

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

An-Najah National University Requirements of Graduation Project report



Faculty of Engineering & Information Technology
Computer Engineering Department
Graduation Project 1

Jawla



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Disclaimer

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Abstract

The Jawla application aims to provide an integrated experience for tourists, from displaying tourist attractions to tourists, and providing information about them, providing the ability to book a place to stay as we show him the hotels near him, and the chat feature was provided for the user to communicate with the hotel from the Socket.

We also provided taxis for transportation, as we send the request to taxis via the Socket and in real world with water on the user's current location.

The application also provides a secure payment method.

We will build the application using Flutter.

The application also supports mobile and web applications.

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1 Introduction

1.1 Problem :

Tourists who visit Palestine, and who do not coordinate with tourism companies or with a friend of theirs in the State of Palestine, suffer from a lack of knowledge of the tourist places in the country.

They also find it difficult to find hotels near their location, and they do not know how to reach them, as they may waste time and effort trying to find a taxi to reach the hotel or to move around; therefore, tourists need an easy-to-use application to plan to go to tourist places effectively, and book hotels and taxis more efficiently and with less time and effort.

1.2 Objectives of the work:

The goal is to design a tourist application for users; to facilitate the tourism experience in Palestine, where we show the tourist places near him, or all tourist places are filtered according to the highest rating by users, and we also provide him with the ability to book a taxi for transportation, where it is booked in real time based on the user's current location, where the request is directed to the nearest taxi to him, and the ability to book hotels where we show him a list of hotels near him, and we also have a reward for the user, which is to obtain points when using the application services , To later convert them into discounts.

1.3 Scope of work:

The application targets tourists visiting Palestine, especially those who travel without coordination with tourism companies, as it provides them with services, displays tourist sites, and also deals with hotels and taxis. To provide integrated services to tourists, which leads to raising the Palestinian economy.

1.4 Importance:

The importance of the project lies in solving the problems facing tourists during their visit to Palestine. We improved the user experience by: facilitating the search for tourist places by displaying them on the map and providing information about them. We provided a means of booking accommodation, and a means of navigation according to geographical location to facilitate the user's movement. We encouraged tourists to use the application by providing a

points collection system, to convert them into discounts during the payment process. Thus, the project contributes to supporting the local economy by enhancing the use of tourism services.

1.5 Report organization:

The report is organized as follows:

Chapter Two: Constraints and Standards\Rules discusses the challenges faced during the implementation of the project.

Chapter Three: Literature Review We identified what distinguishes this project from others.

Chapter Four: Methodology and techniques used in the project.

Chapter Five: The results of the project will be discussed.

Chapter Six: The results of this application were discussed.

Chapter Seven: It will talk about the conclusion and some features that will be added to the project in the future.

Chapter Eight: Includes the references used.

2 Constraints and Earlier course work

2.1 Constraints:

2.1.1 Time Management :

One of the biggest challenges we faced while developing this project was time management. The project was being worked on simultaneously with studying academic subjects, which required dividing time between studying academic courses and working on the project.

2.1.2 Limited Experience:

One of the limitations I faced while developing this project was my limited experience with the technologies used in the project. To overcome this limitation, I watched online courses to learn app development using Flutter, in addition to learning the ts.ed framework online, and I also got help and advice from my professors at the university to ensure successful implementation.

2.2 Earlier course work:

The development of this project builds upon the knowledge and skills acquired in previous coursework, including OOP, software development, algorithms, advanced web development, and database management. My earlier coursework in these areas provided a strong foundation for the successful development and implementation of this project. Additionally, my experience with user interface design, and web development helped to ensure the successful completion of this project.

3 Literature Review

The tourism sector has witnessed a remarkable development in recent years, and it has become necessary to provide them with an application that facilitates exploring tourist sites, booking accommodation, and a taxi for transportation. There are many applications targeting tourists, such as:

Booking.com: It is a hotel reservation site with displaying ratings and prices, but it does not provide a taxi request feature.

Uber application: It provides transportation services to tourists, but it does not provide information about tourist sites or a hotel reservation feature.

As for our application, it combines many features to meet the needs of tourists in an integrated manner, as we designed an easy-to-use interface to facilitate the tourist to explore tourist sites and provide information about them, and the ability to book a place to stay, and request a taxi directly through the application based on the current location, and we provided discounts through points; to encourage tourists to use our application to support the local economy by using hotels and local transportation services.

4 Methodology

The methodology used to build the mobile application and the backend server involved the use of several tools and technologies. There are essential parts that cannot be dispensed with in building mobile applications and websites, such as frameworks, programming languages, and tools. All these details will be mentioned and talked about more.

4.1 Software needs :

4.1.1 Database:

The server uses MongoDB as the database management system. MongoDB is a widely used, open-source NoSQL document-based database. It is a popular choice for web and mobile applications because it allows for easy scalability and the ability to handle large amounts of unstructured data

4.1.2 Mobile Application:

Flutter was used because it is a great framework that supports cross-platform app development, allowing code to be shared between different systems easily. It is also easy to use and seamless, giving developers a flexible development experience. Additionally, it is open source, providing a wealth of documentation and resources that help speed up the learning and development process.

4.1.3 Website:

The same Flutter framework was used to develop the site, allowing the same pages and features that were implemented in the mobile app to be used without having to re-implement them. I took advantage of this thanks to Flutter's support for website design, where I added some management features and developed functional pages that meet the needs of the administrators.

4.1.4 Server Side:

The ts.ed framework built on Node.js is used with TypeScript to develop RESTful APIs. This framework facilitates CRUD operations, authentication management, and middleware handling, which speeds up development and makes code maintenance more efficient. TypeScript provides static typing that improves code quality, which helps improve scalability and extensibility over time.

4.1.5 Real-Time Communication & Updates :

Sockets were used in the application because they provide a real-time, bidirectional connection. Sockets are considered a fundamental component as they allow messages to be sent and received instantly without the need to reload the page or send a new HTTP request for each message.

4.2 Tools and services

- Android Studio
- Visual studio code
- Postman
- GitHub
- MongoDB
- ngrok



4.3 Implementation :

In this section, we'll dive into the details of each part of the system.

4.3.1 Mobile Application :

- **User Screens :**
- **Welcome Screen:** This screen will show up to user only the first time he open the app

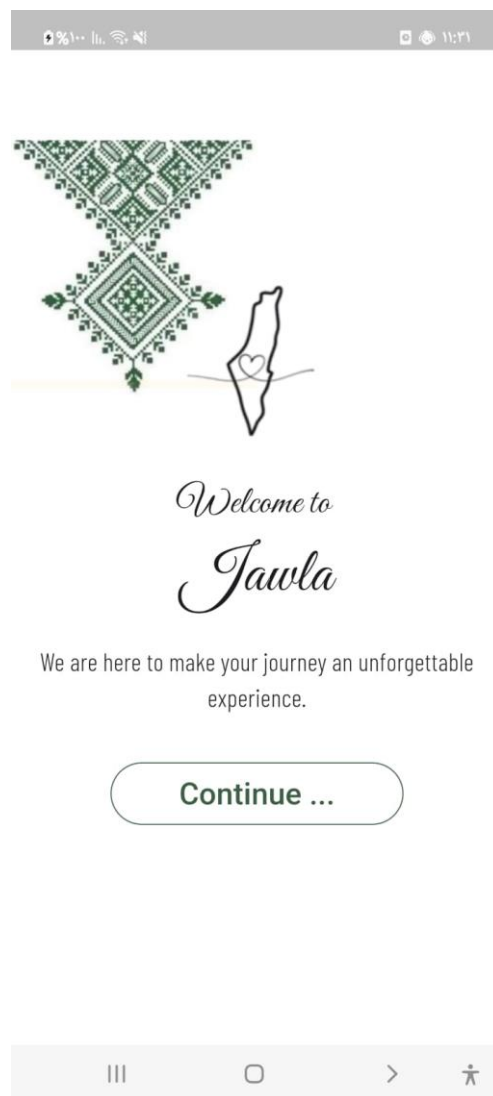


Figure 1 Welcome Screen

- sign in screen : The login page is accessible to all users, allowing any account to log in based on its role, It also provides options to navigate to the sign-up screen and the password recovery screen.

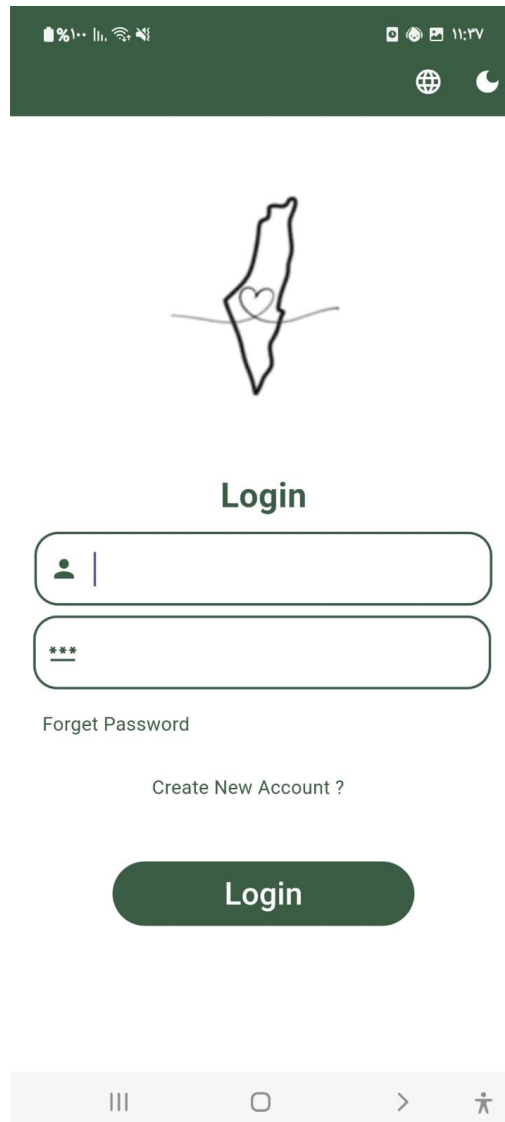


Figure 2 Sign In Screen

- Sign Up screens :If the user wants to register, he can click on the register button and will be directed to the registration pages according to his type, such as user, taxi, or hotel. He must enter a valid email, password, and other information. After that, the code will be sent to his email, and he must enter it to go to the home page:

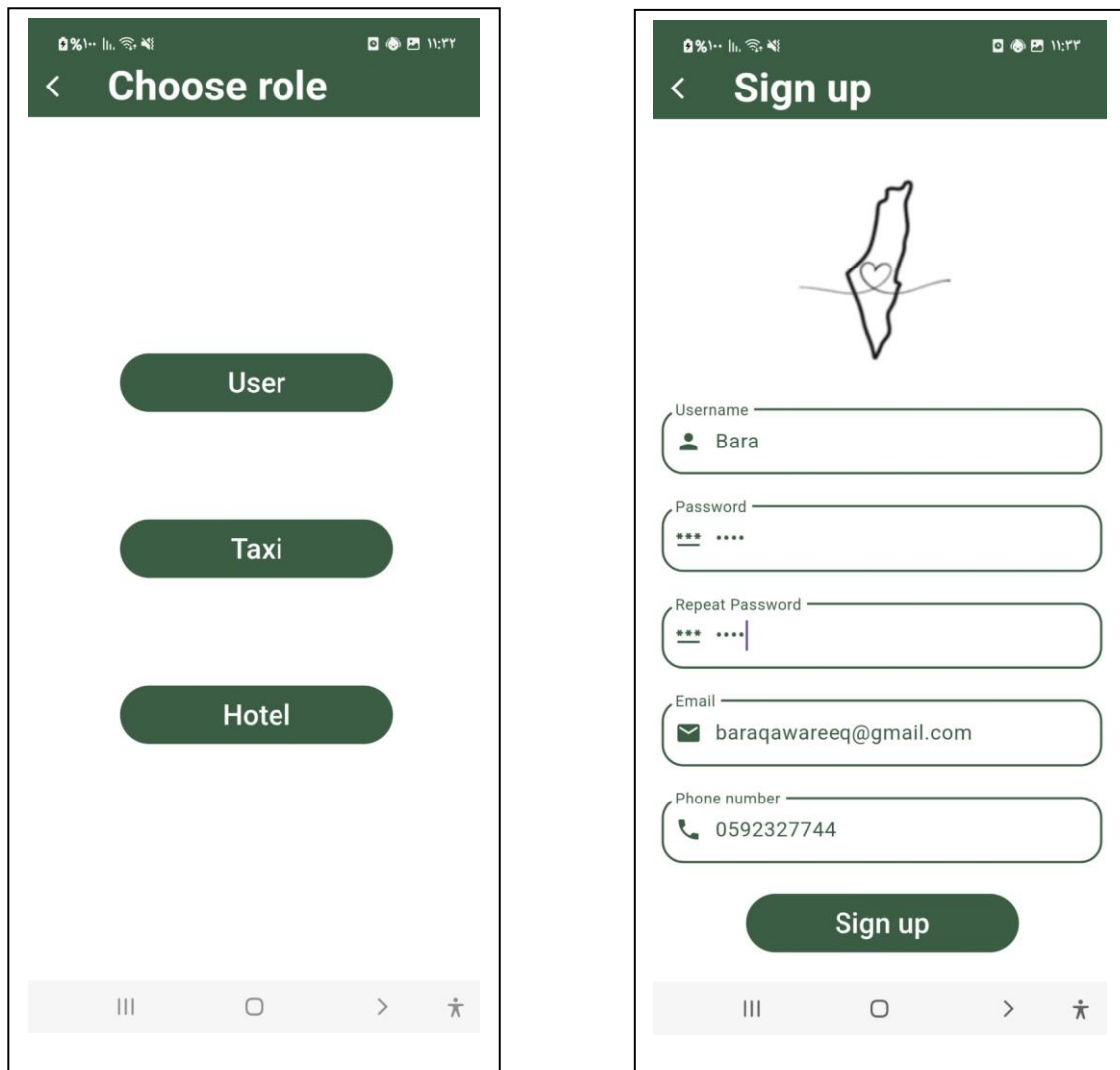


Figure 3 Sign up

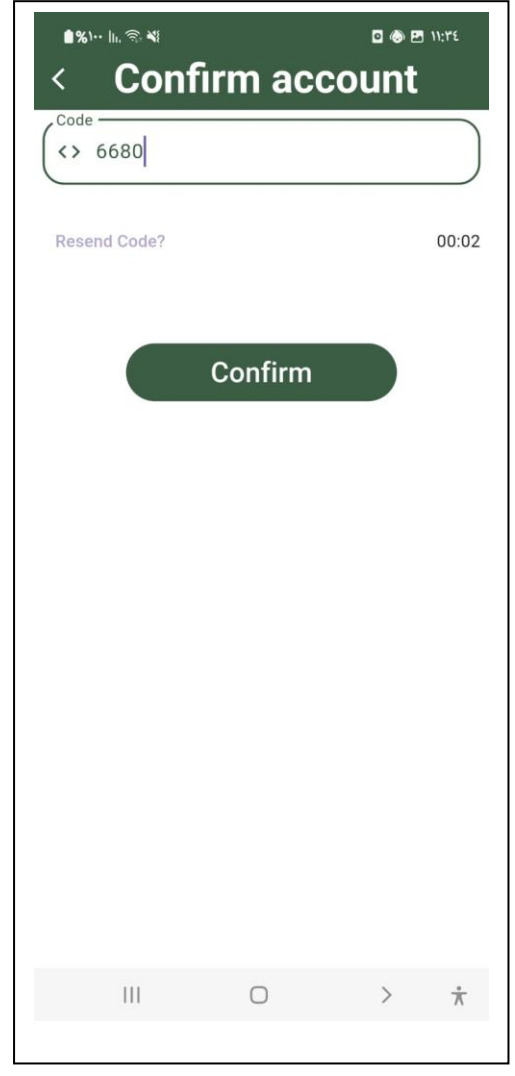
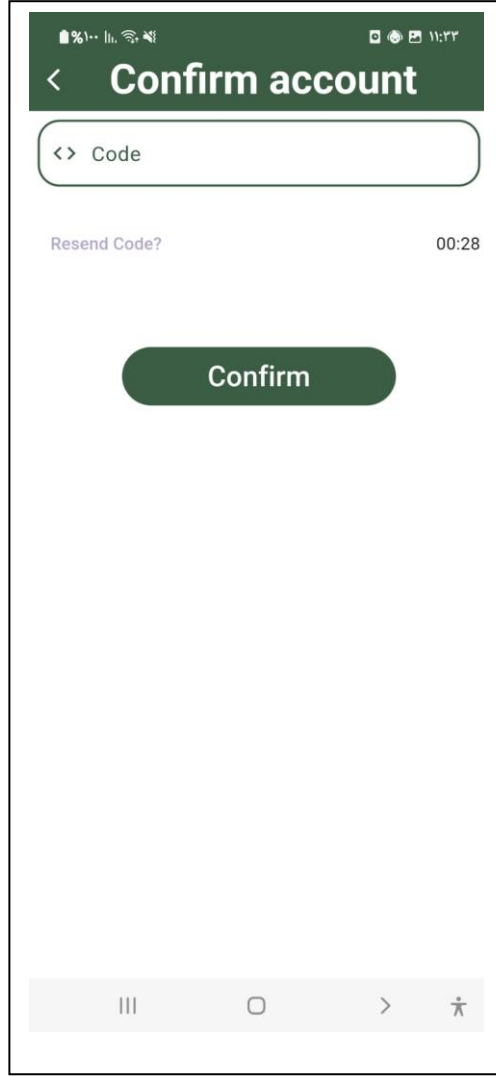
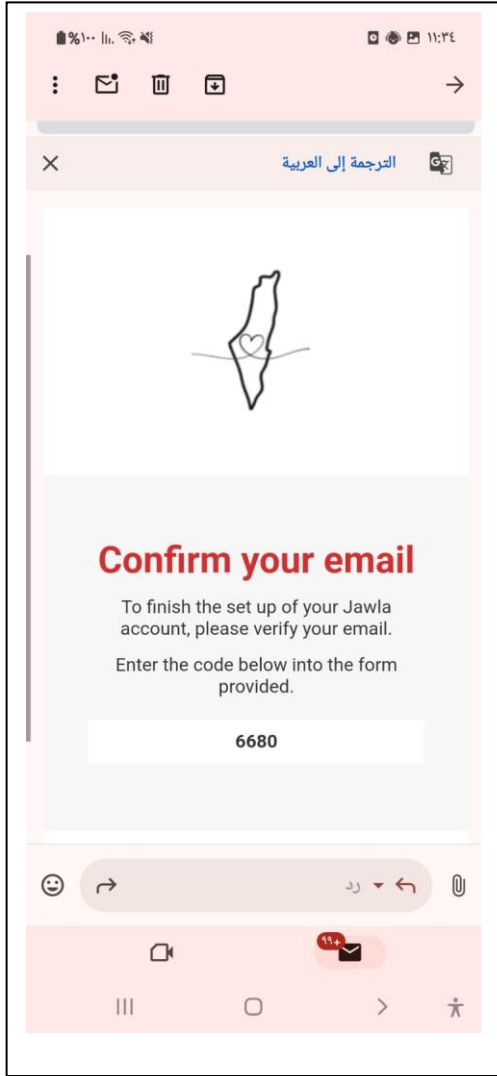


Figure 4 confirm account screens

- **Forgot Screen:** On this page, you enter the email where you want to receive the notification to set a new password, as shown in the following images.

