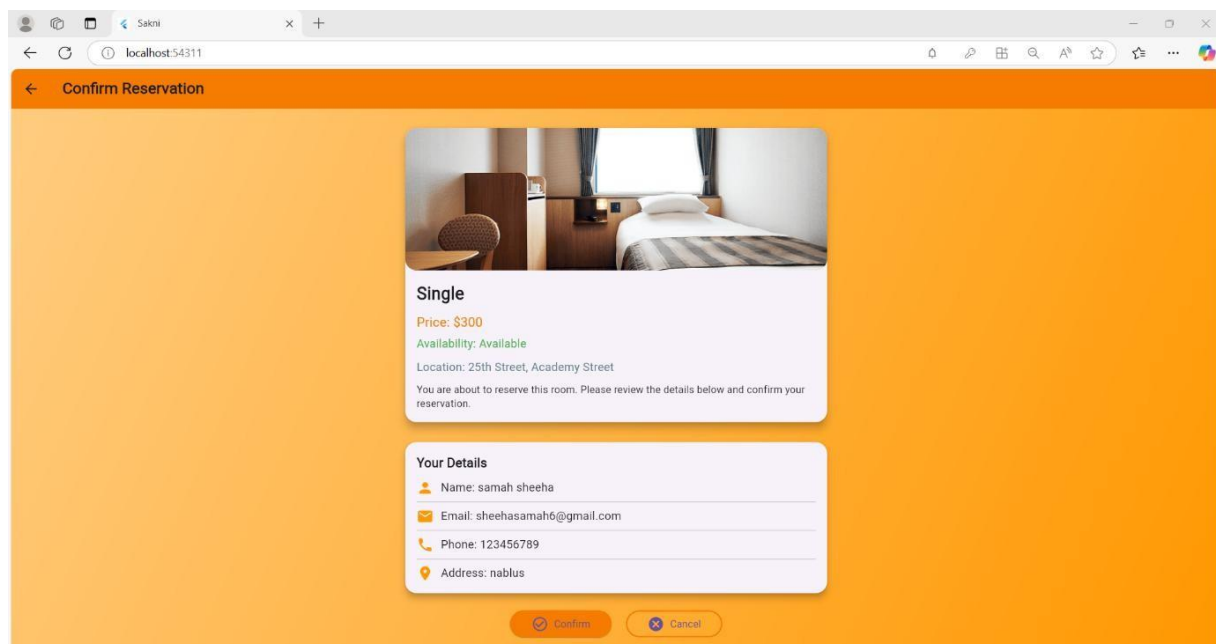


Figure 7.21: Confirm Reservation

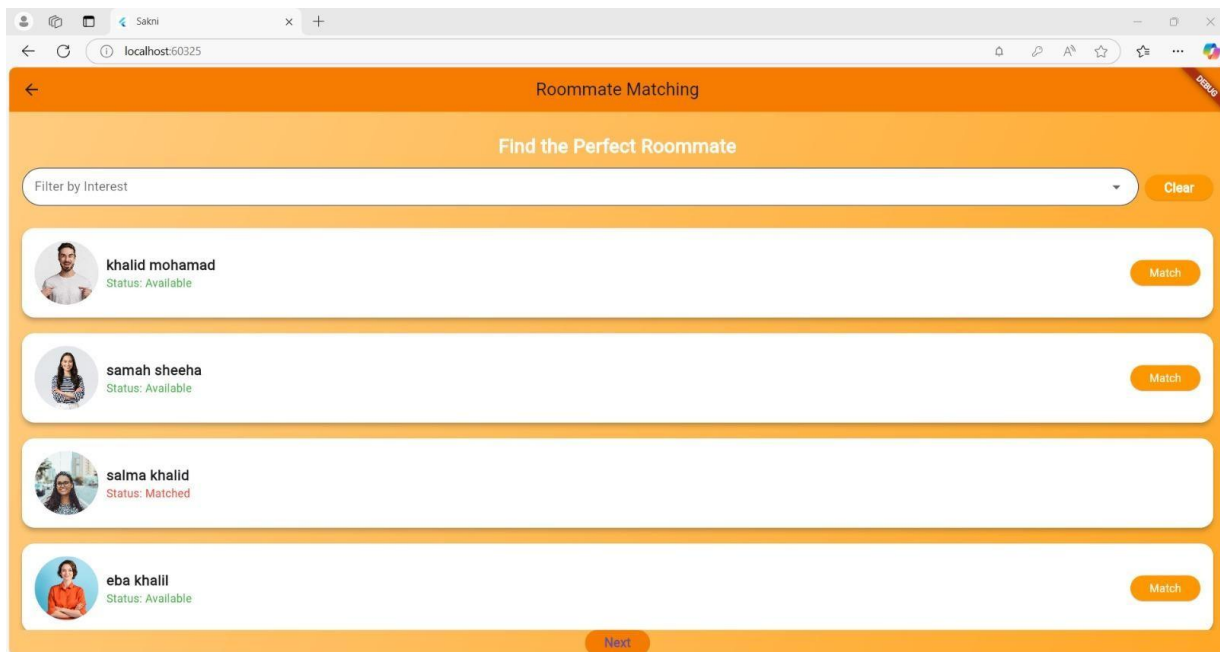


Figure 7.22: Roommate Matching

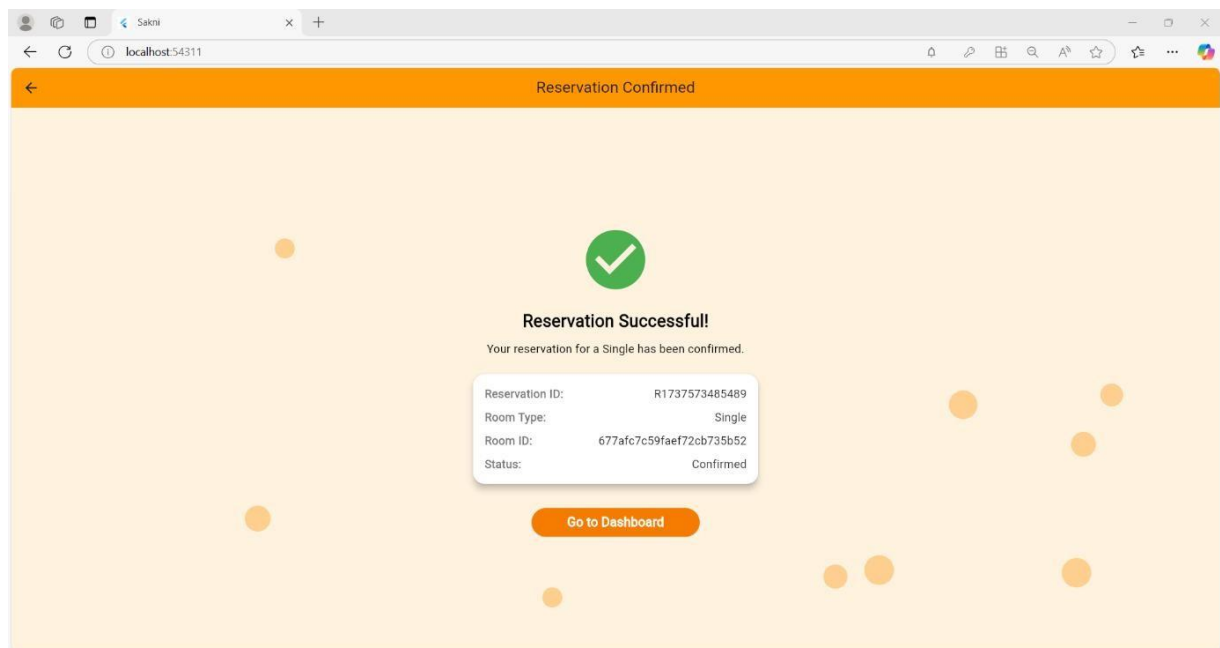


Figure 7.23: Reservation Confirmed

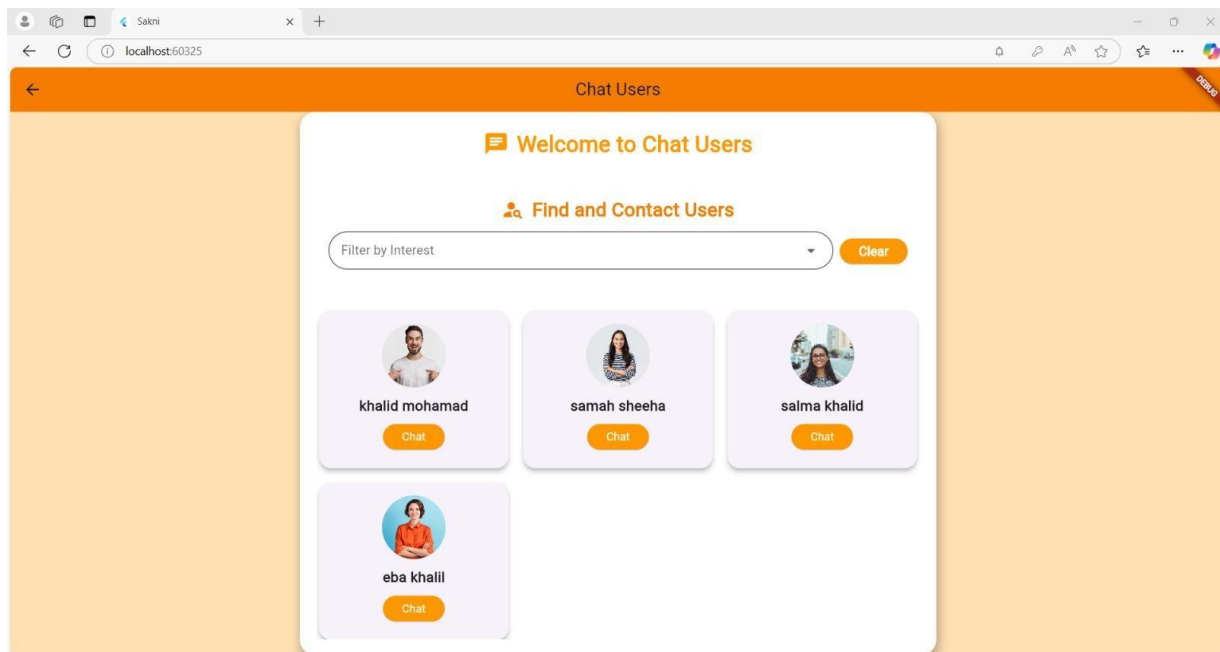


Figure 7.24: Chat Users