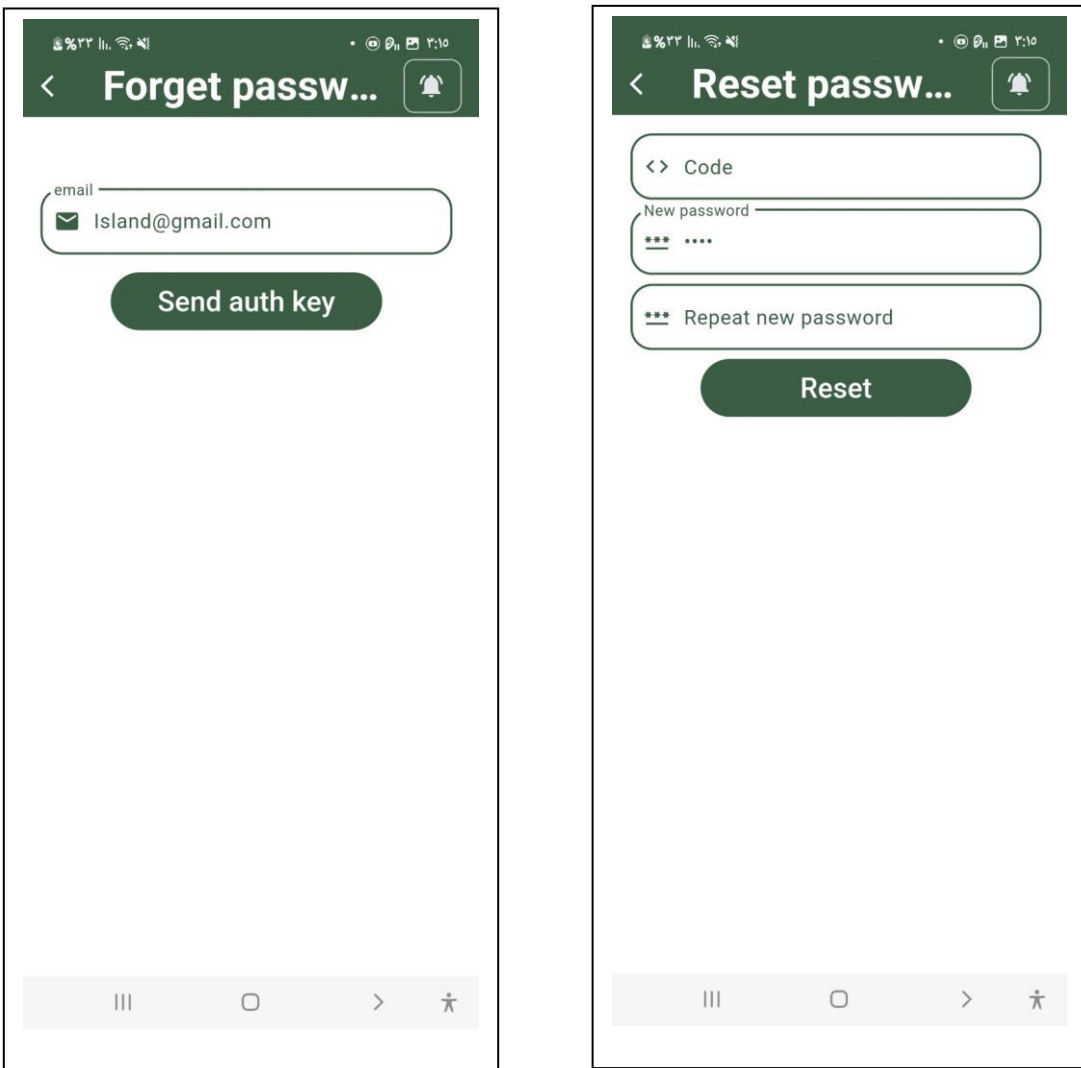


Figure 5 Forgot Screen

- Home Screen : On the home page, tourist places in Palestine are displayed.

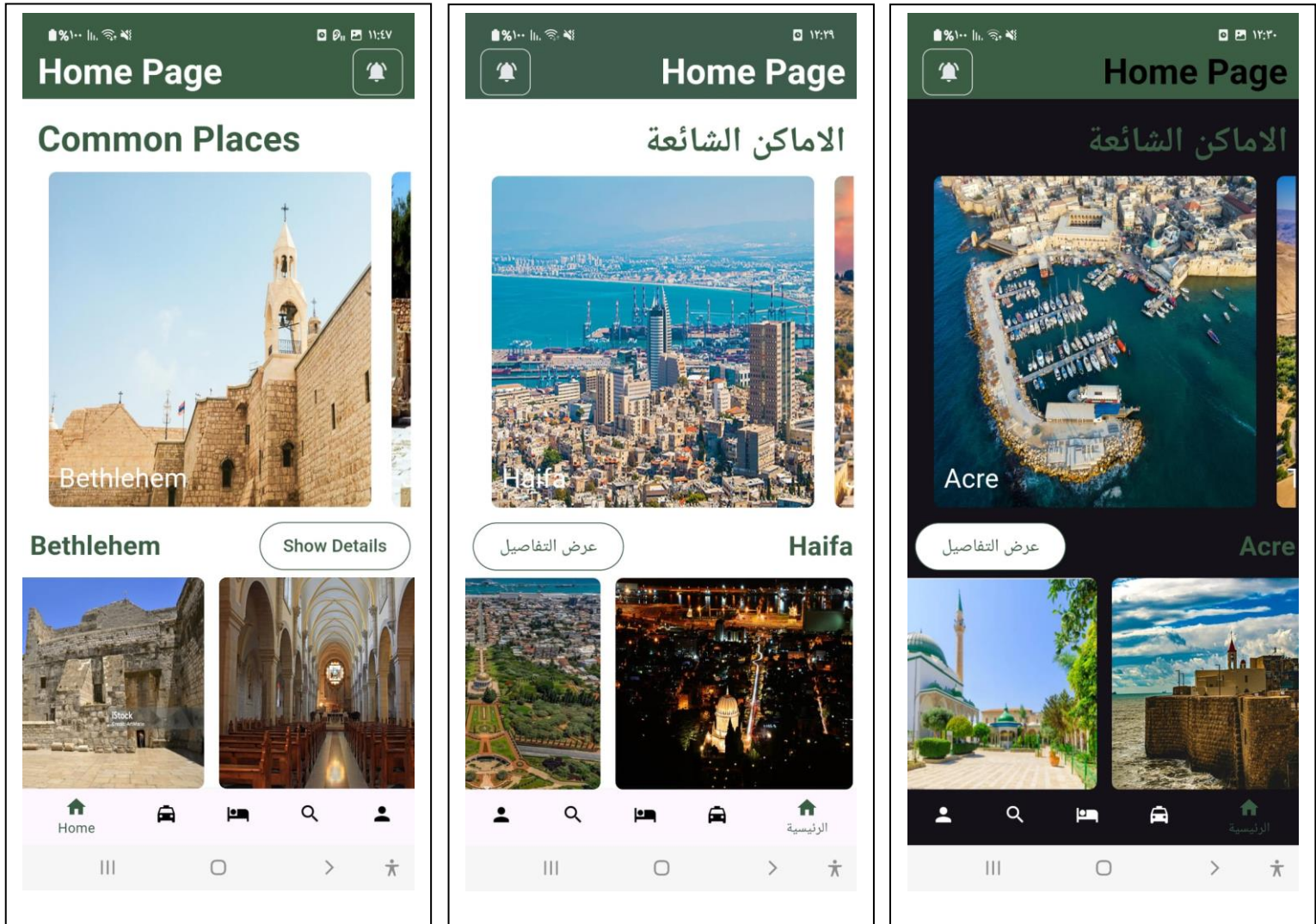


Figure 6 Home page screen

And here, when clicking on "Show Details," these interfaces appear.

It contains multiple images, displays its location on the map, and shows existing comments. Additionally, users can write a comment and give a rating. Also, on the map, the highest-rated comment appears.

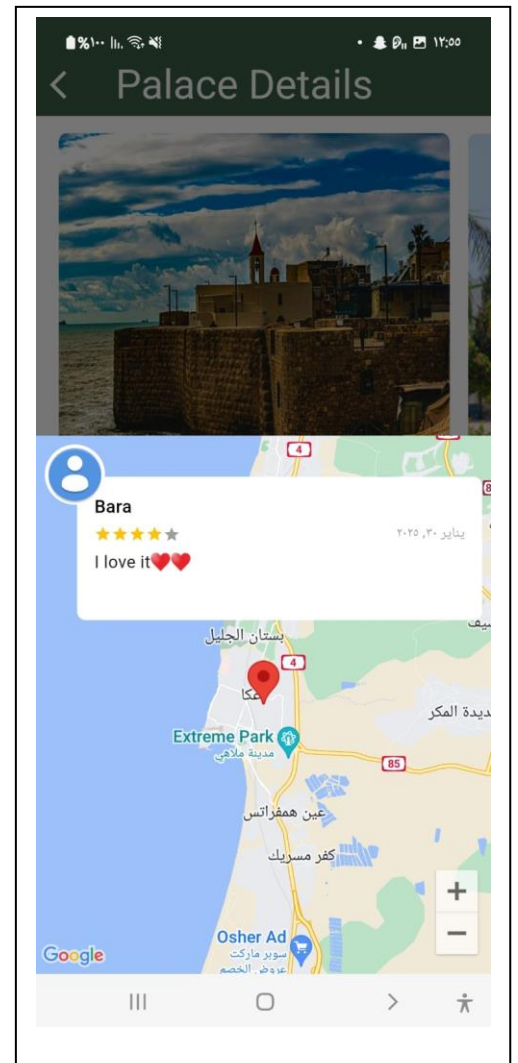
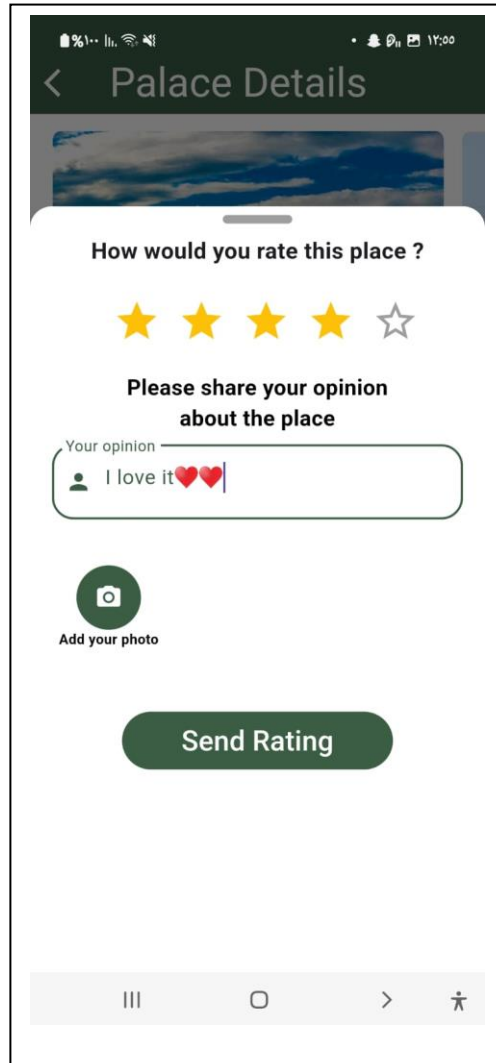
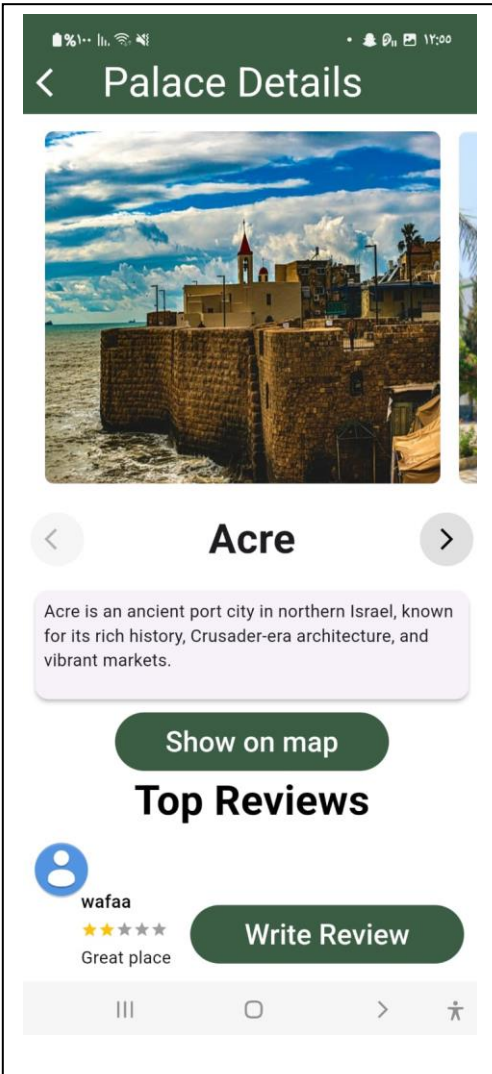


Figure 7 Home page / show details

- Hotel Page : hotels are displayed with two filter options: by highest rating and by proximity to the user. From this page, users can book, contact, and view hotel details.

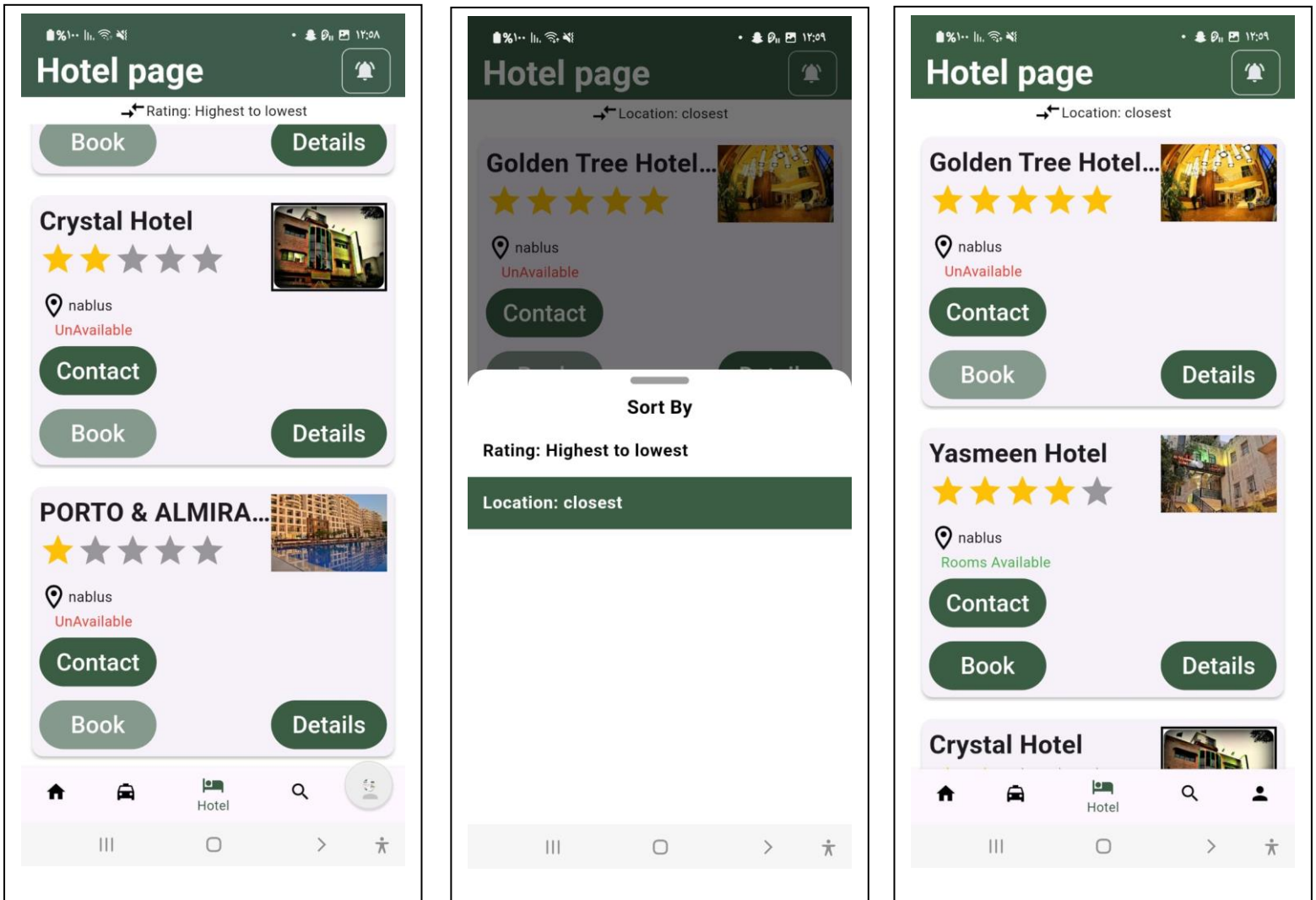


Figure 8 Hotels page screens

As shown in the previous images, in the hotel, there are buttons for booking, contact, and viewing details. It is also noticeable that the booking buttons are grayed out and cannot be clicked when there is no availability, meaning the hotel is fully booked.

Booking details

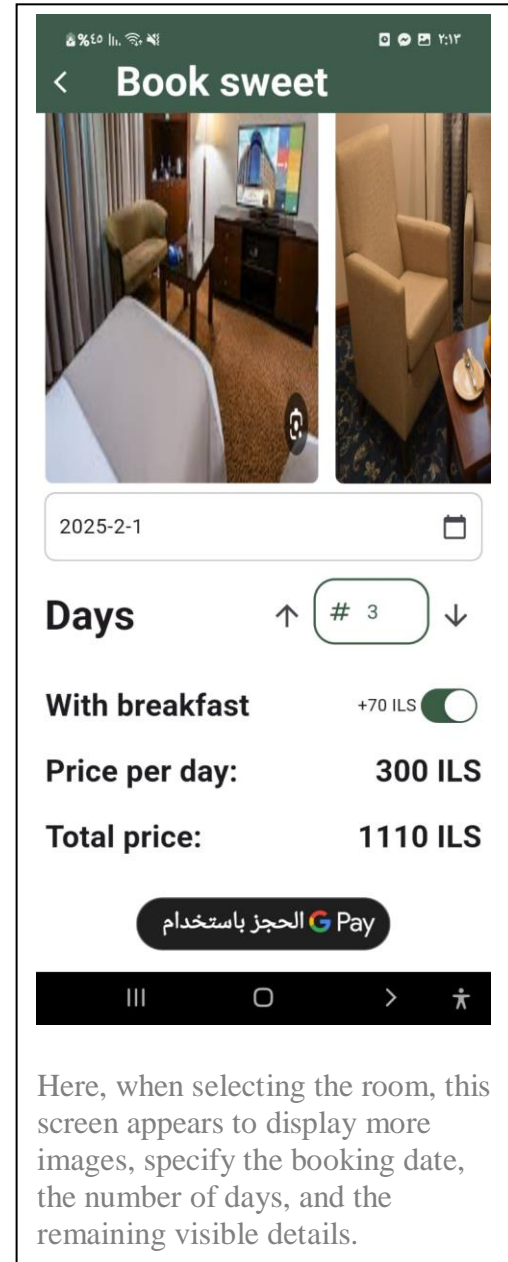
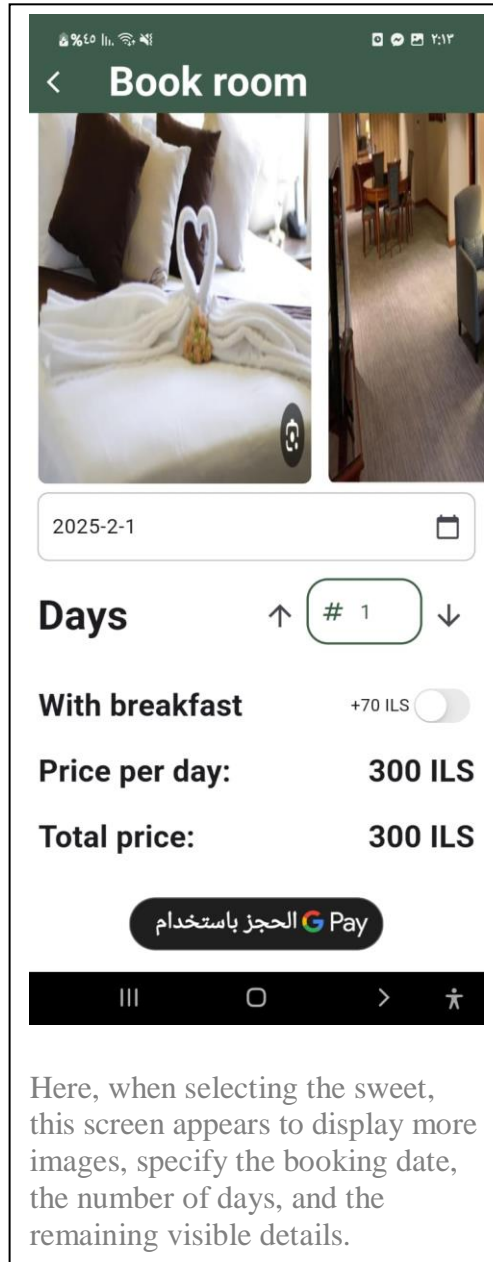
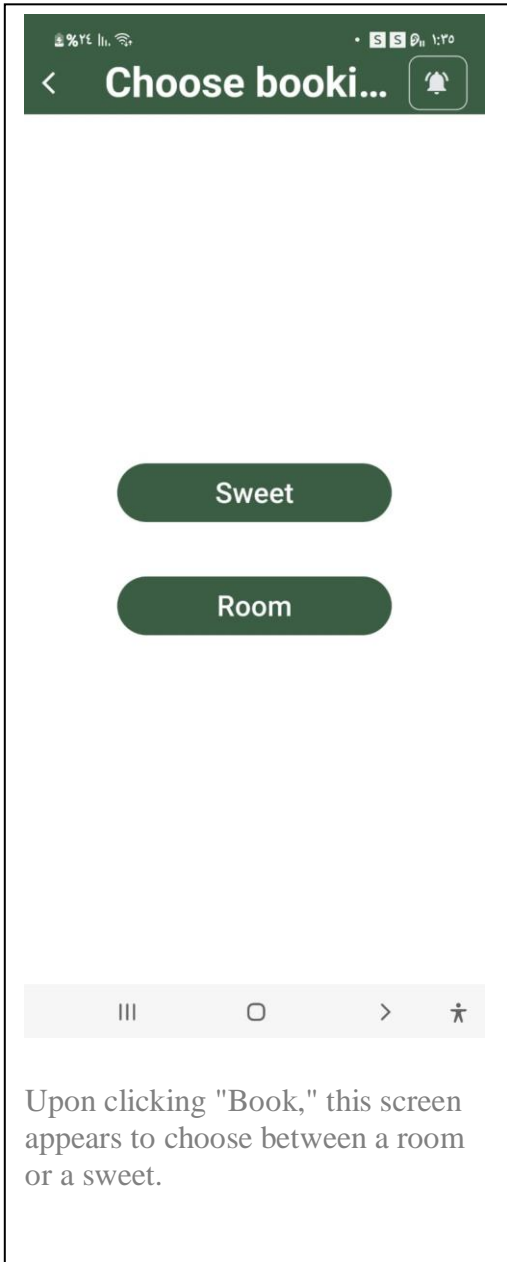


Figure 9 Booking details Screens

Now, after the reservation process, the requests are sent to the hotel account. After approval, the user receives a notification confirming the reservation, where the payment process is made using Google Pay as shown in the picture.

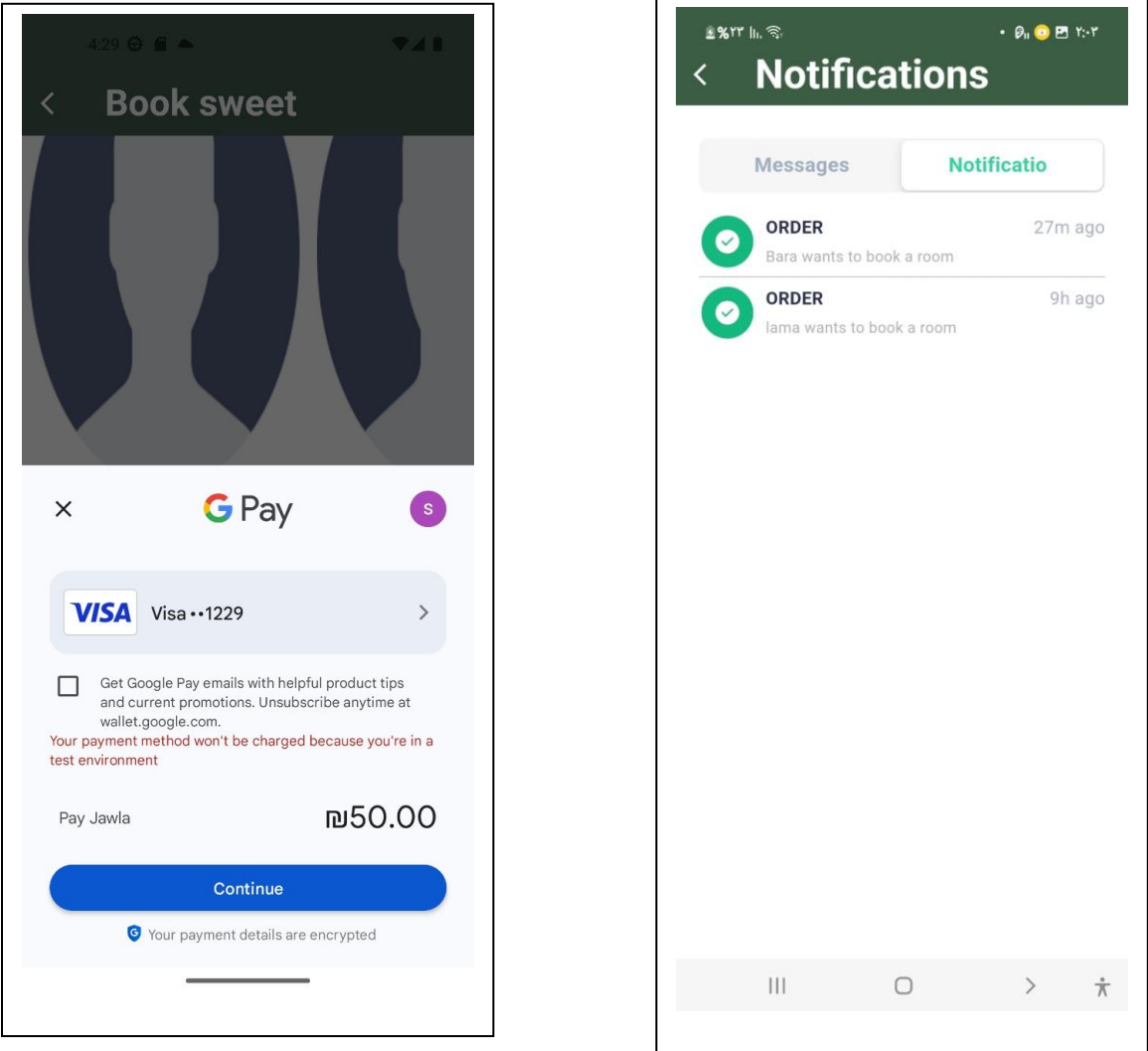


Figure 10 Notification screen & pay

Hotel Details

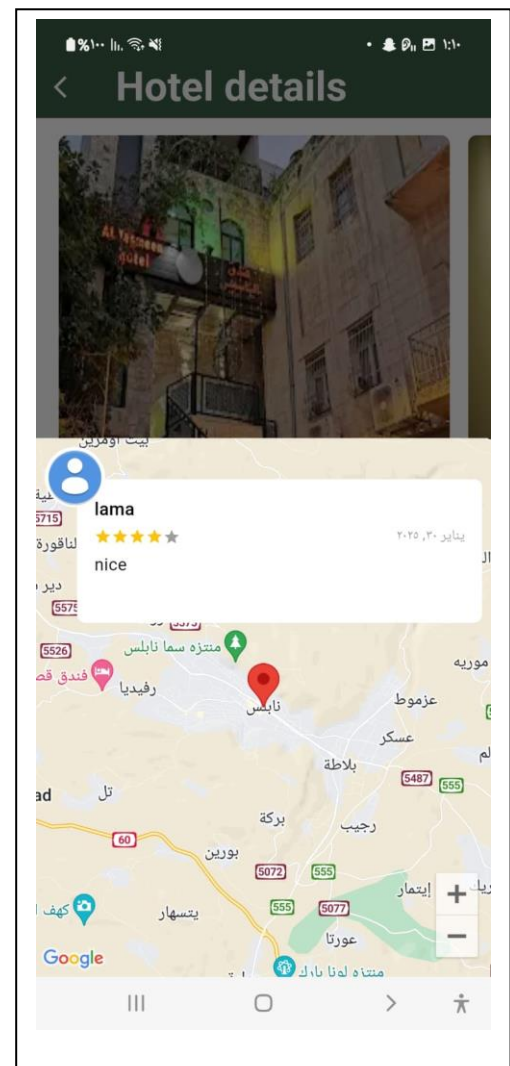
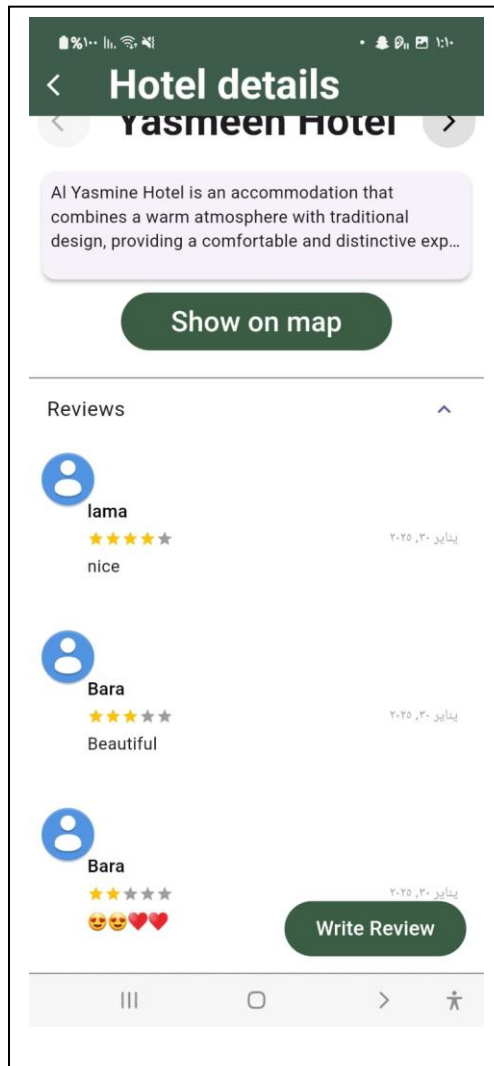
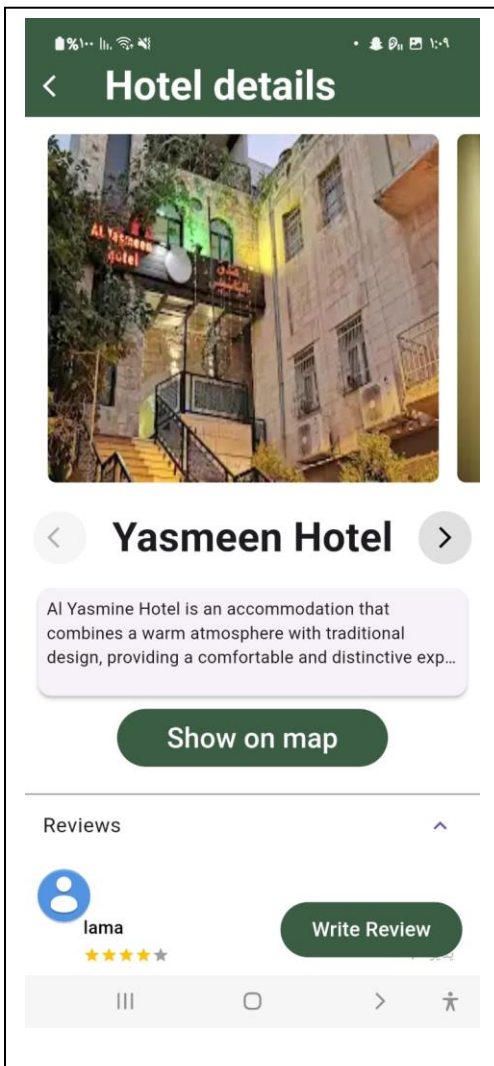


Figure 11 Hotel details screens

Contact Page

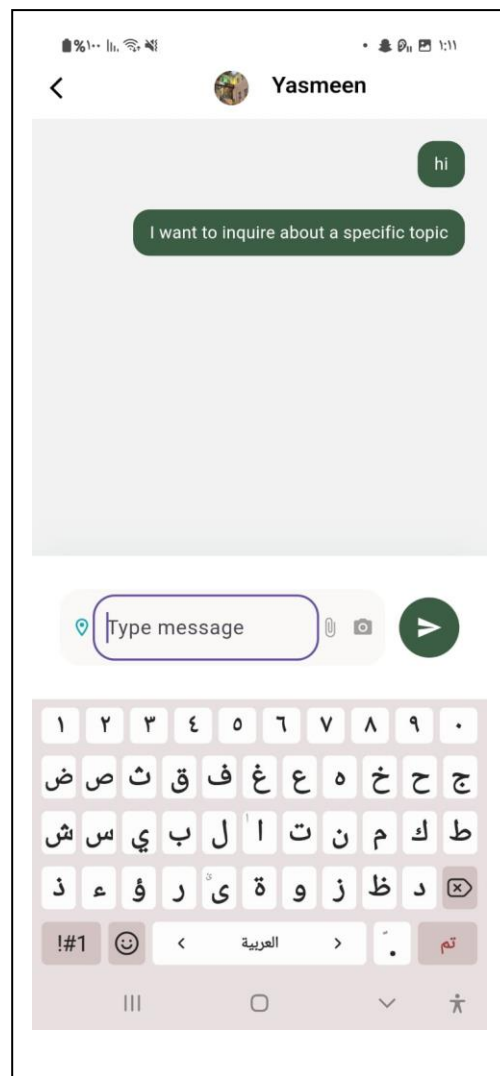
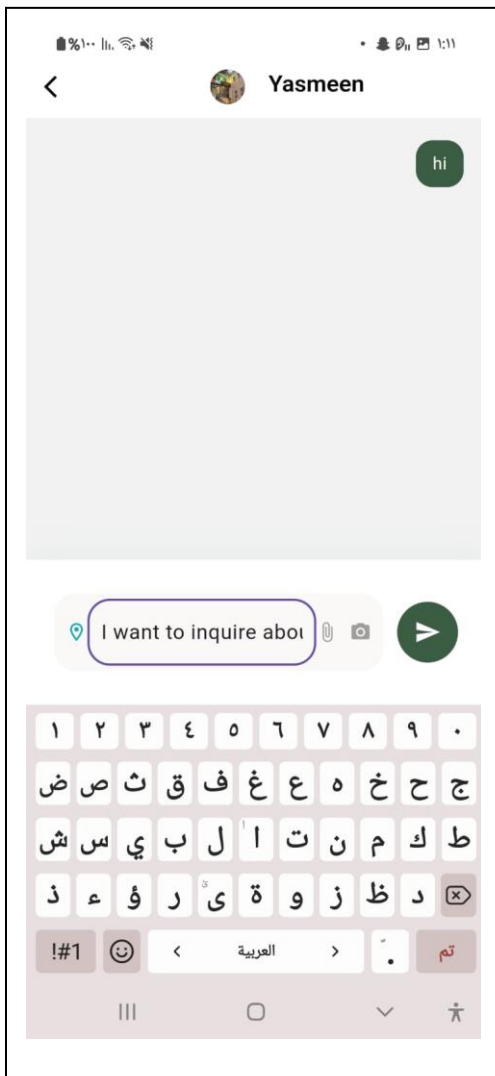
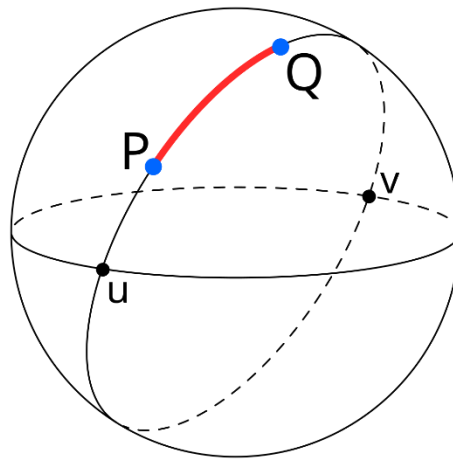


Figure 12 contact page screens

- Taxi's Page : Here, the user can request a taxi. When clicking "Request Taxi," the system starts sending the request to the taxis in order from the nearest to the farthest, with a time gap to allow the nearest taxi to accept the request first. When a request is sent, the location of the taxi that received the request is shown. When a taxi accepts the request, the route starts to appear, showing the distance between the user and the taxi. The locations of the other taxis disappear. Once one taxi accepts, the request is removed from the other taxis.