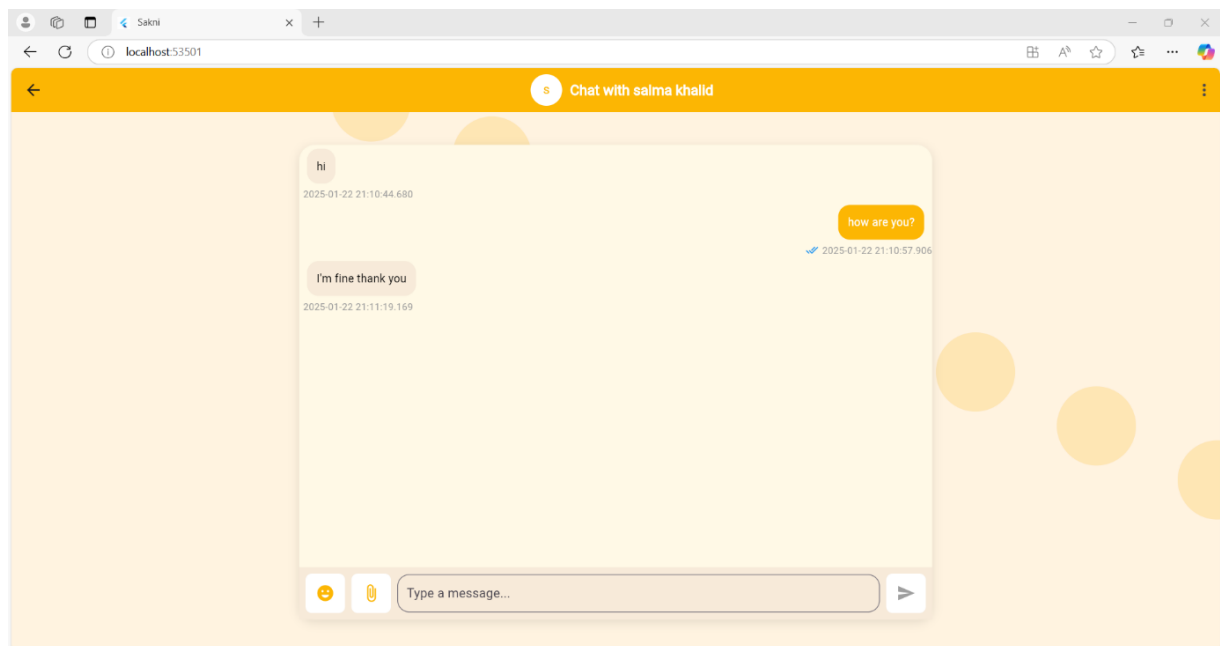


Figure 7.25: Chat with a User

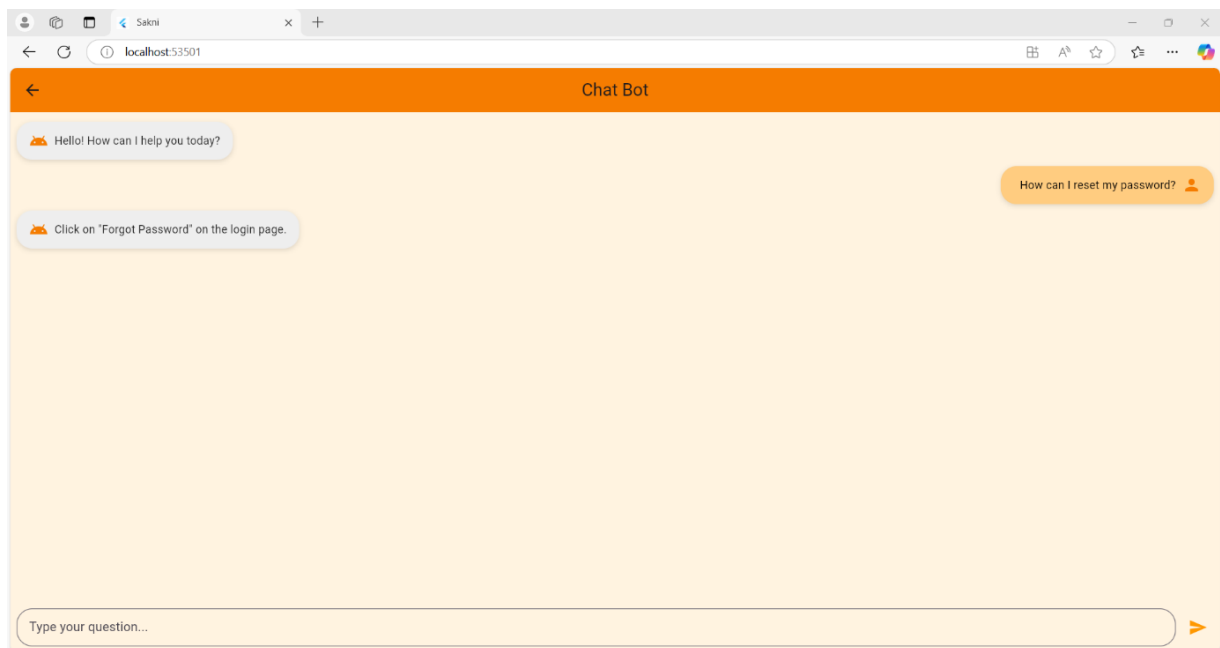


Figure 7.26: Chat Bot

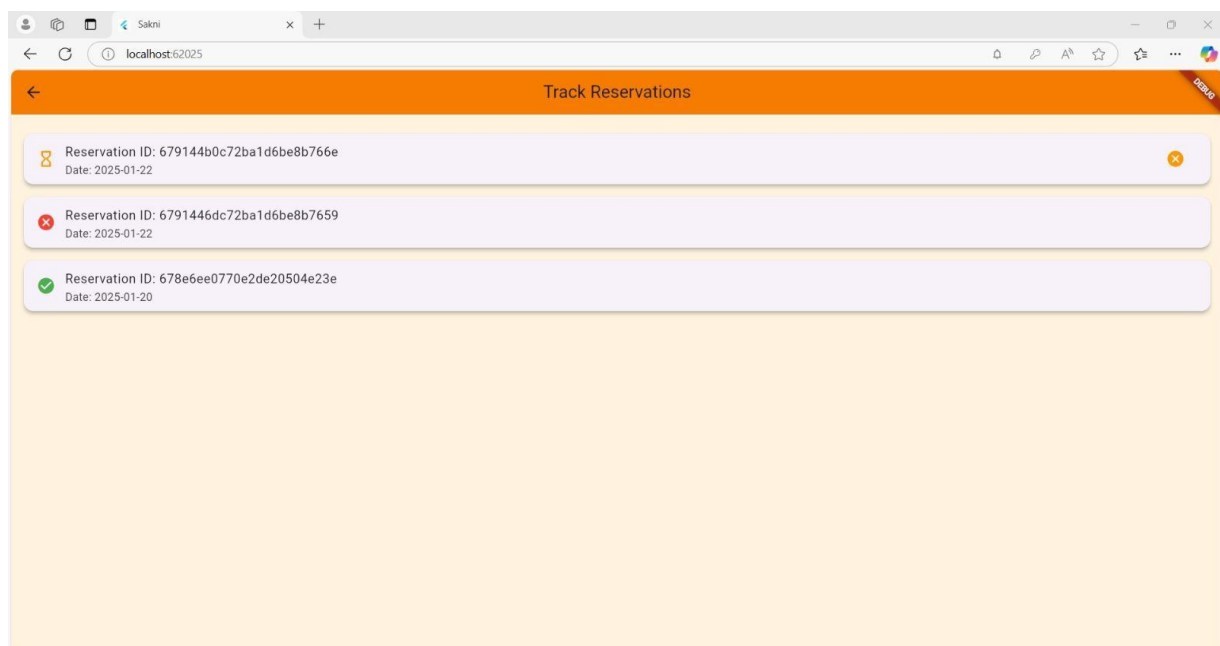


Figure 7.27: Track Reservations

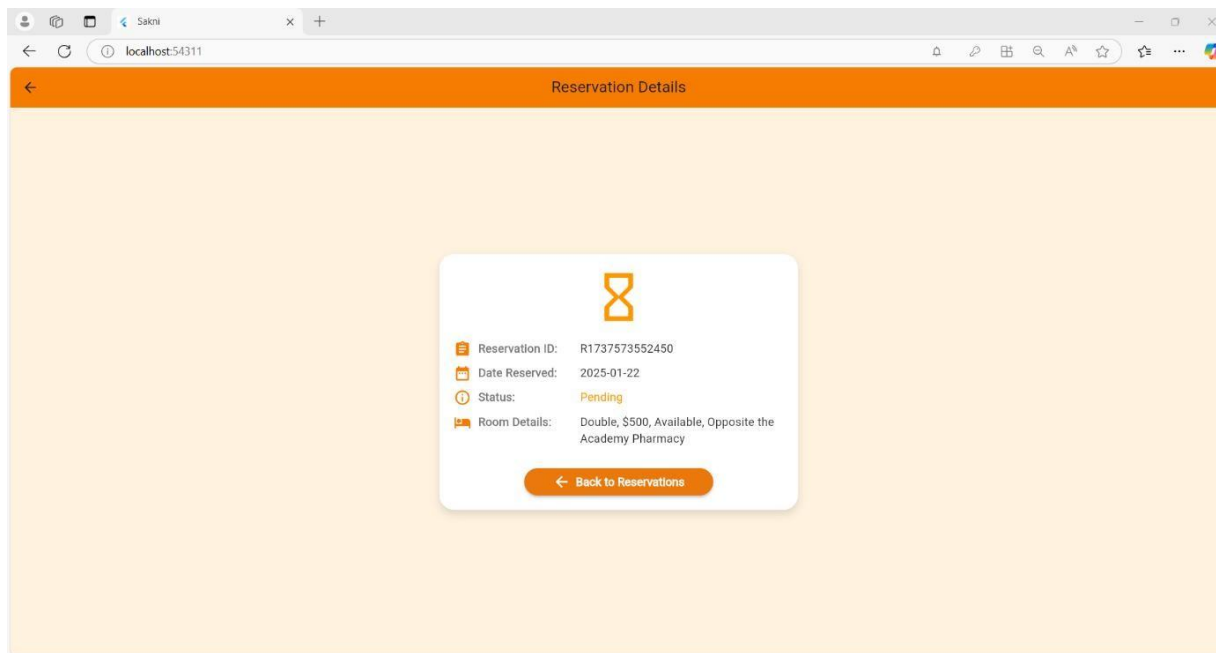


Figure 7.28: Reservations Details