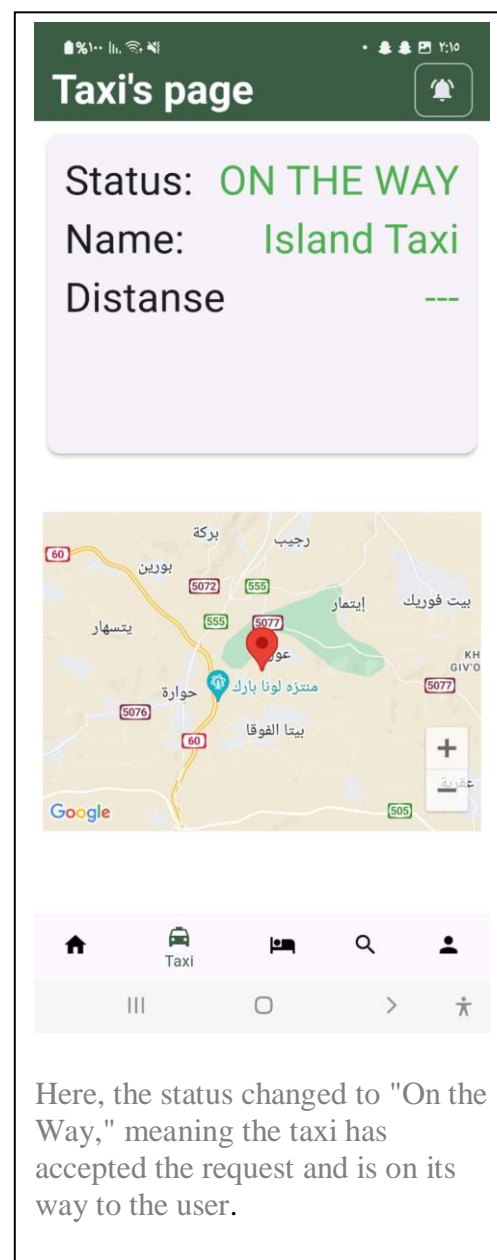
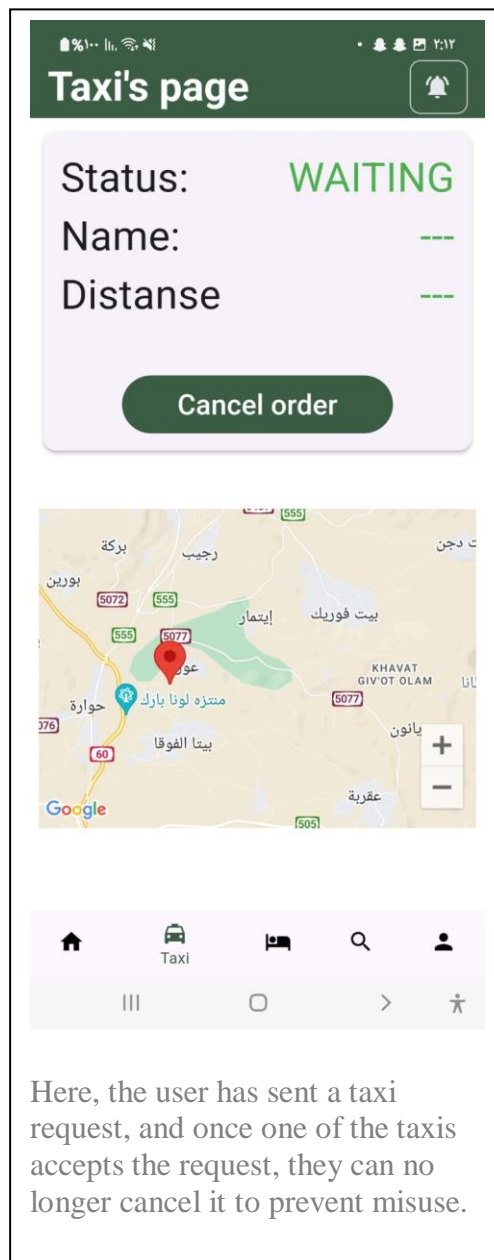
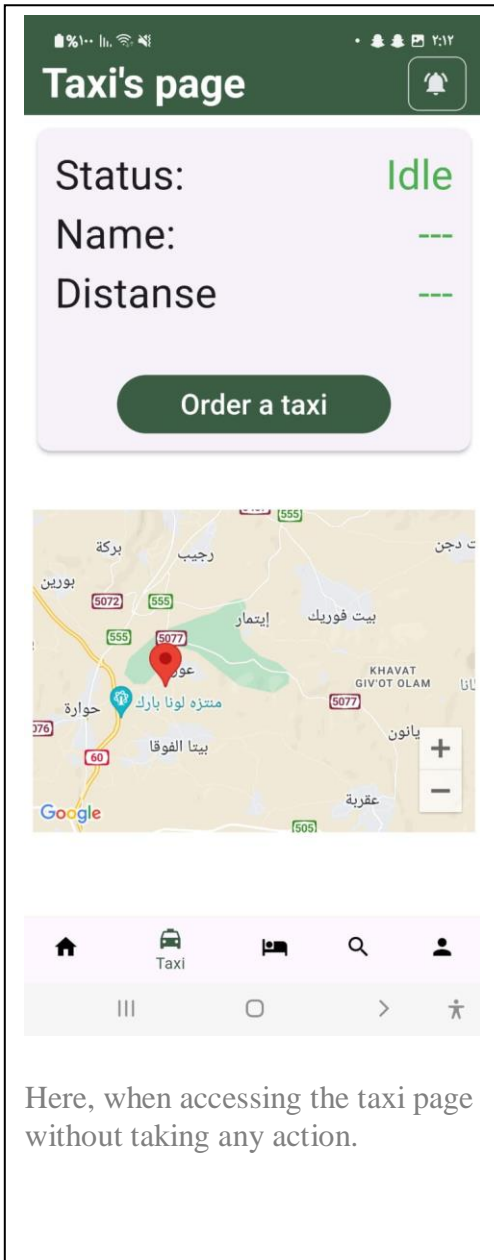
To calculate the distance, we used the Haversine Formula. The Haversine Formula is a method for calculating the distance between two points on the surface of the Earth using their geographic coordinates (latitude and longitude). The formula takes into account the curvature of the Earth, making it more accurate compared to calculating straight-line distances between the two points.



$$\left(\frac{\Delta\lambda}{2}\right)^2 \sin^2 \phi_2 \cdot \cos(\phi_1) + \left(\frac{\Delta\phi}{2}\right)^2 \sin^2 \phi_1 = a$$

$$(\sqrt{a-1}, \sqrt{a}) \operatorname{atan2} \cdot 2 = c$$

$$c \cdot R = d$$



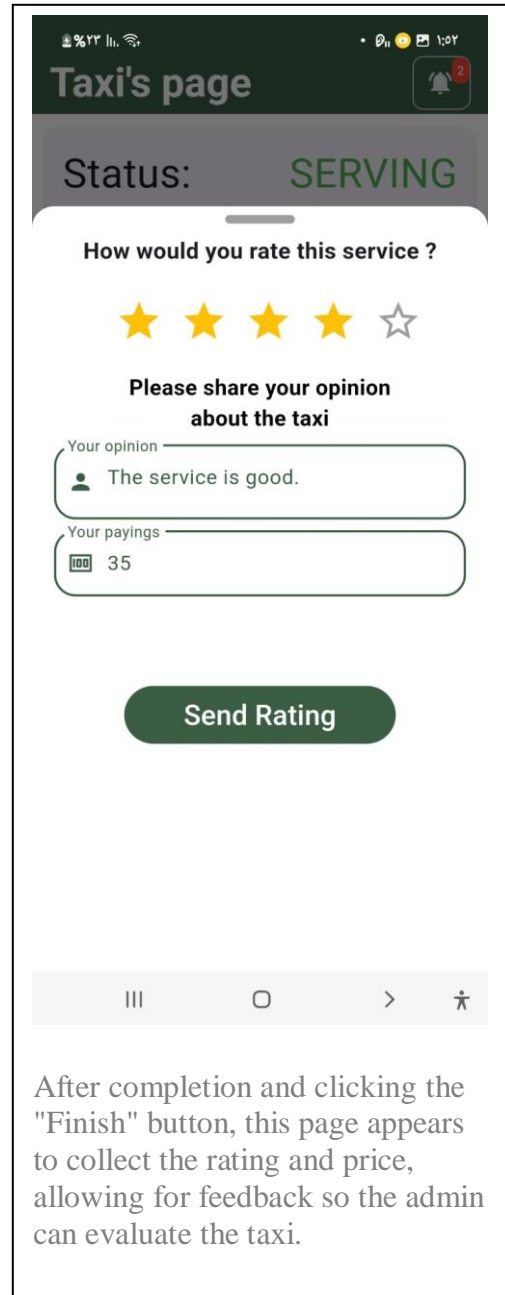
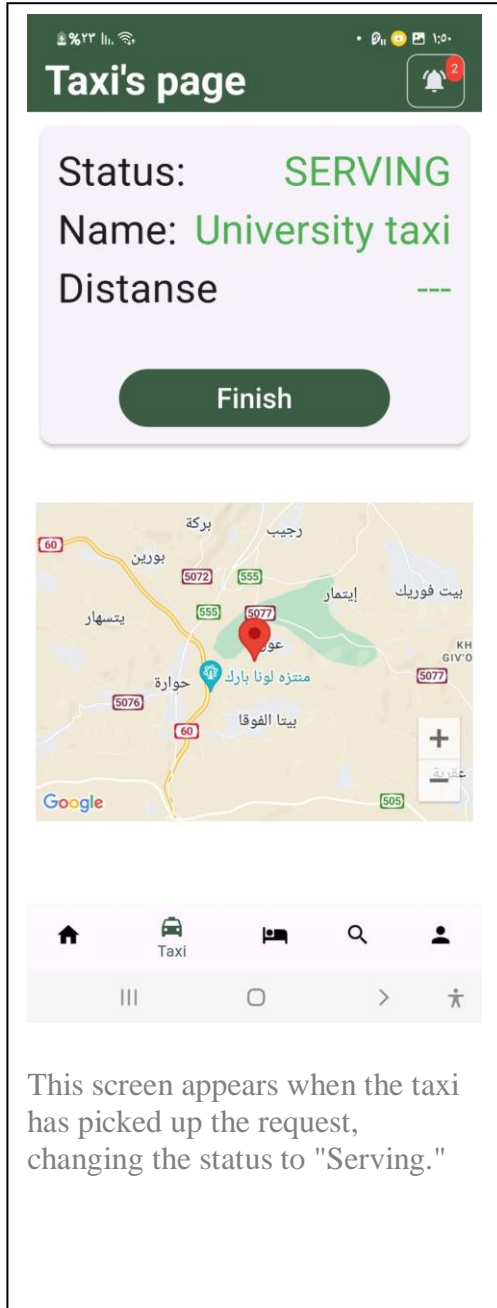


Figure 13 taxi's page screens

- Notifications and Chats :Here, the user can view *chats* with hotels and taxis if they have communicated with them. In the *notifications* section, they receive responses from taxis and hotels regarding their requests.

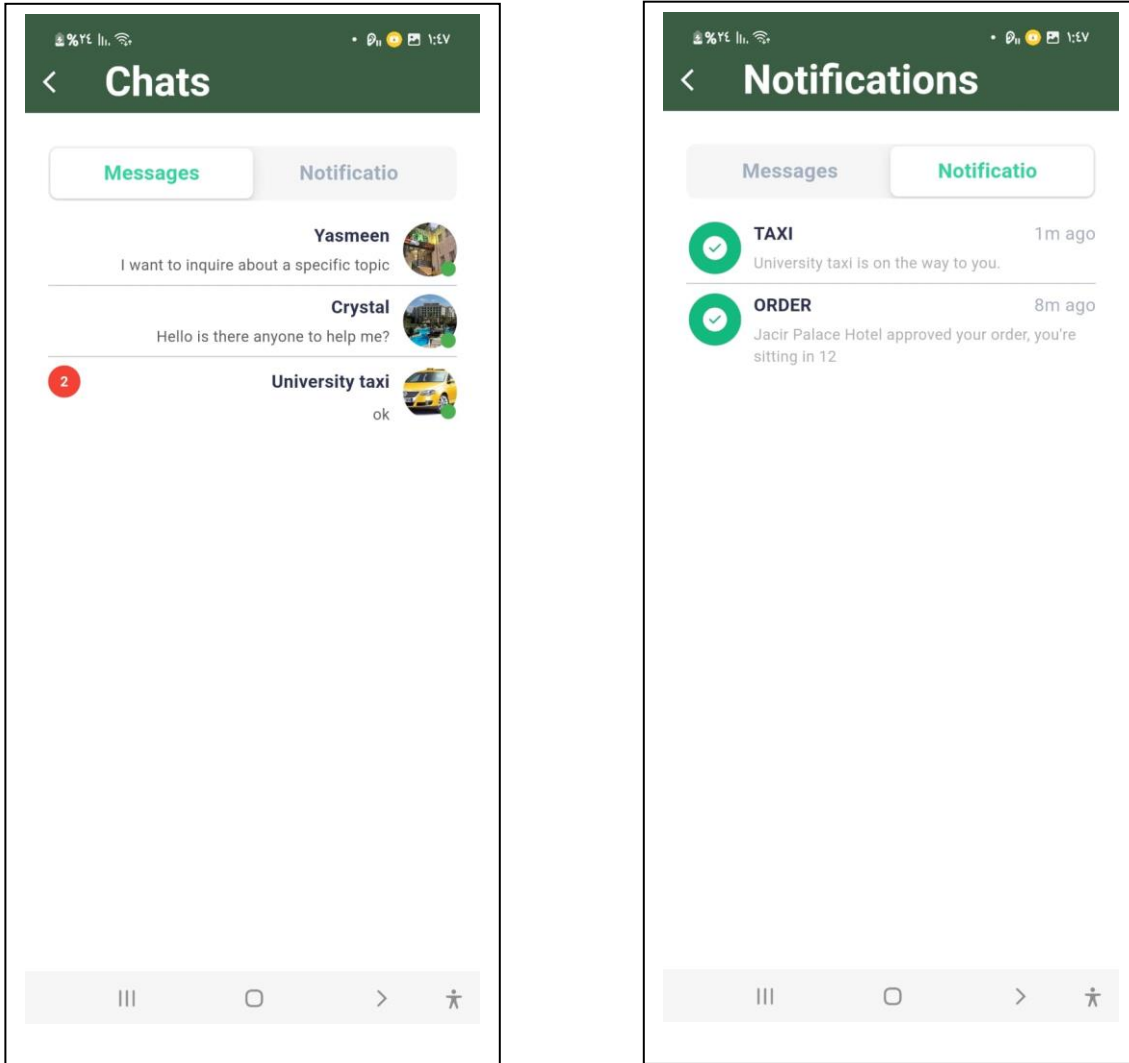


Figure 14 Notifications and Chats Screens

- search screen :It allows you to search for the hotel name you want.

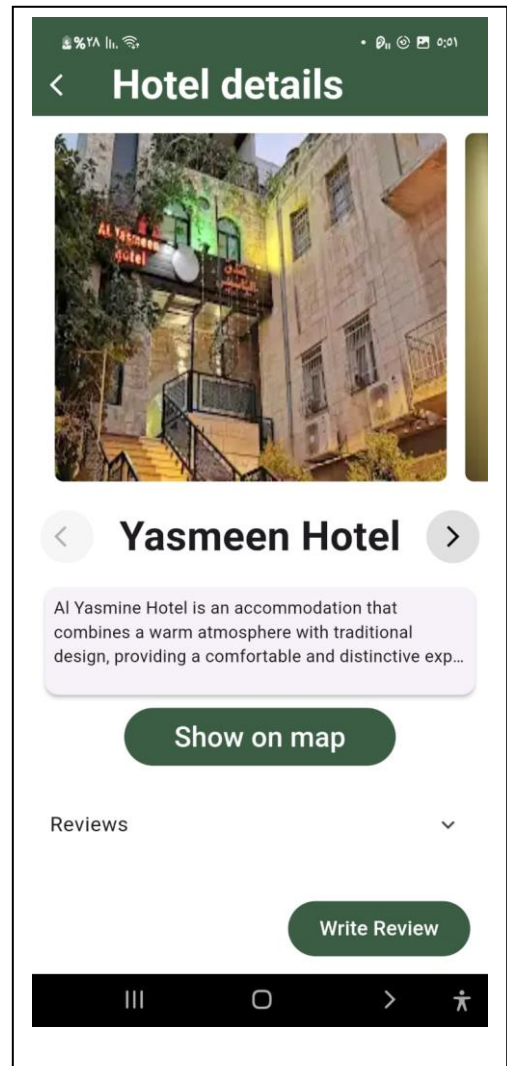
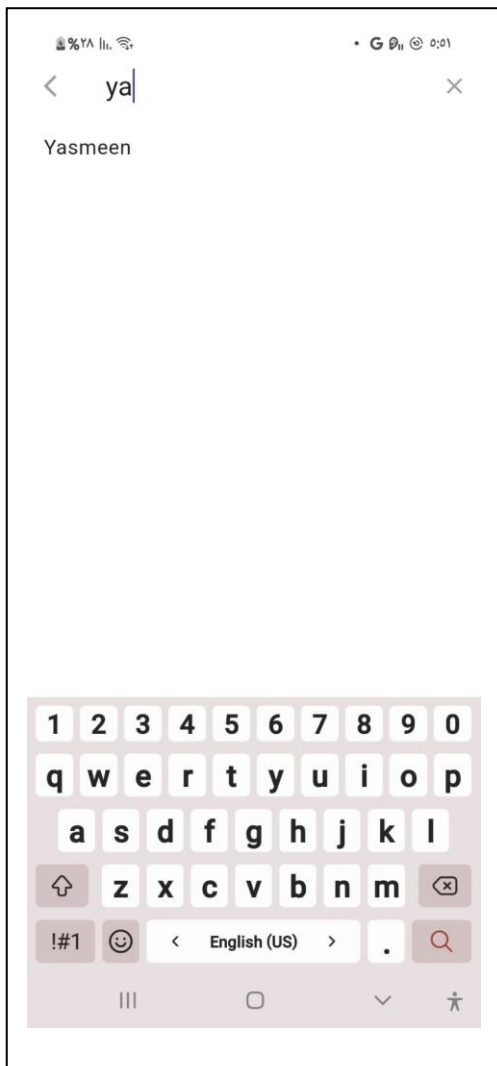


Figure 15 search screen

- My Profile

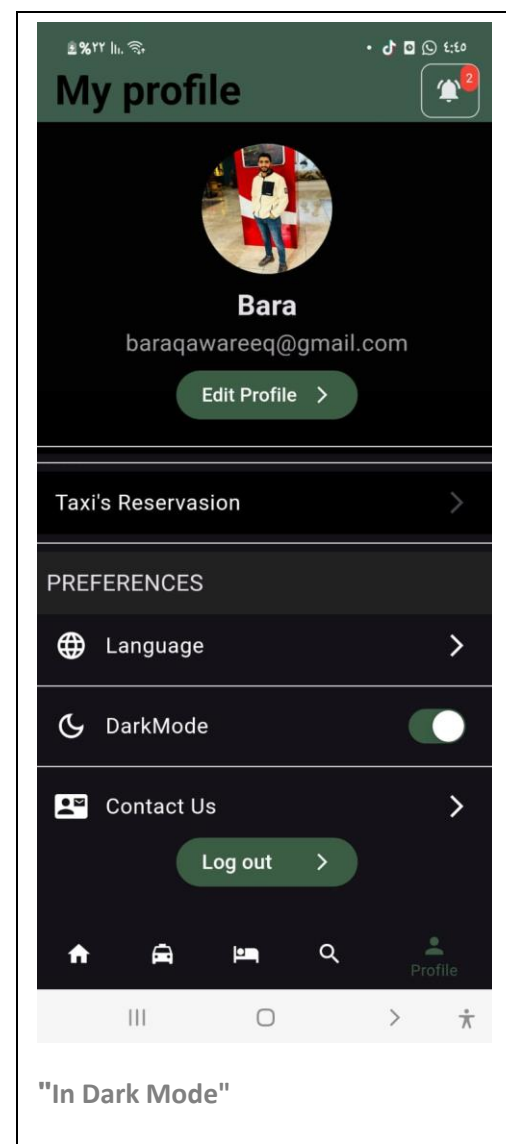
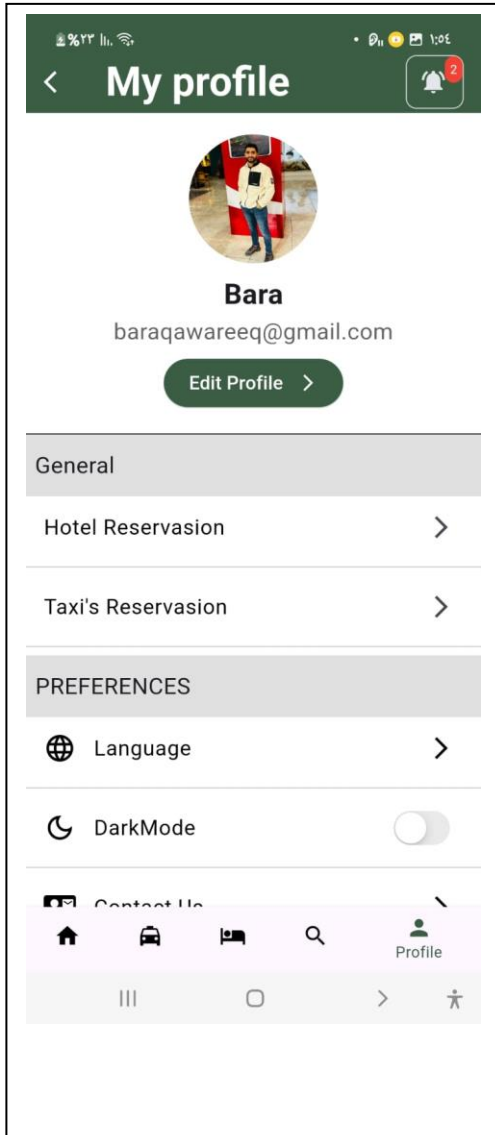


Figure 16 My Profile Screens

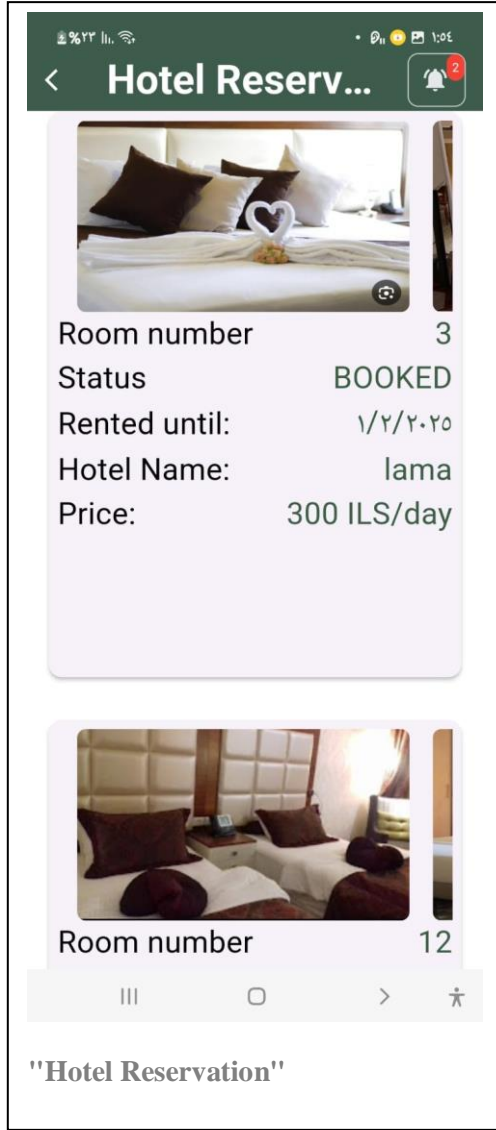
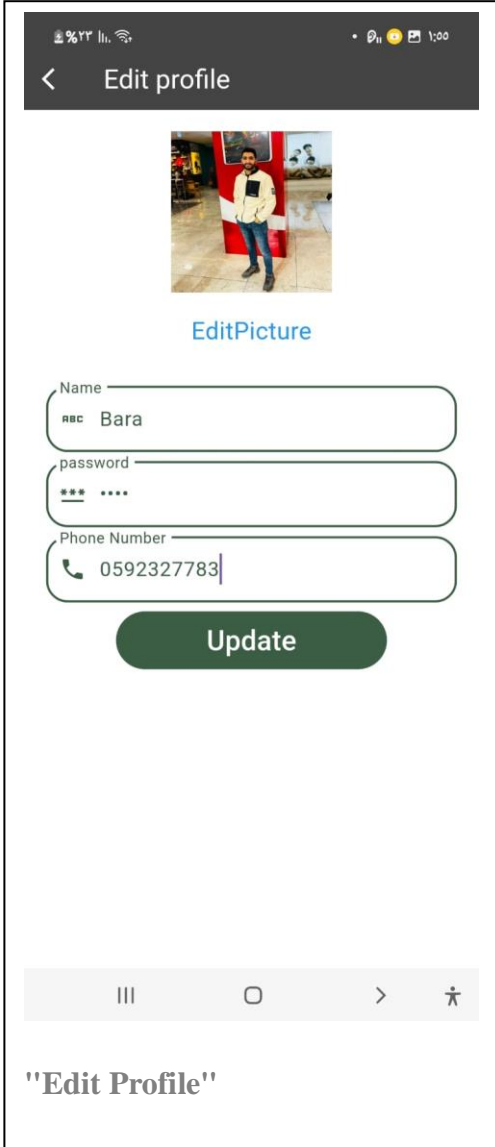


Figure 17 My Profile operations Screens

- **Taxis Screens**

The welcome and login page is the same as the one shown to the user, and here we will begin by displaying the sign-up page .

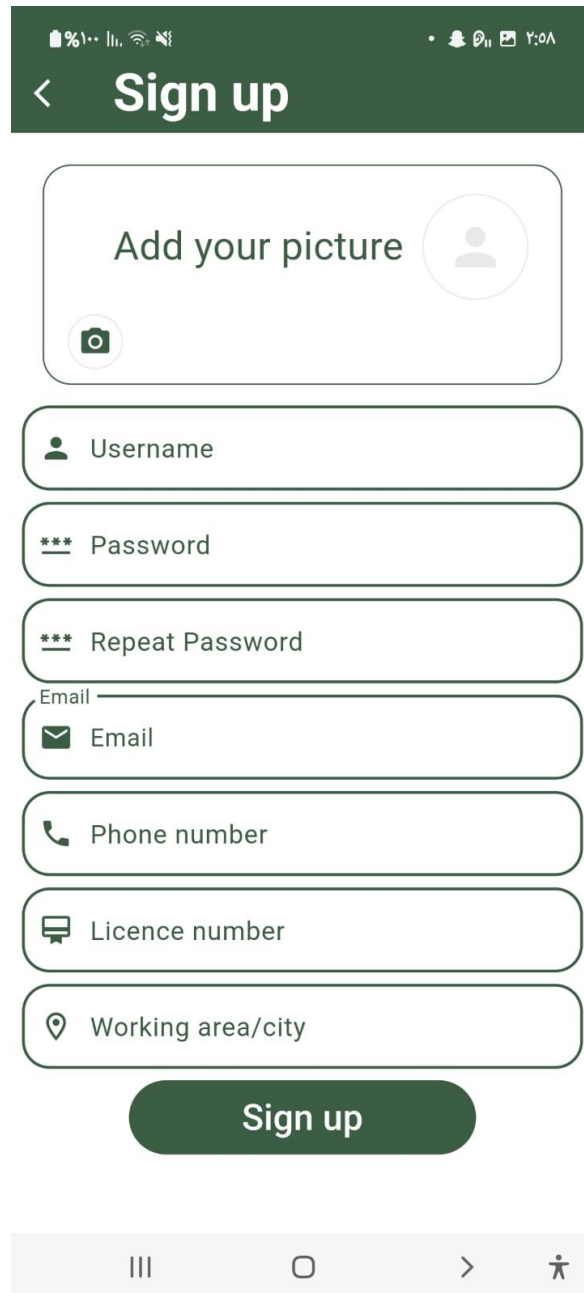


Figure 18 taxi sign-up screen

- Taxi homepage : The taxi homepage displays the general information about the taxi that was entered through the sign-up page, along with its current status and statistics on the number of requests it has received and the number of requests it has completed successfully.

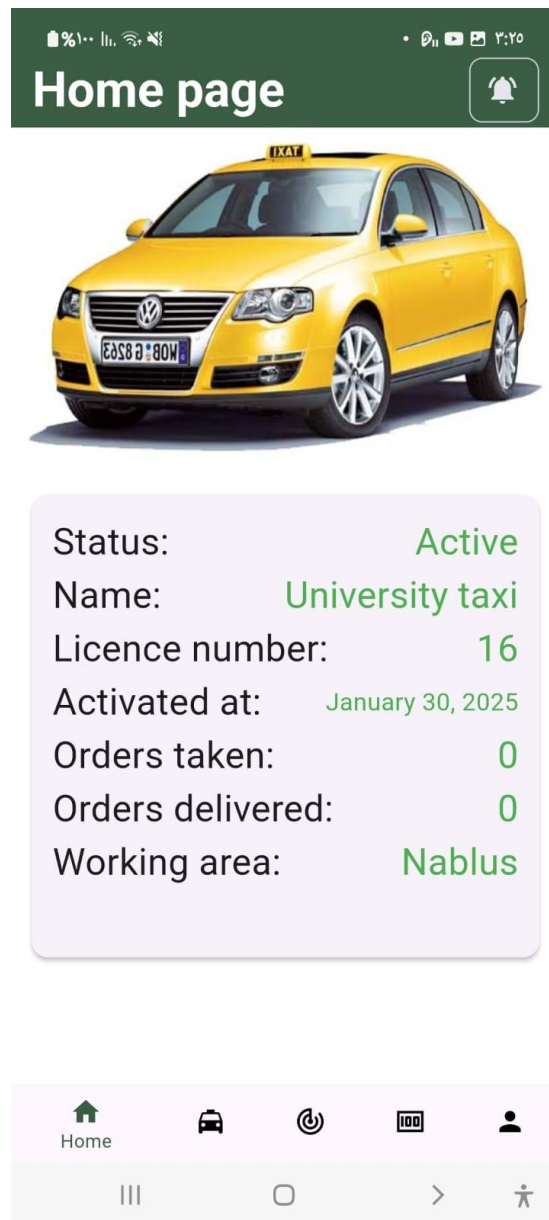


Figure 19 : taxi home page screen

Requests Page: As shown on this page, taxi requests submitted by users are displayed. If the taxi accepts one of these requests, the remaining requests are deleted, and it will not receive new requests until the user clicks "Finish the Ride," making them available again for new requests. Also, if the taxi is "Take Order OFF" it will not receive any requests, meaning it will be unavailable to users.

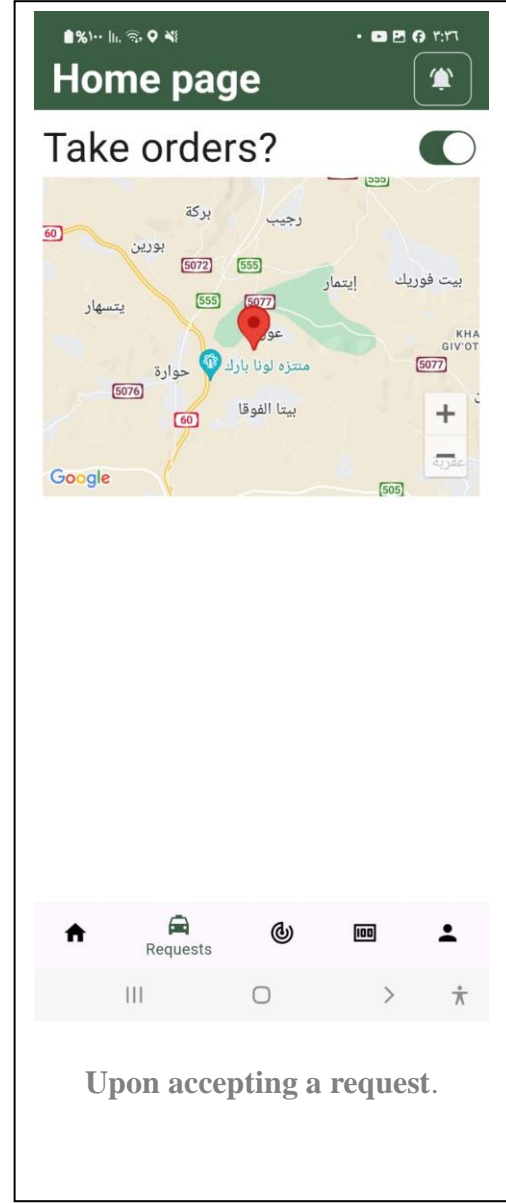
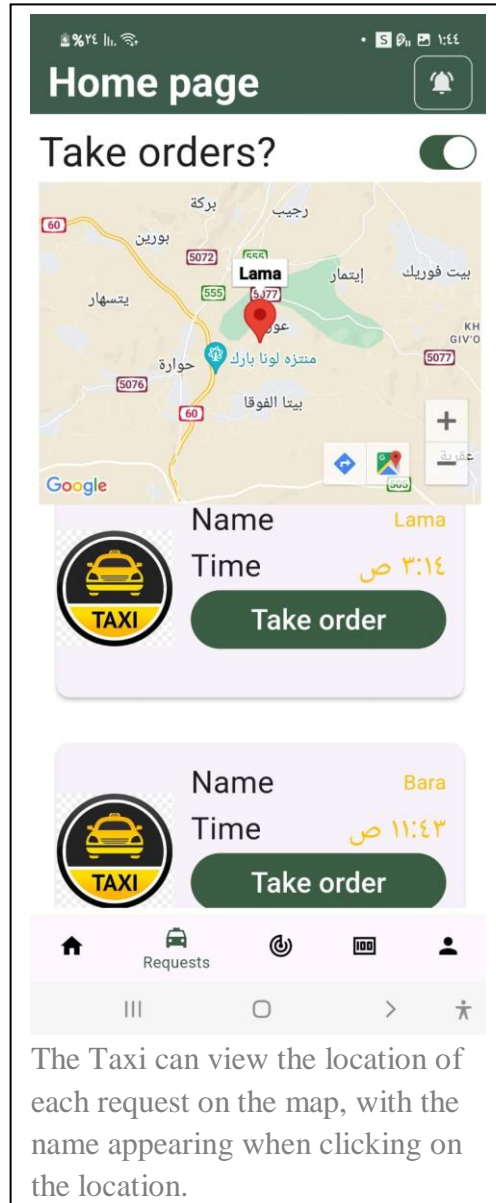
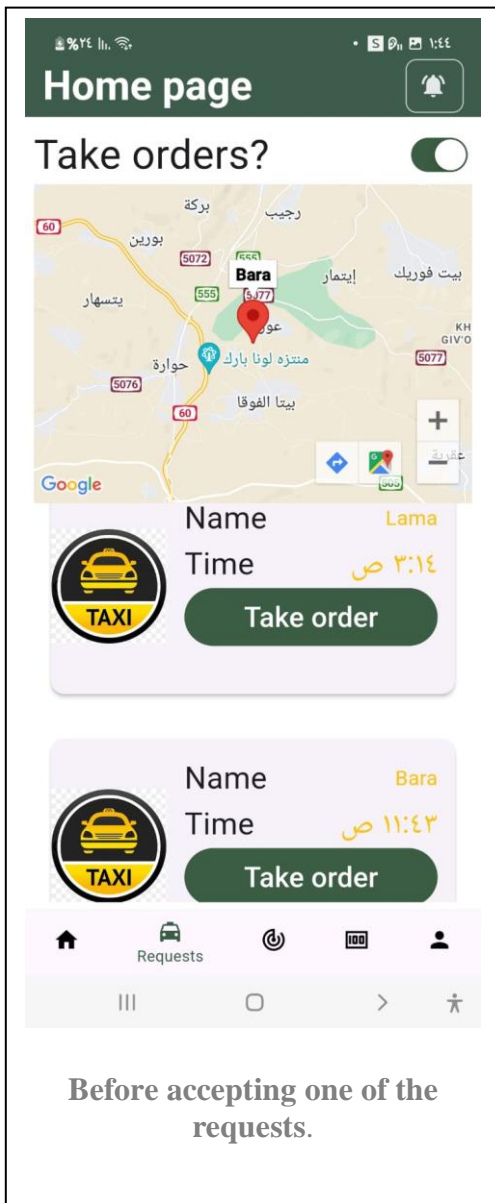
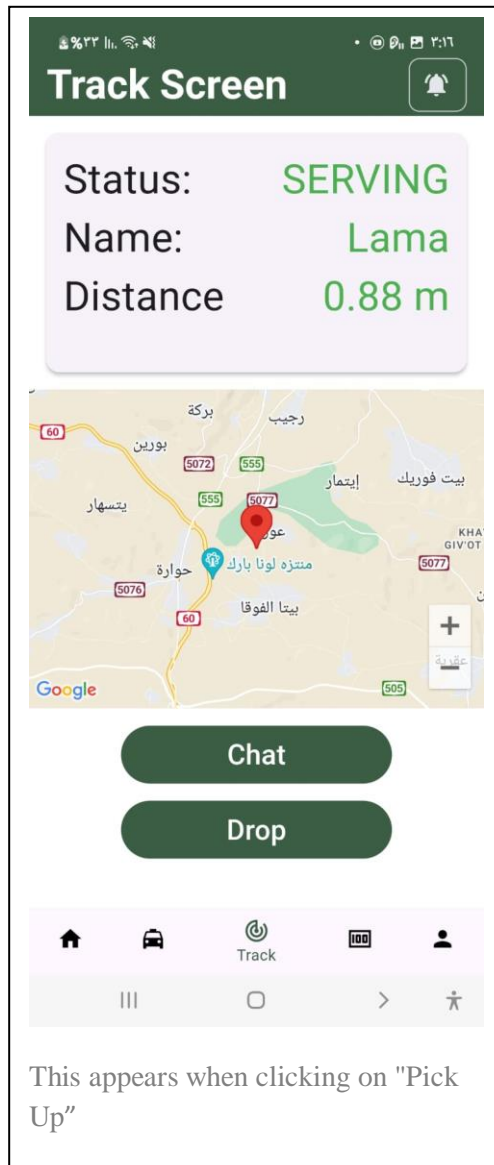
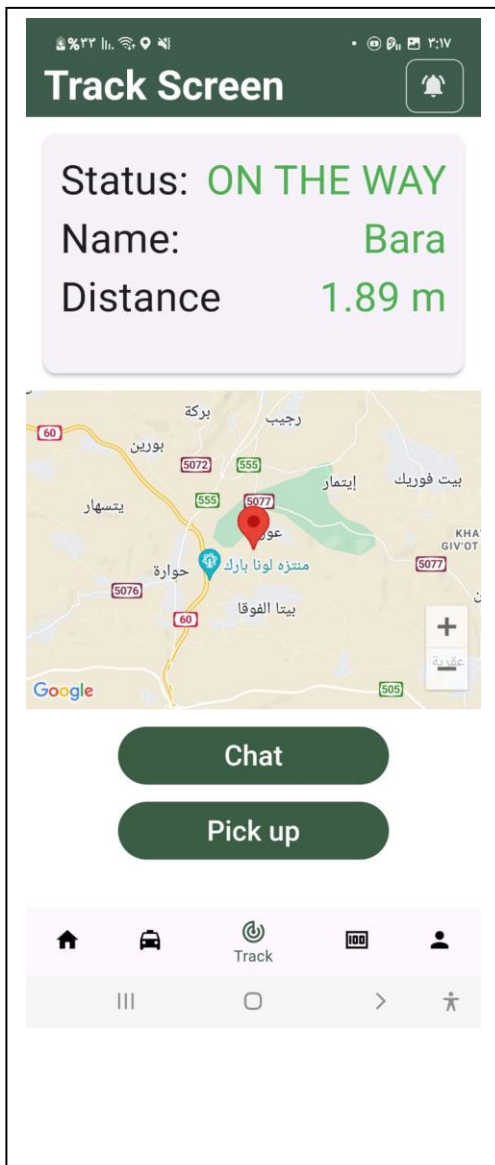
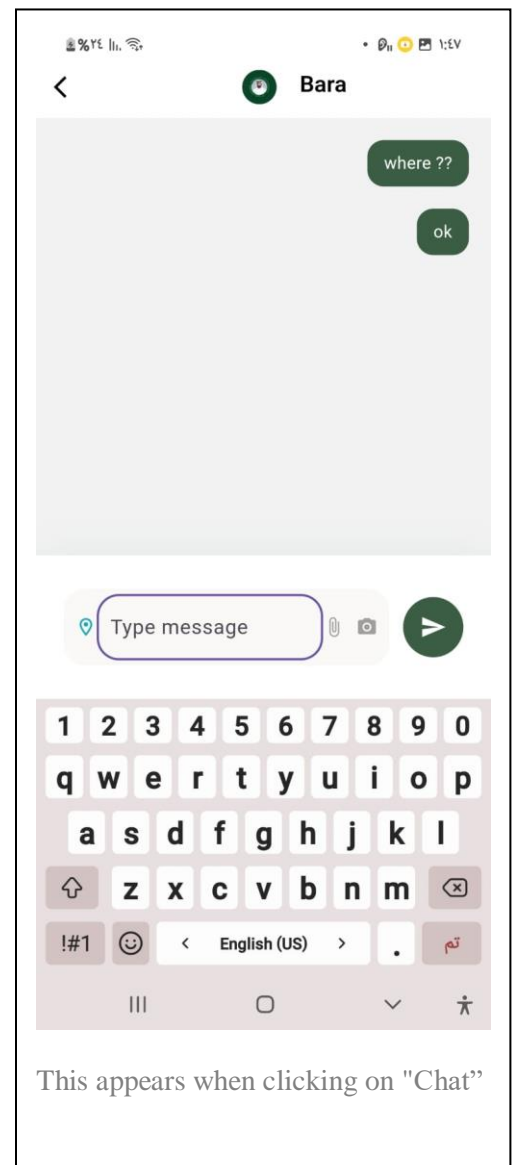


Figure 20 Request: Requests Page screens

- Track Page: Upon accepting a request, the route between the taxi and the user is displayed on the map. Additionally, there is a button for the taxi to click on "Pick Up" to enter "Serving" mode. If the request is not completed for any reason, it can be deleted; otherwise, the taxi continues with the request. There is also a chat feature for communication. Once the user finishes and rates the service, the taxi becomes available for other requests.