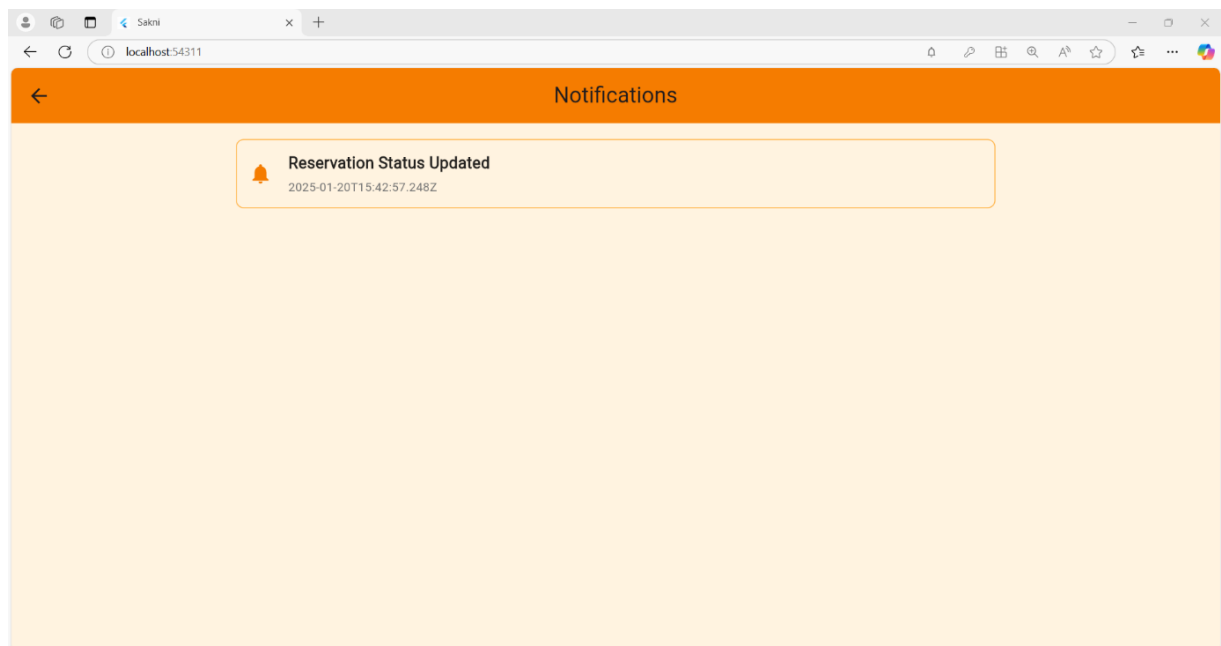


Figure 7.29: Notification

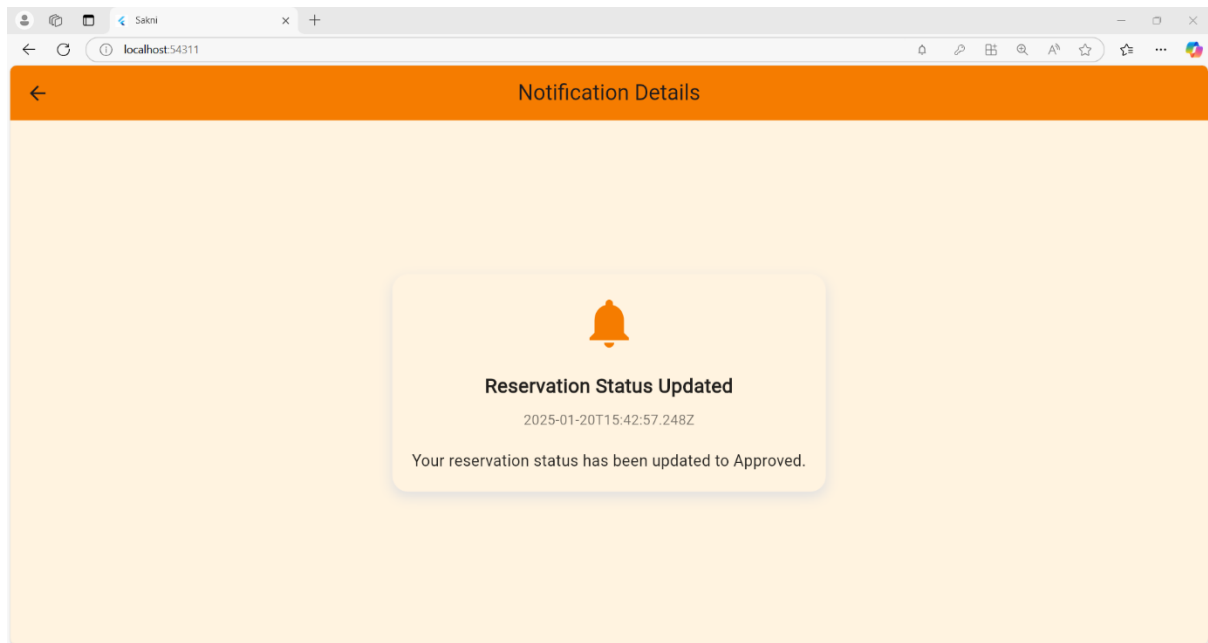


Figure 7.30: Notification Details

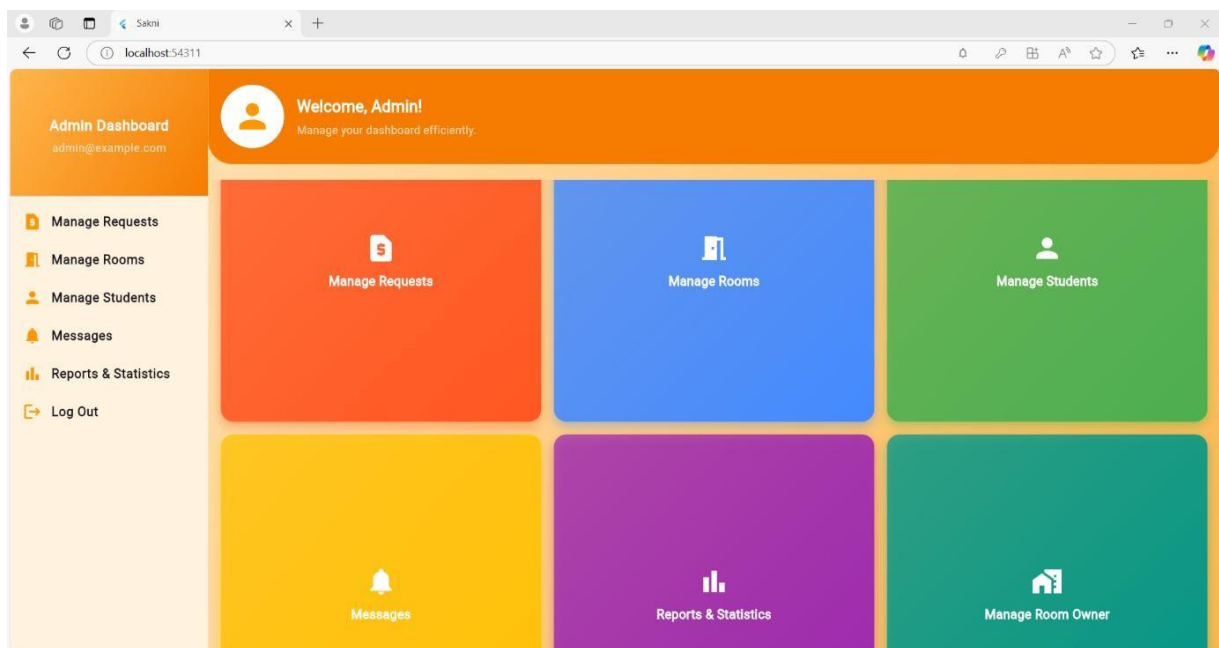


Figure 7.31: Admin Dashboard

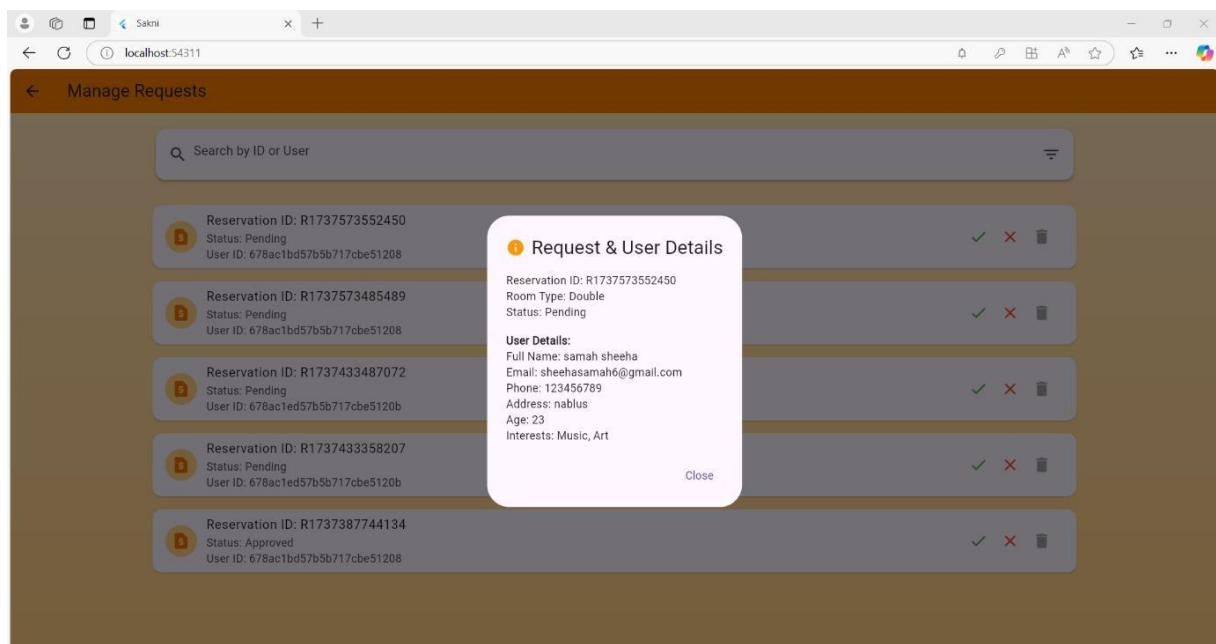


Figure 7.32: Manage Requests

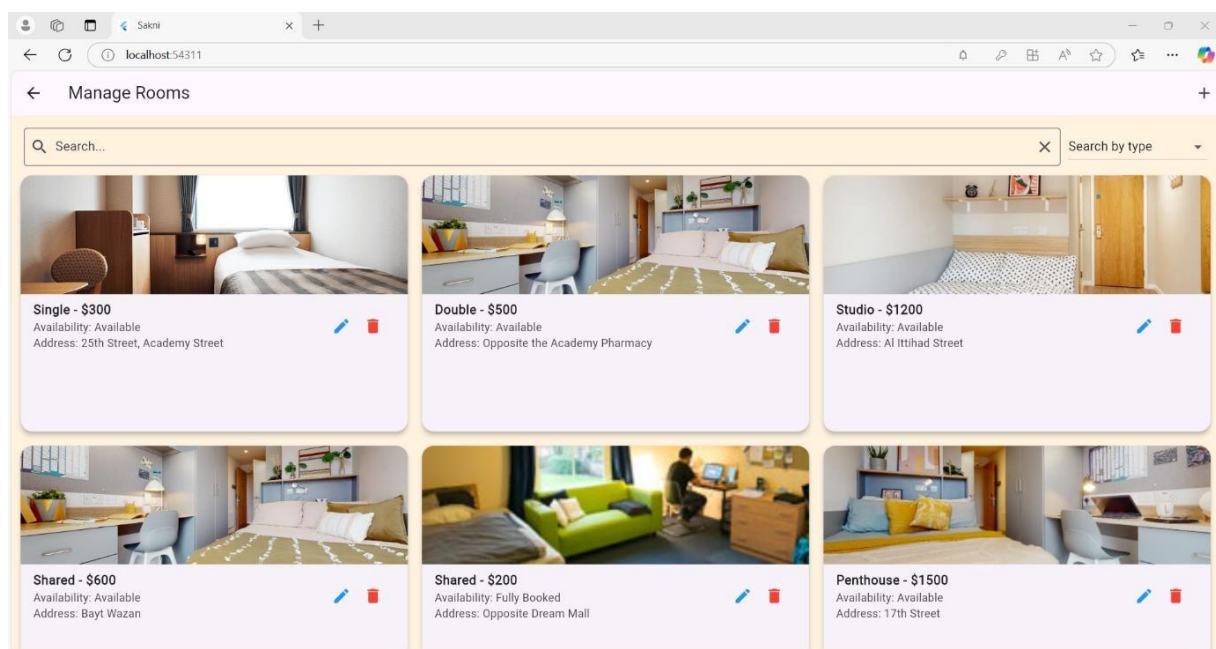


Figure 7.33: Manage Rooms

← Add Room

Enter Room Details

Room Type

Price

Address

Number of Beds

Availability
Available

Latitude

Longitude

Select Location on Map

Select Images

+ Add Room

Figure 7.34: Add Rooms

← Manage Rooms

Search...