This appears when clicking on "Pick Up"



This appears when clicking on "Chat"

Figure 21 Track Page screens

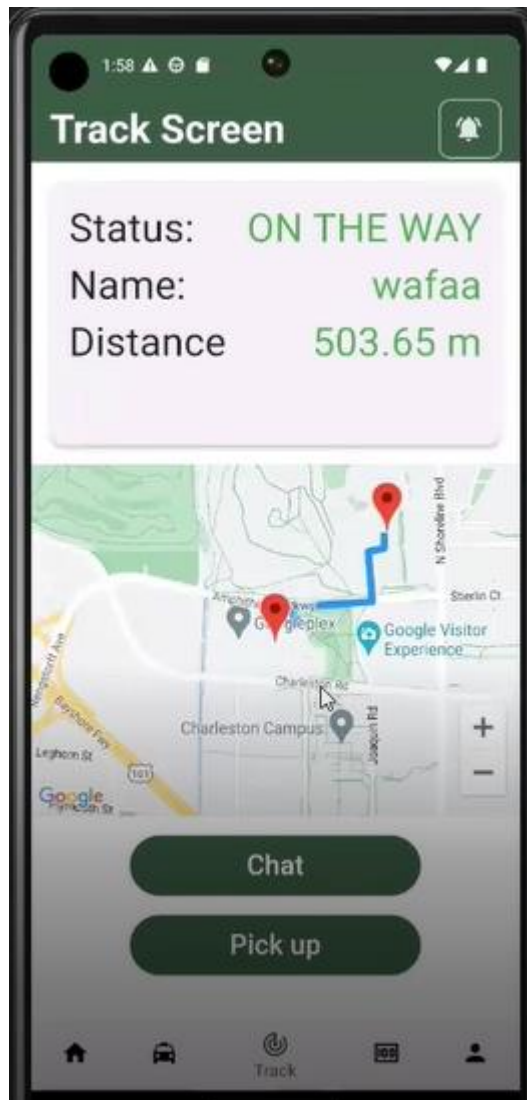


Figure 22 tracking screen

- Profits Page : In this page, the weekly earnings of this taxi are displayed, as shown in the image.

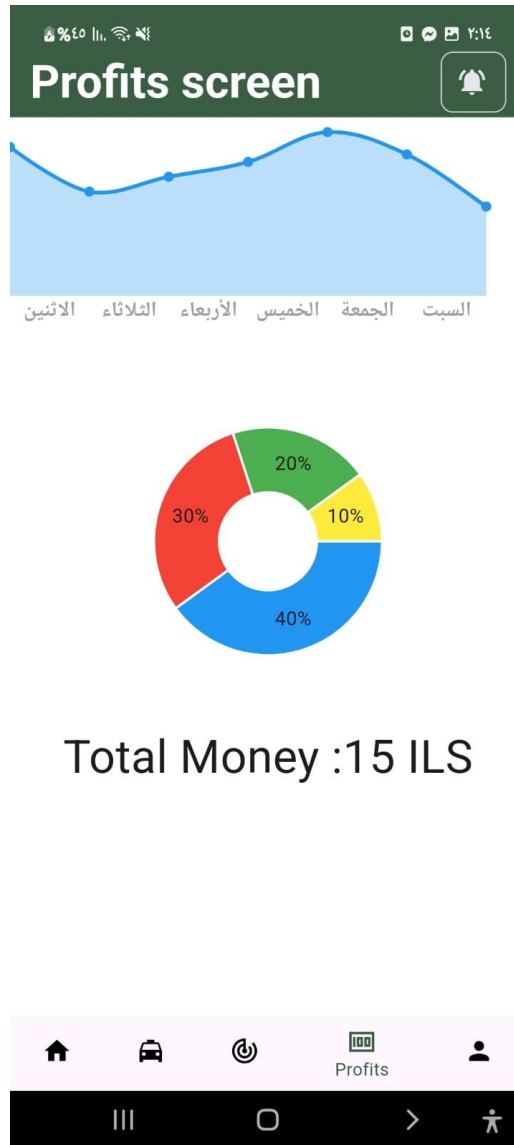


Figure 23 profits screen

- Profile Page : On this page, the taxi driver can update their information, view their order history, and change their password.

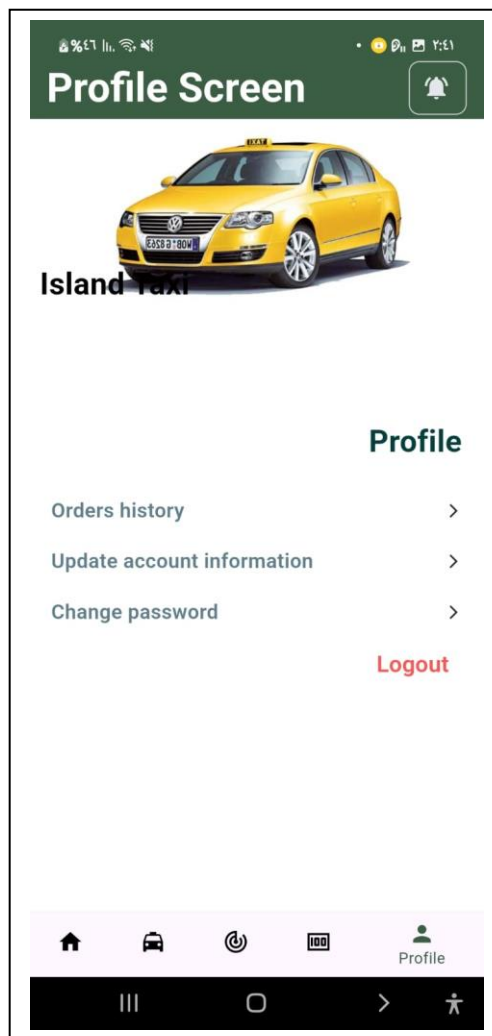


Figure 24 taxi profile Page screens

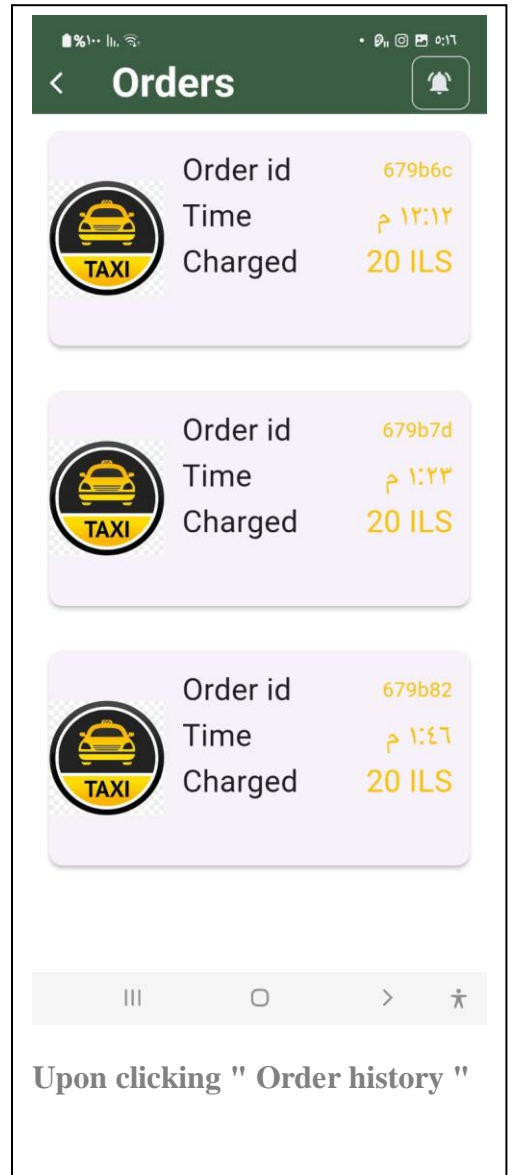
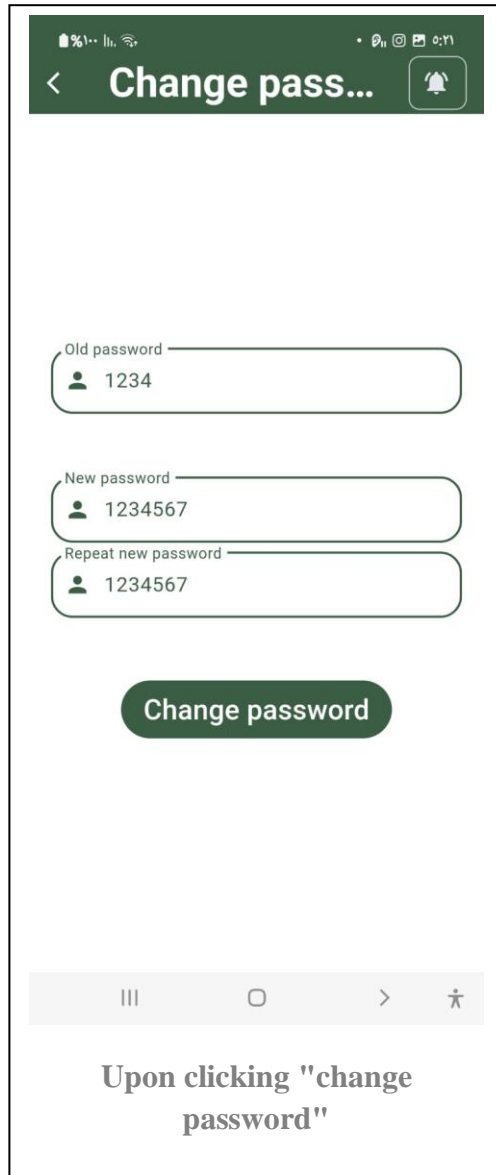
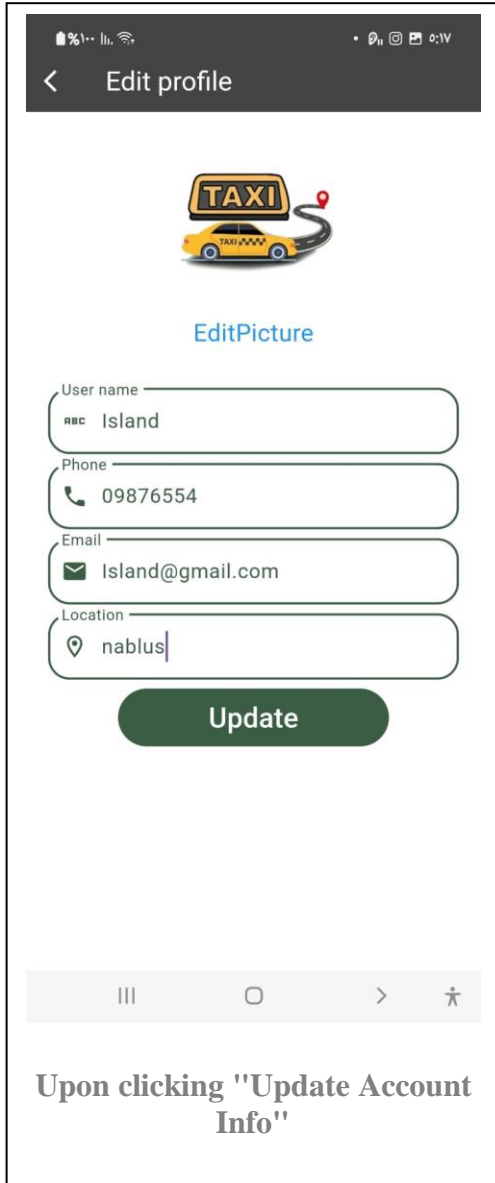


Figure 25 taxi profile operations Page screens

- **Hotel screens**

The welcome and login page is the same as the one shown to the user, and here we will begin by displaying the sign-up page .

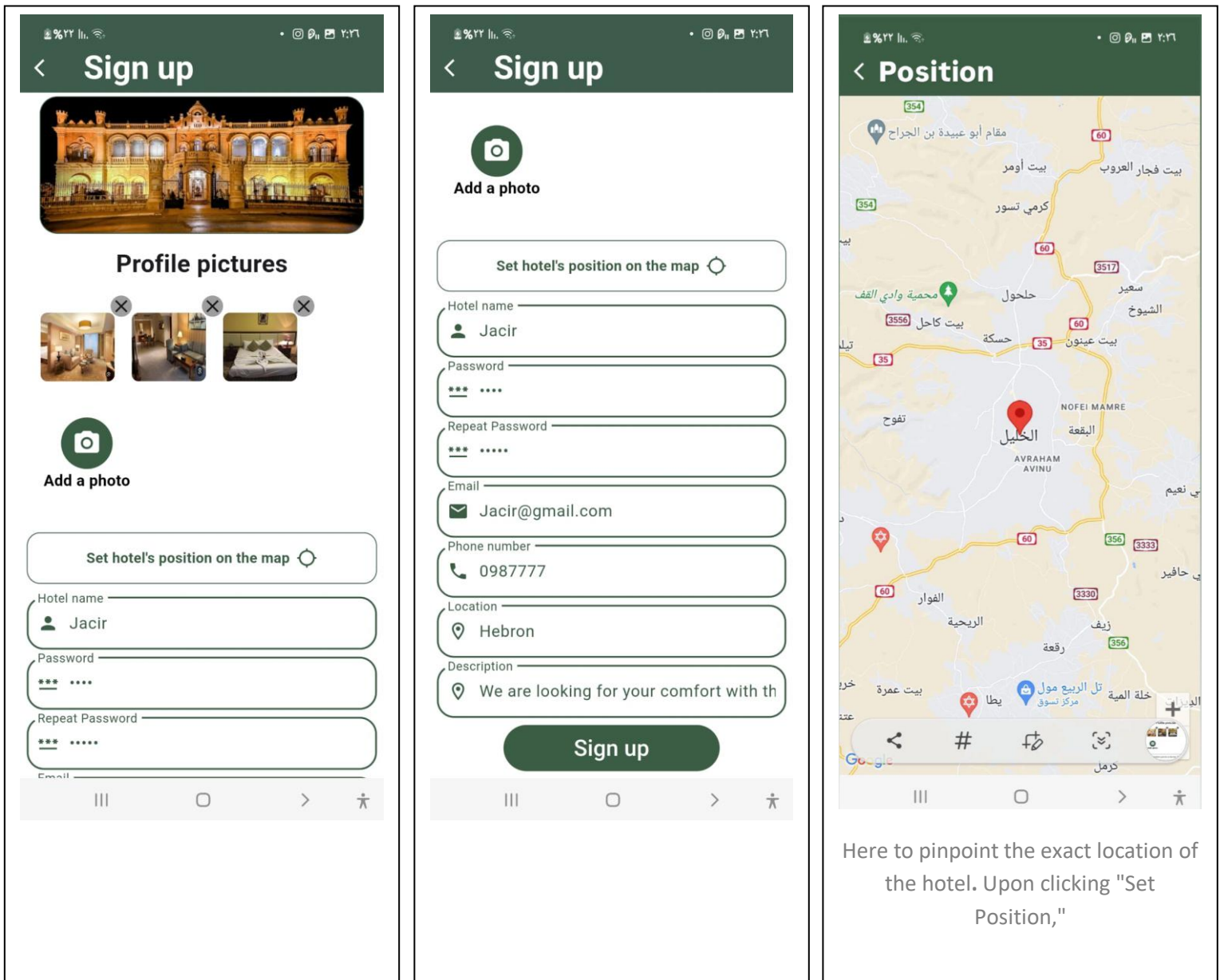


Figure 26 Hotel Sign up Page screens

- Home Page : On it images of the rooms and suites are displayed, along with the number of available rooms and the number of bookings.