Search by type

Single - \$300
Availability: Available
Address: 25th Street, Academy Street

Double - \$500
Availability: Available
Address: Opposite Dream Mall

Studio - \$1200
Availability: Available
Address: Al Ittihad Street

Shared - \$600
Availability: Available
Address: Bayt Wazan

Shared - \$200
Availability: Fully Booked
Address: Opposite Dream Mall

Penthouse - \$1500
Availability: Available
Address: 17th Street

Edit Room - Single

Room Type
Single

Price
\$300

Address
25th Street, Academy Street

Number of Beds
1

Availability
Available

Update Cancel

Figure 7.35: Edit Room

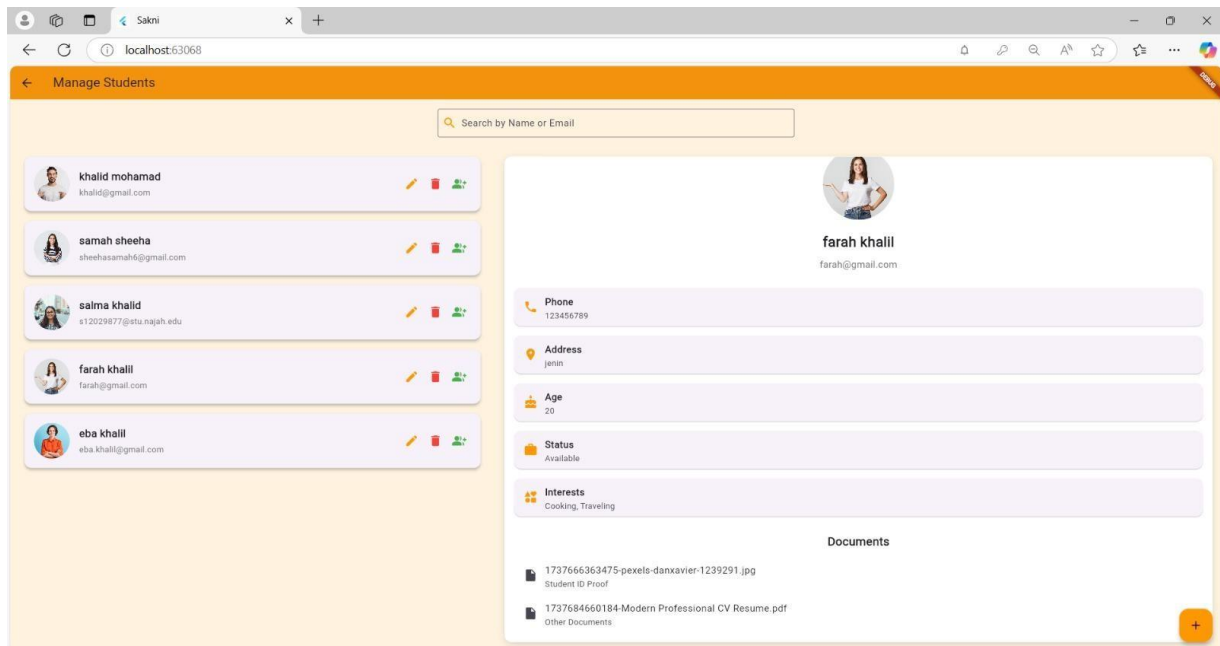


Figure 7.36: Manage Students

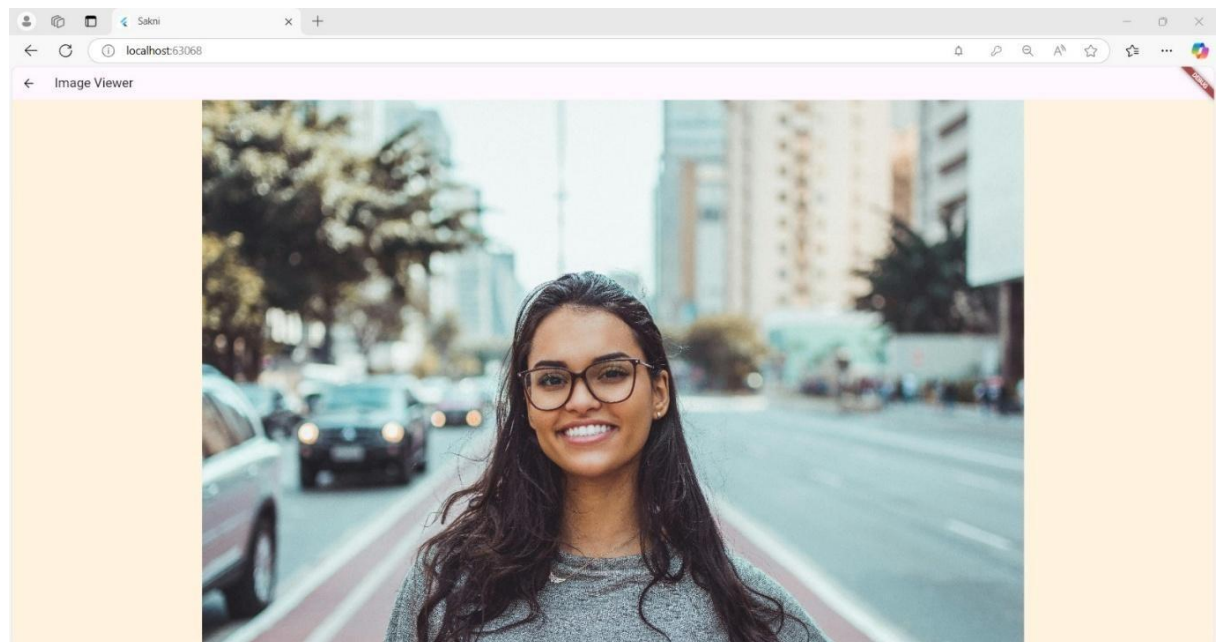


Figure 7.37: Image upload by a Student

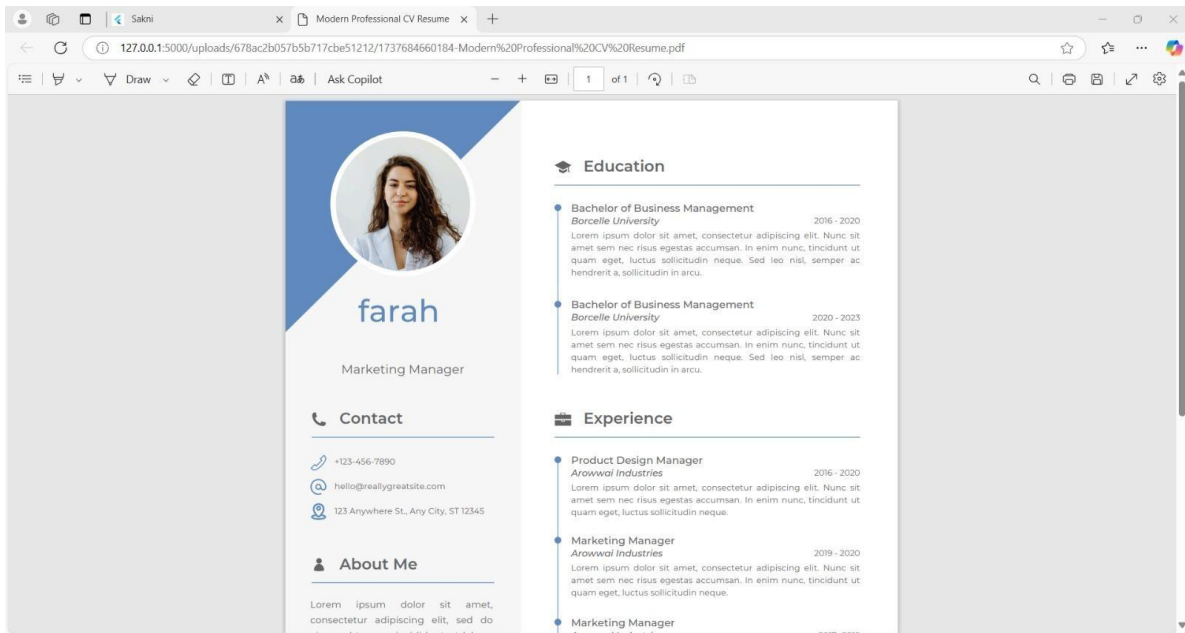


Figure 7.38: Documents upload by a Student

Figure 7.39: Add Students

The screenshot shows a web browser window with a tab titled 'Edit Student'. The address bar shows 'localhost:54311'. The form is for adding a new student and includes the following fields and sections:

- Full Name:** khalid mohamad
- Email:** khalid@gmail.com
- Password:** [Masked]
- Phone:** 123456789
- Address:** ramallah
- Age:** 24
- Interests:**
 - Sports
 - ☒ Music
 - Art
 - Reading
 - Gaming
 - Traveling
 - Cocking
 - ☒ Movies
- Save** button

A screenshot of a web browser showing the 'Edit Student' page. The browser's address bar displays 'localhost:54311'. The page has an orange header with a back arrow and the text 'Edit Student'. The main content area is a light orange color. In the center, there is a white card with a circular profile picture of a man. Below the picture are several input fields: 'Full Name' (containing 'khalid mohamad'), 'Email' (containing 'khalid@gmail.com'), 'Password' (with masked characters), 'Phone' (containing '123456789'), 'Address' (containing 'ramallah'), and 'Age' (containing '24'). Below these fields is an 'Interests' section with buttons for 'Sports', 'Music' (checked), 'Art', 'Reading', 'Gaming', 'Traveling', 'Cooking', and 'Movies' (checked). At the bottom of the card is an orange 'Save' button.

Figure 7.40: Edit Students

A screenshot of a web browser showing the 'Assign Roommate' page. The browser's address bar displays 'localhost:54311'. The page has an orange header with a back arrow and the text 'Assign Roommate'. The main content area is a light orange color. In the center, there is a white card with an orange icon of two people. Below the icon is the text 'Assign a Roommate'. Underneath is a dropdown menu with the text 'Select Roommate' and a downward arrow. At the bottom of the card is an orange 'Assign Roommate' button.

Figure 7.41: Assign Roommate

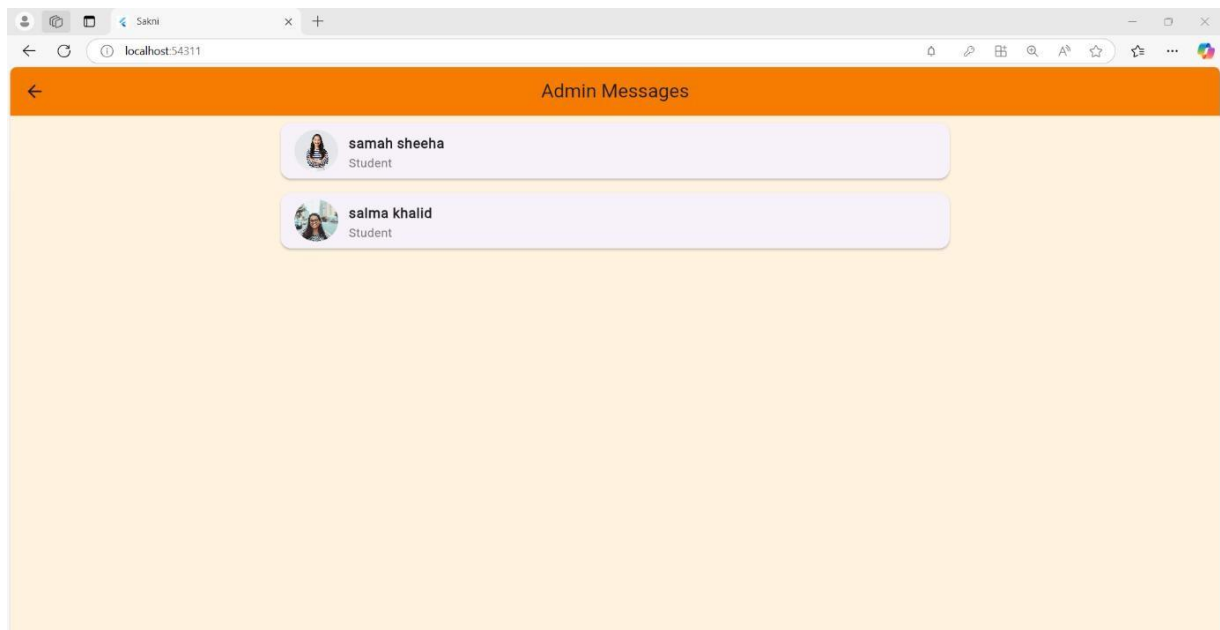


Figure 7.42: Admin Messages

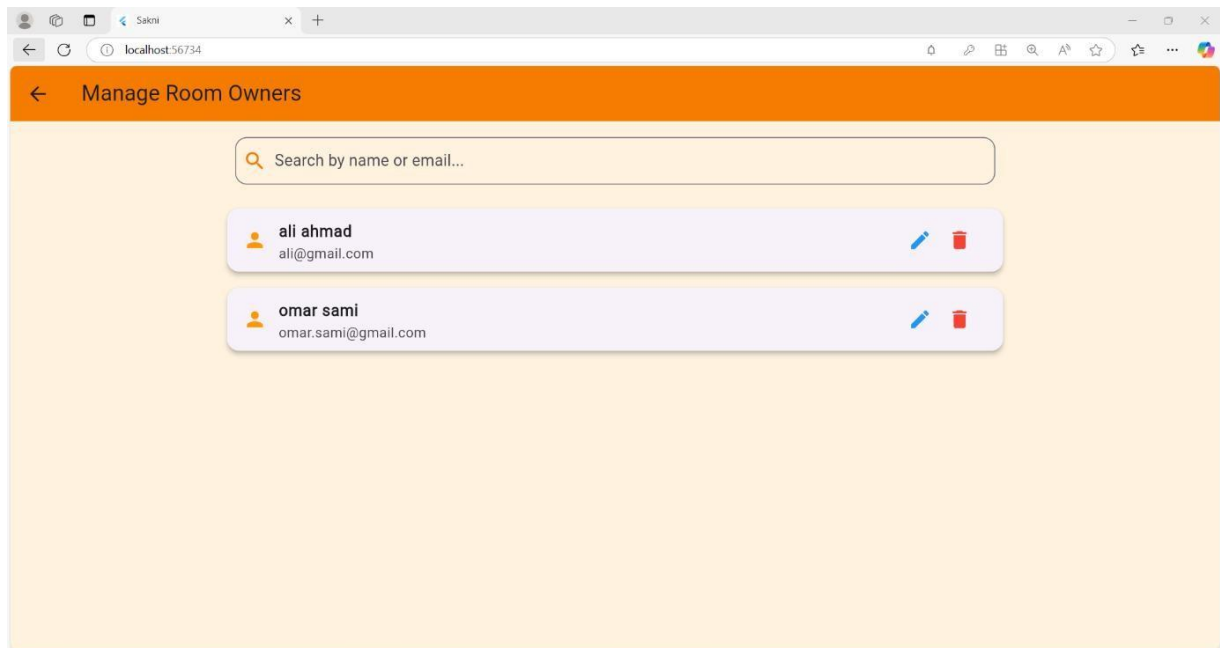
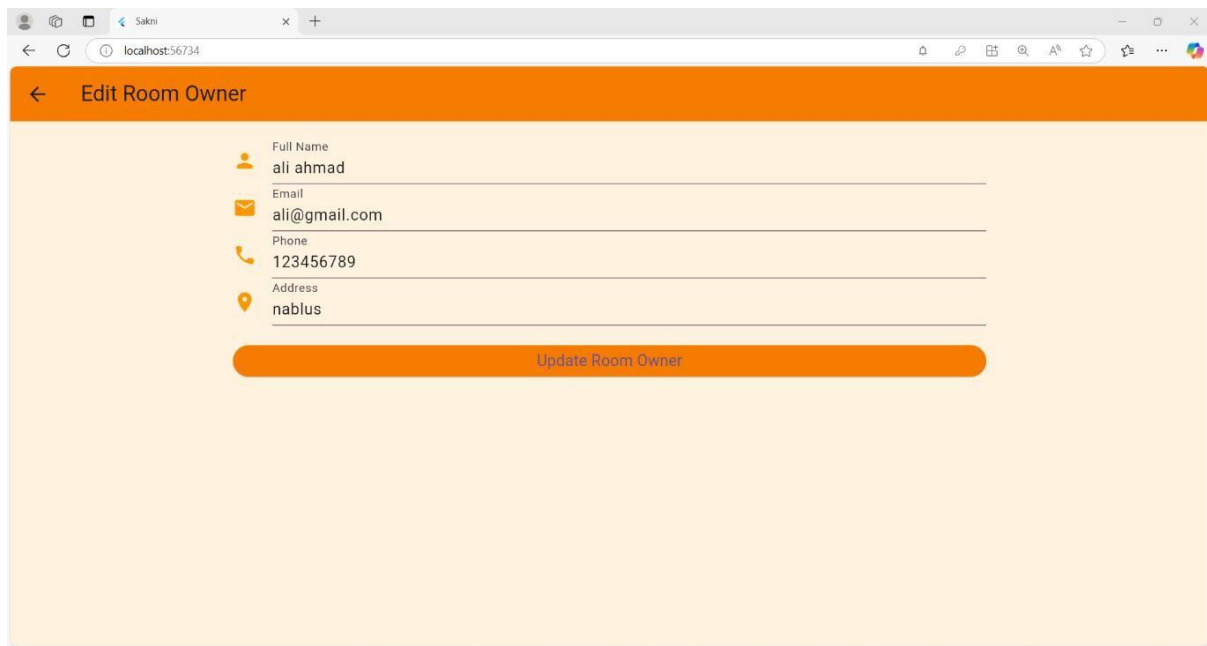


Figure 7.43: Manage Room Owners



The screenshot shows a web browser window with the address bar displaying 'localhost:56734'. The page title is 'Edit Room Owner'. The form contains the following fields:

- Full Name: ali ahmad
- Email: ali@gmail.com
- Phone: 123456789
- Address: nablus

At the bottom of the form is a large orange button labeled 'Update Room Owner'.

Figure 7.44: Edit Room Owner

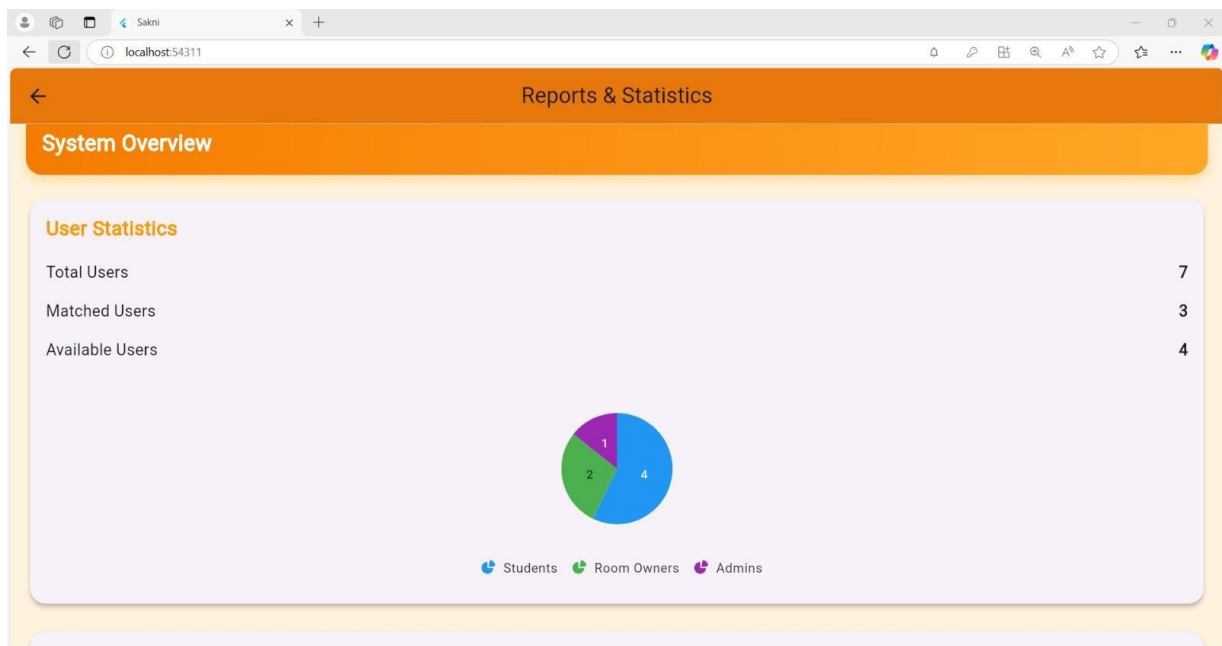


Figure 7.45: Reports & Statistics

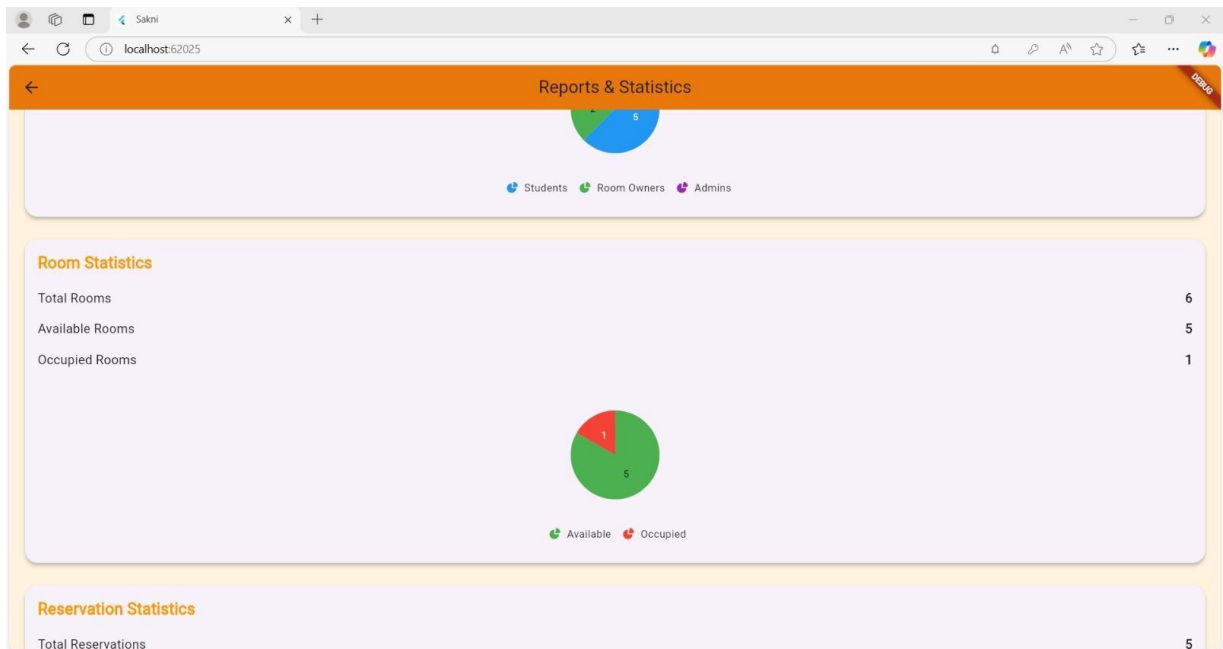


Figure 7.46: Reports & Statistics

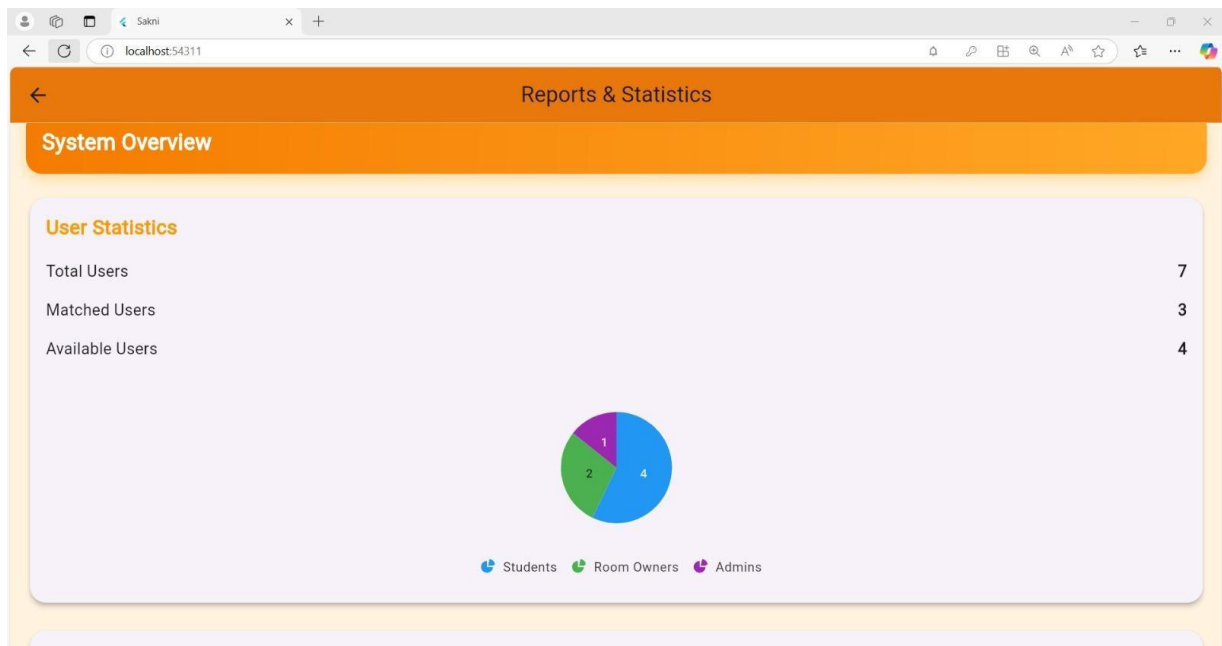


Figure 7.47: Reports & Statistics

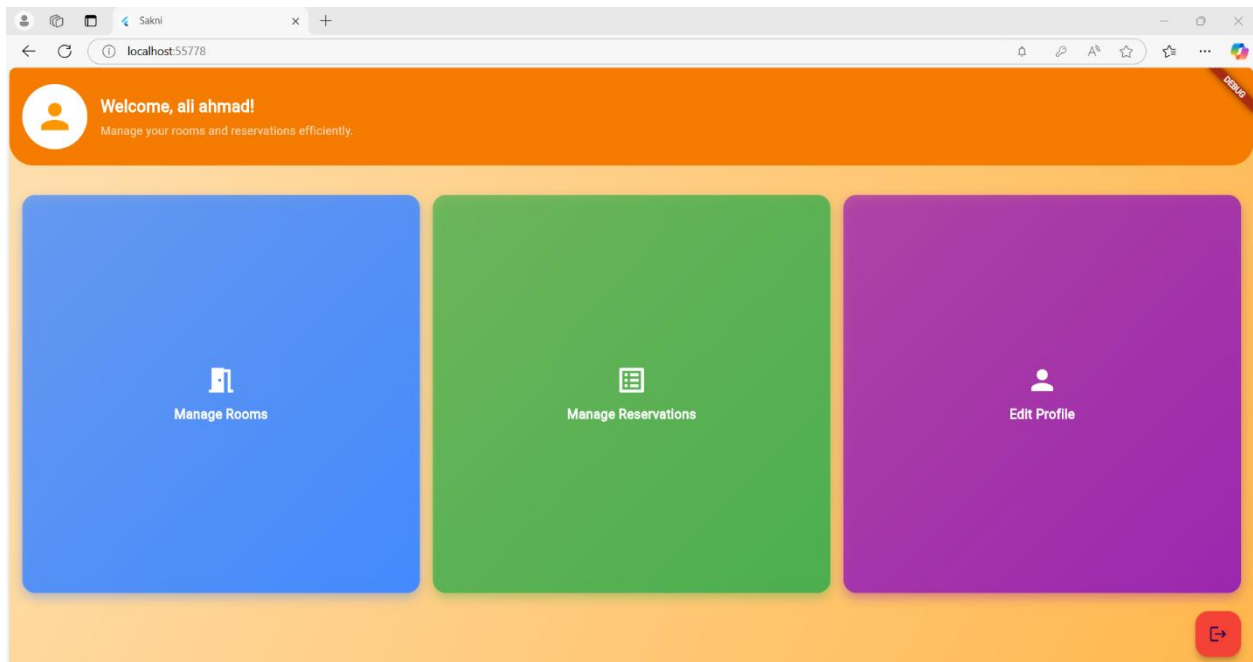


Figure 7.48: Room Owner Dashboard

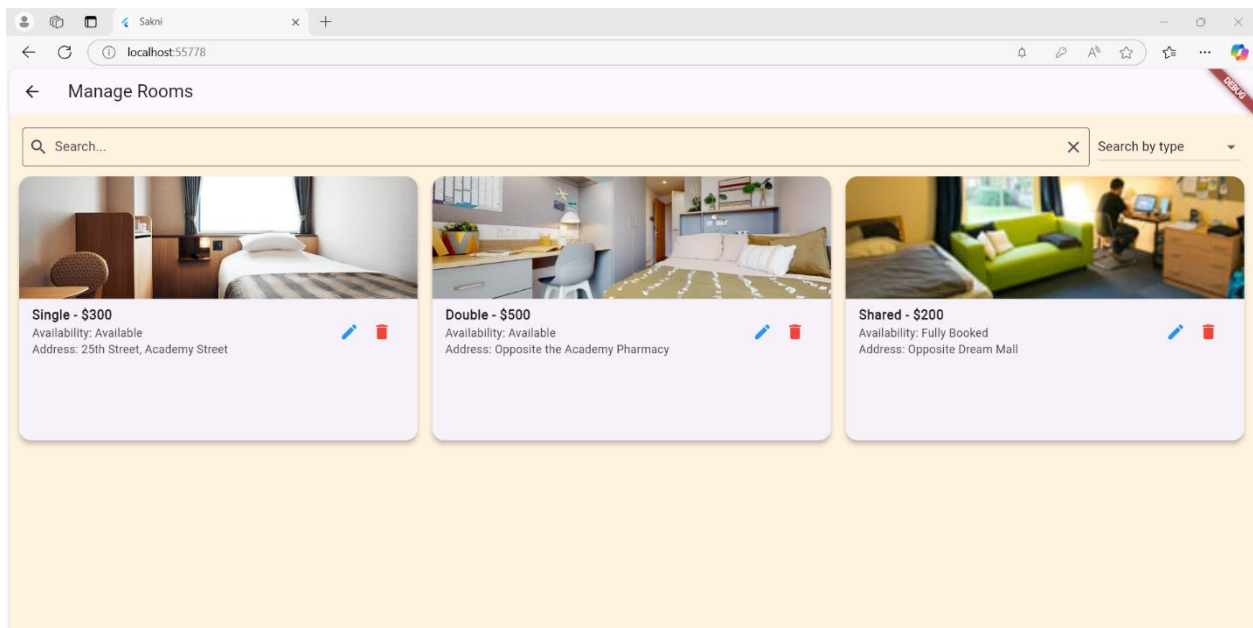


Figure 7.49: Manage Rooms

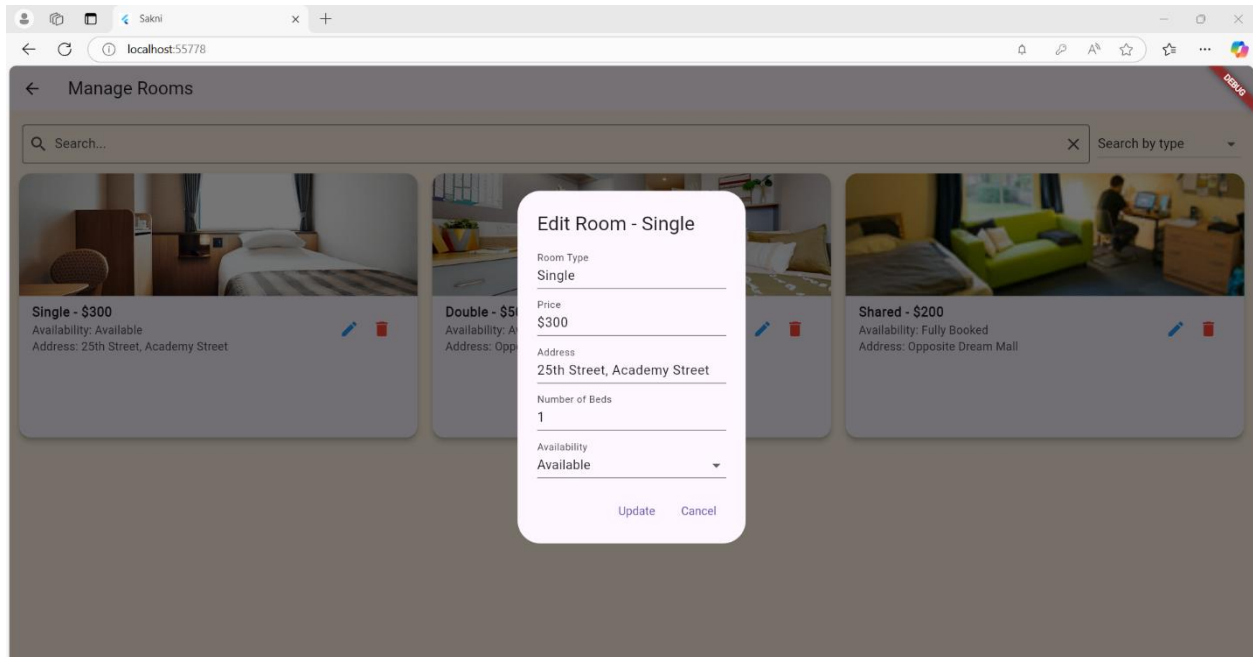


Figure 7.52: Edit Rooms

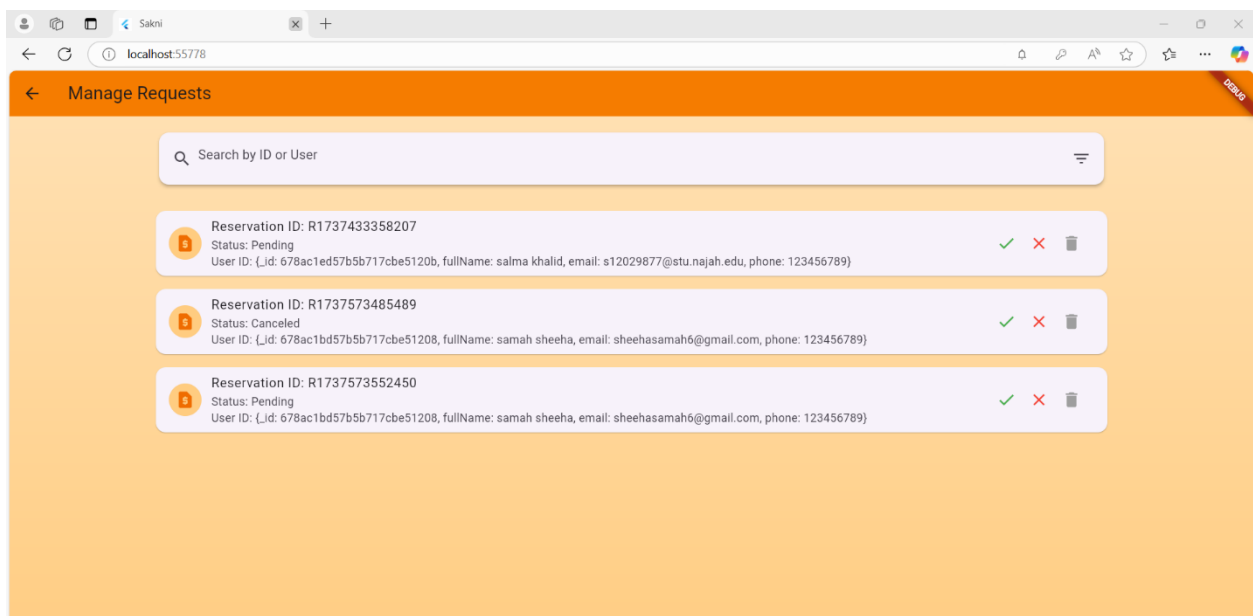


Figure 7.53: Manage Reservations

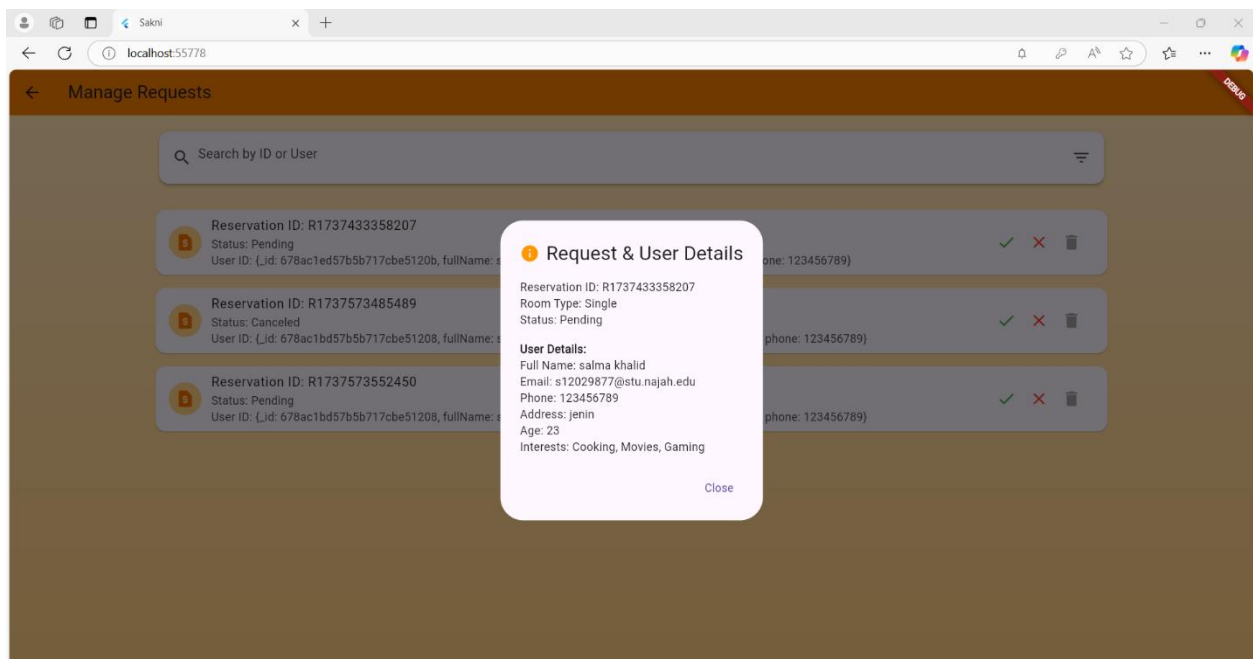


Figure 7.54: Reservations Details

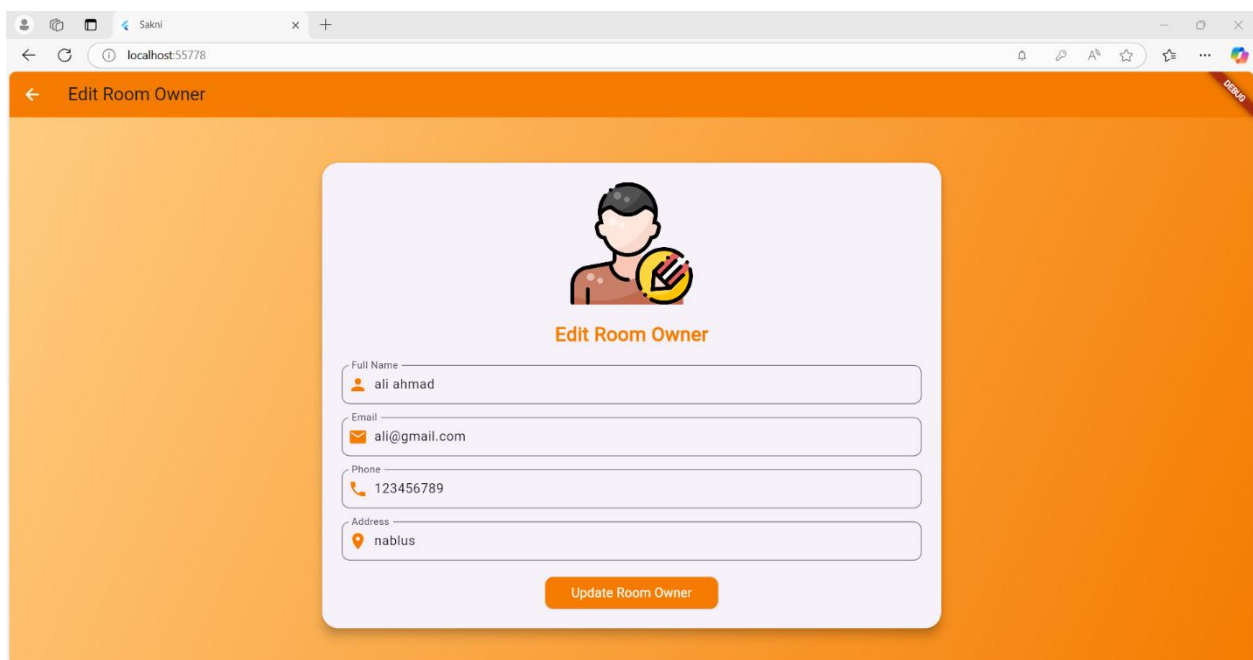


Figure 7.55: Edit Room Owner