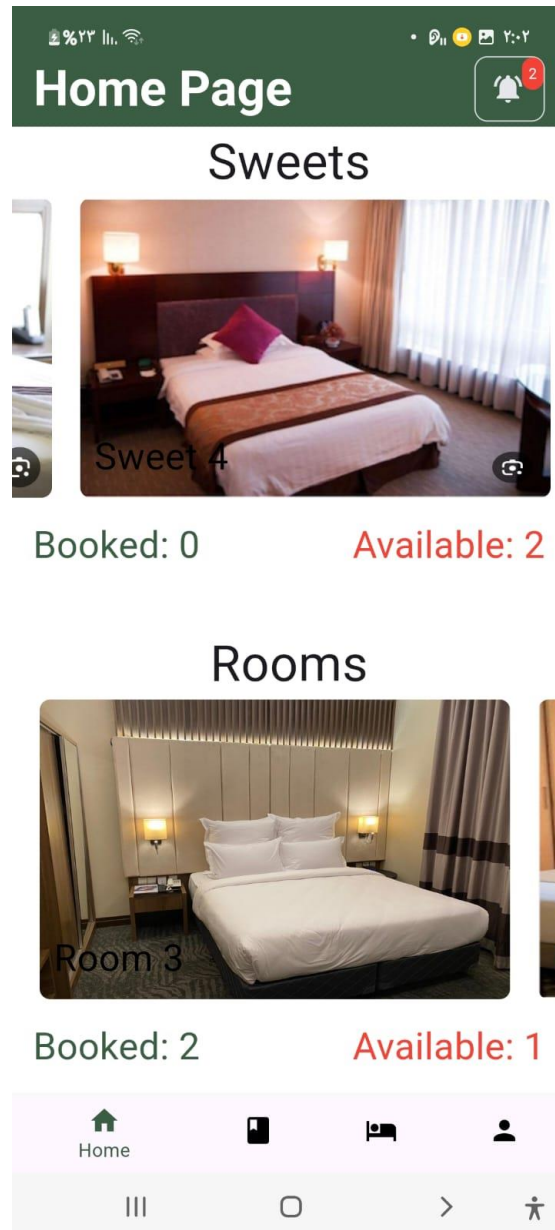


Figure 27 Hotel home Page screen

- Order Page :On it all orders are displayed, as shown here:

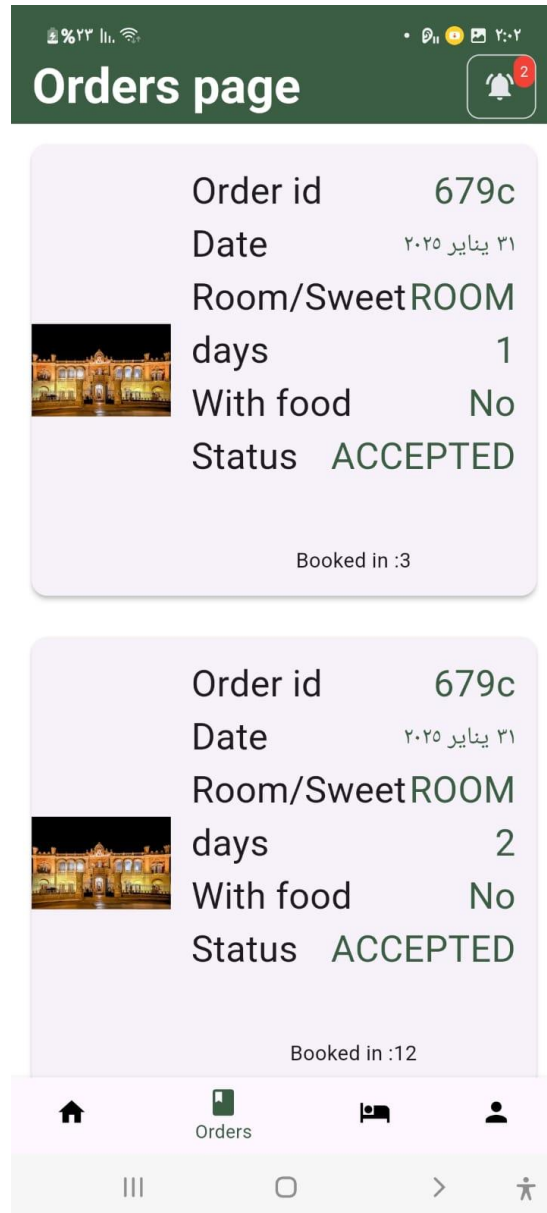


Figure 28 Order Page screen

- Notifications and Chats

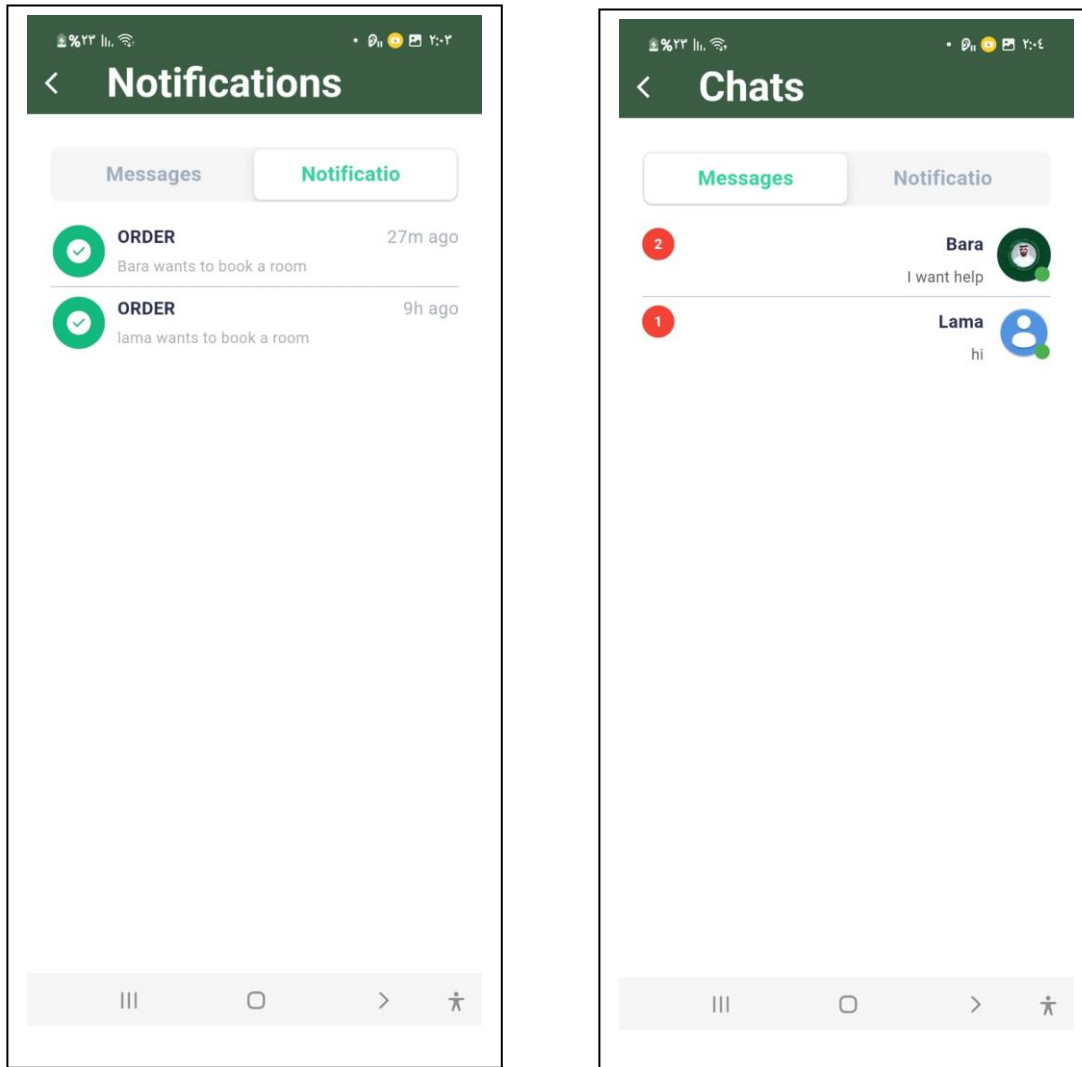


Figure 29 Hotel Notifications and Chats Page screens

- Room Page: As shown in the images, this interface can display the images and suites page with a switcher. It shows the details of the rooms and suites, with the option to edit the information and check out of the rooms. This scenario is for when the user has to cancel the booking before completing the entire stay duration.

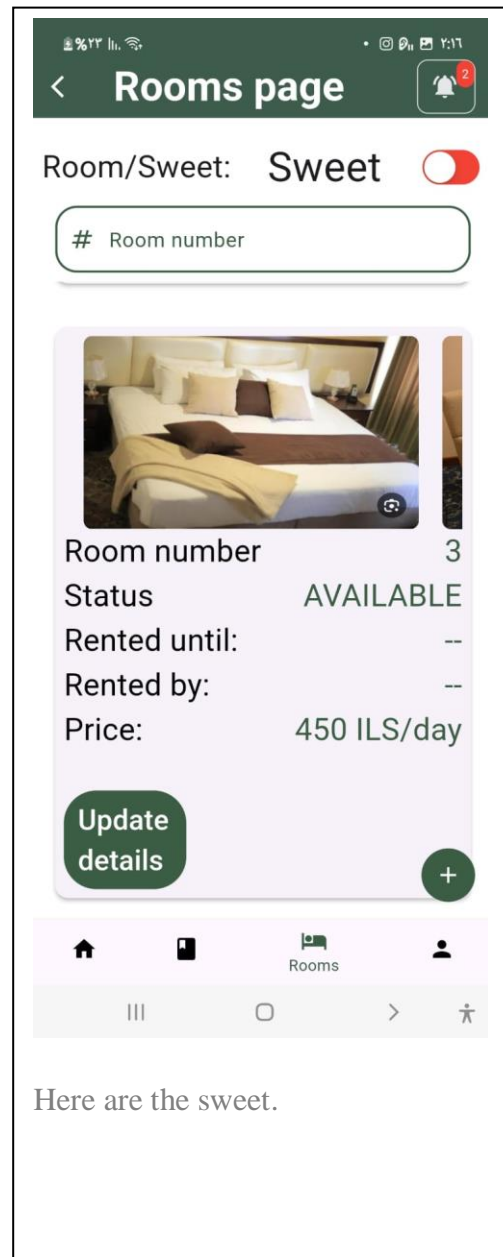
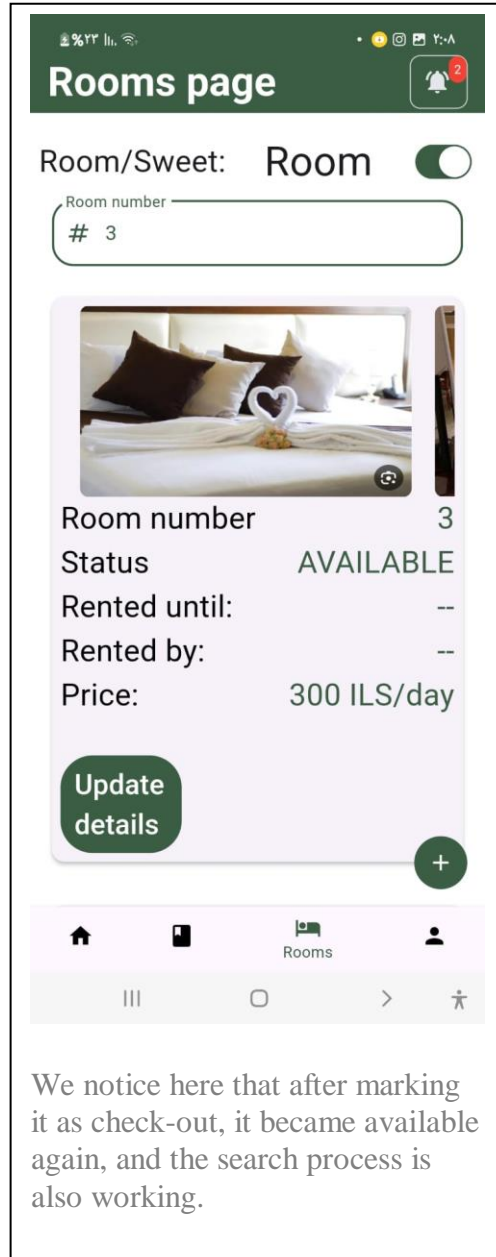
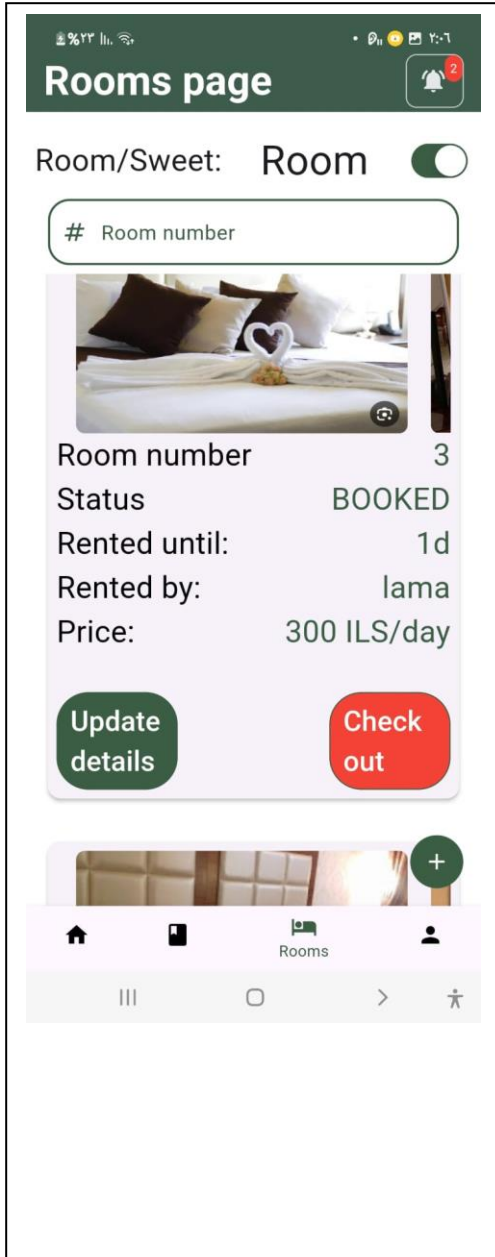


Figure 30 Rooms Page screens

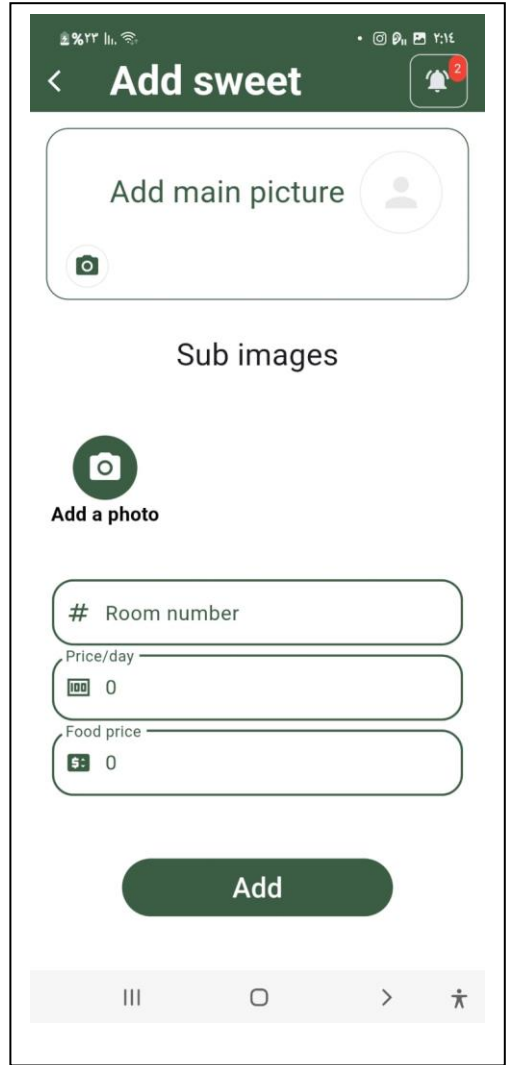
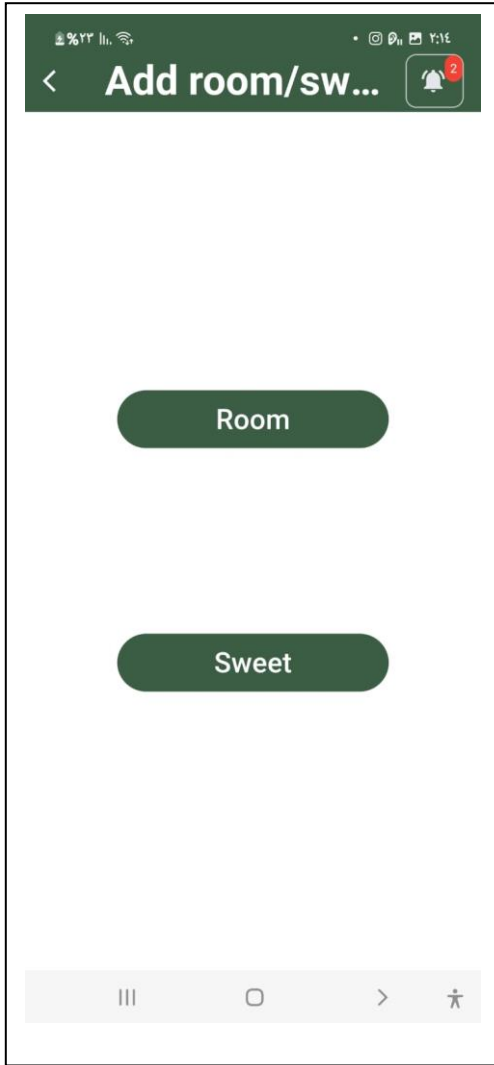
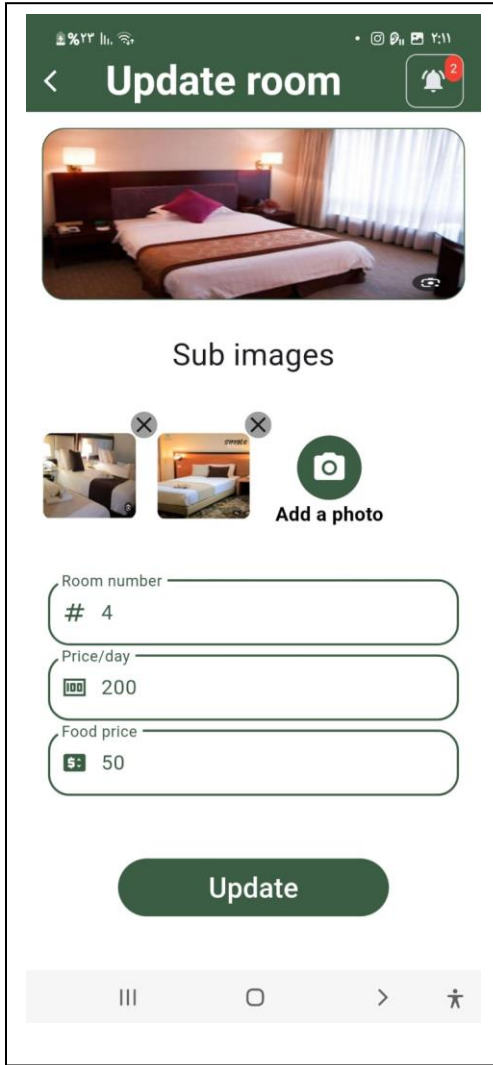


Figure 31 Rooms operations Page screens

- Profile Page:

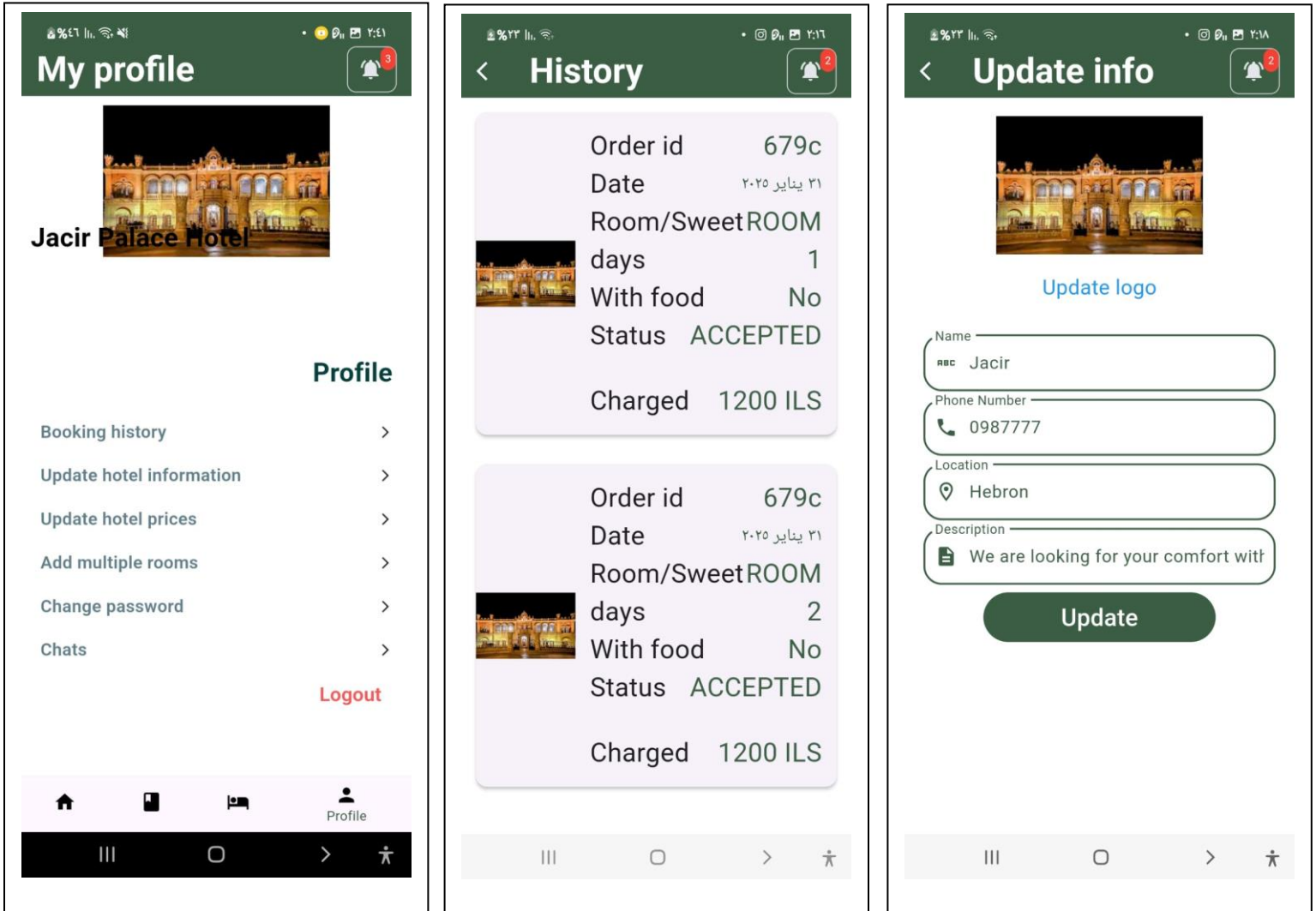


Figure 32 hotel profile Page screens

< **Add multiple ...**

Single/Double **Double**

Room/Sweet **Room**

Start number

End number

Add

||| ○ > ✕

This option is very practical in case you want to add a large number of rooms.

< **Add multiple ...**

Single/Double **Double**

Room/Sweet **Sweet**

Start number

End number

Add

||| ○ > ✕

This option is very practical in case you want to add a large number of sweet.

< **Update prices**

Room prices

Price per day:

Food charge:

Sweet prices

Price per day:

Food charge:

Update

||| ○ > ✕

This option is useful when adding many rooms and suites, as the default price for them will be the one entered here.

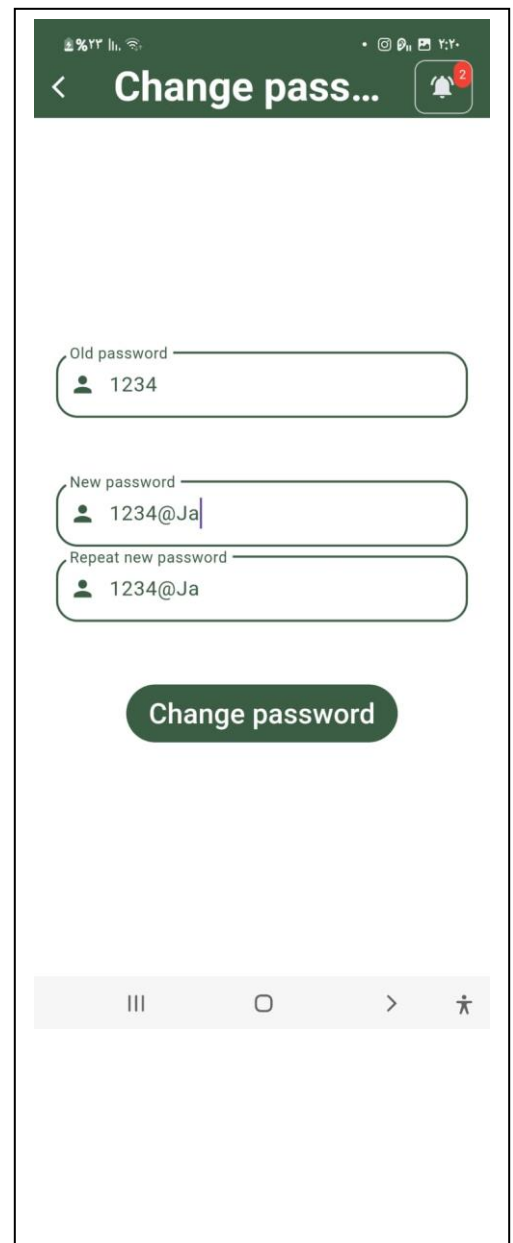
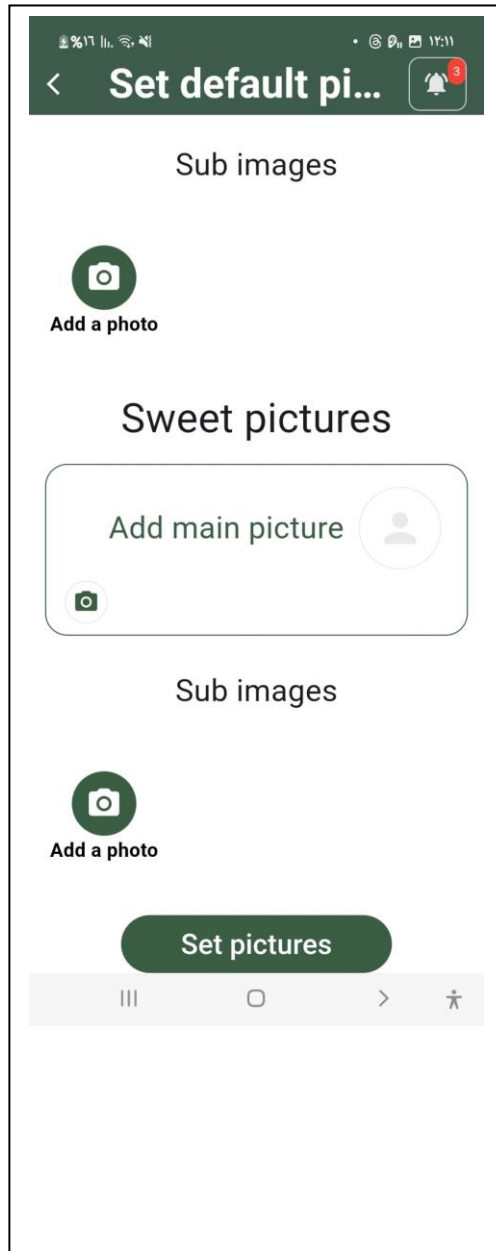
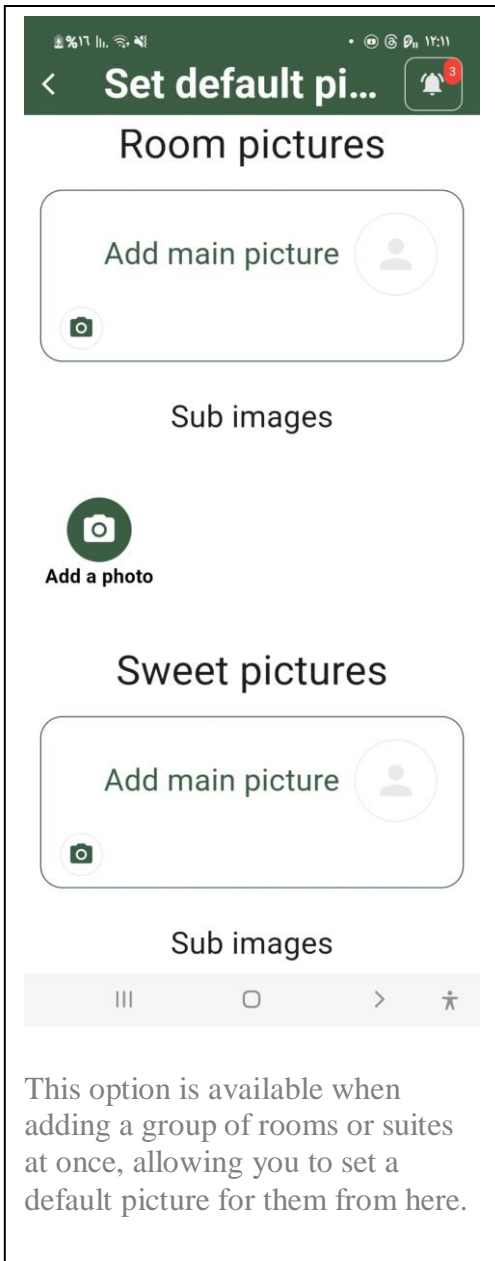


Figure 33 hotel profile Page screens

4.3.2 Website :

Admin screens:

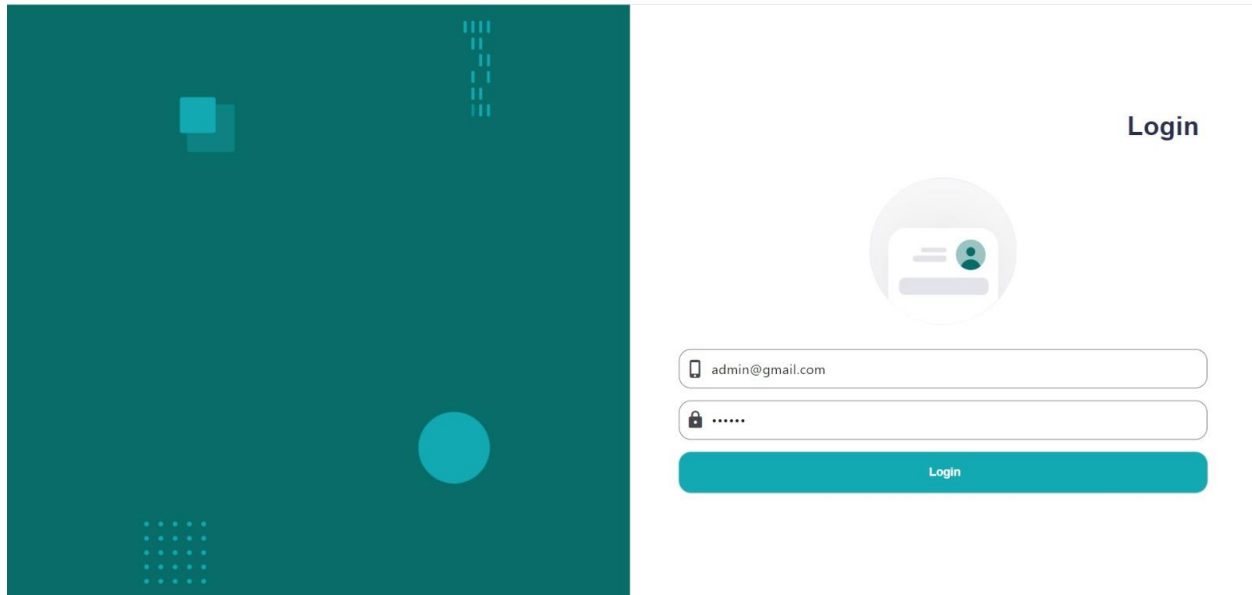


Figure 34 admin log in

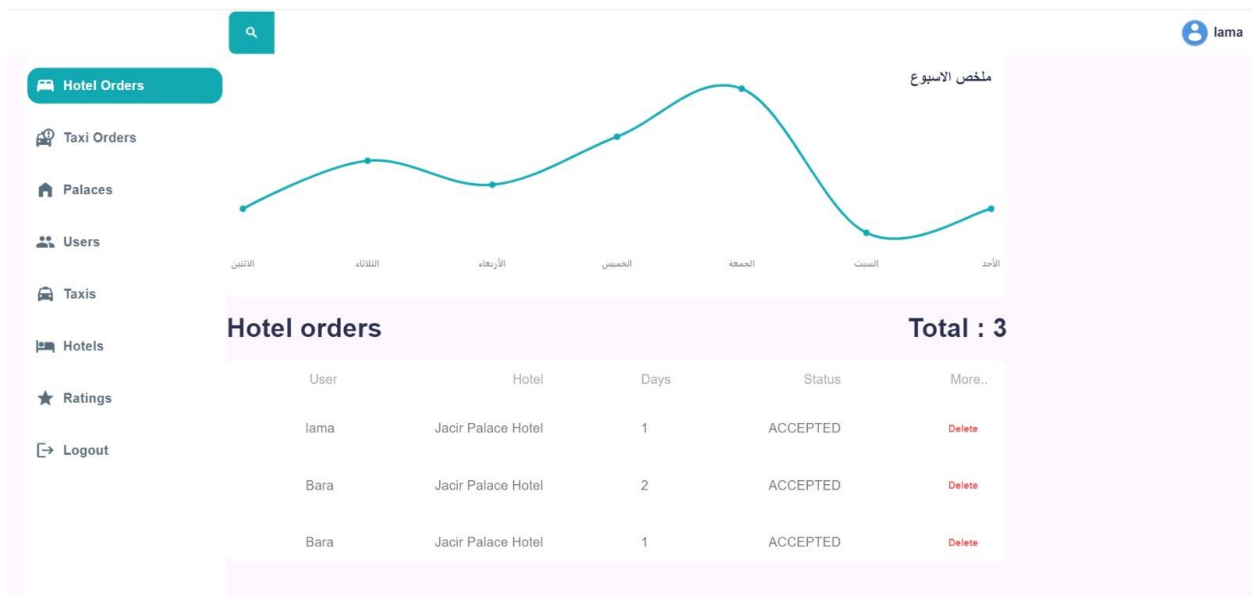


Figure 35 hotel order

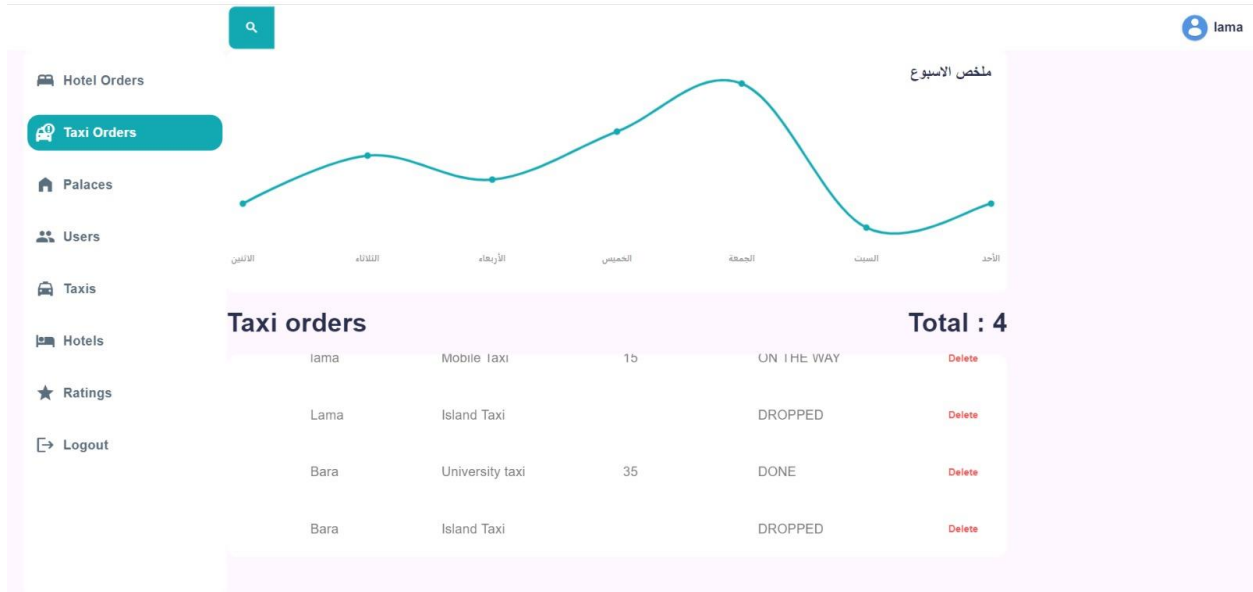


Figure 36 taxi orders

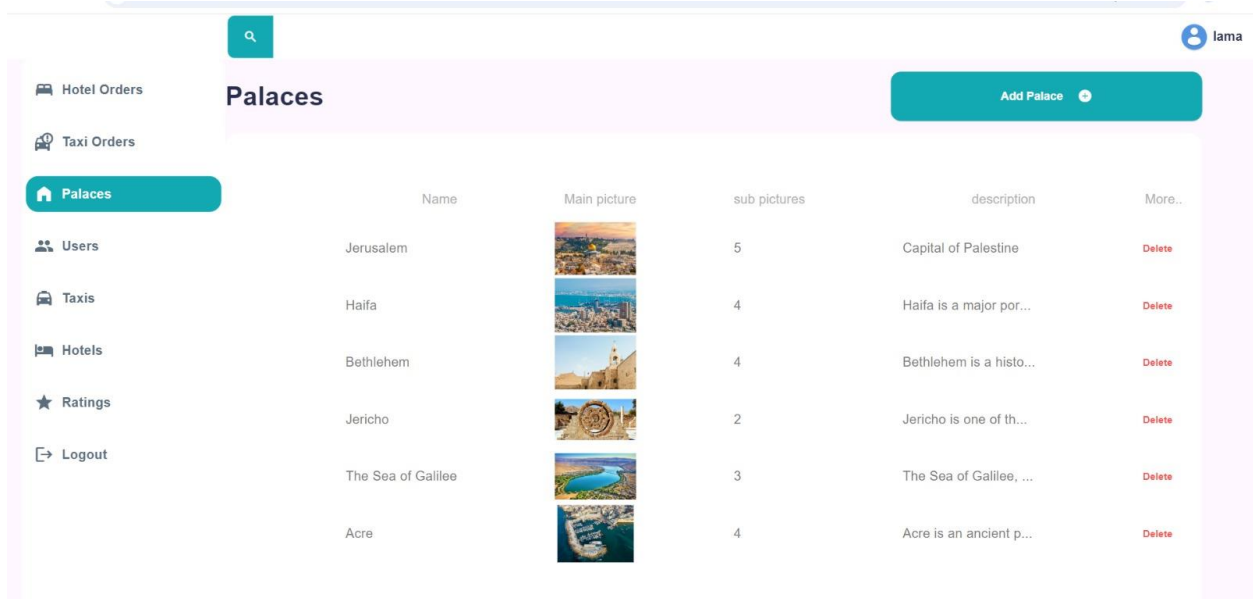


Figure 37 palaces

Name	Logo	email	phone	taxis taken	hotels t
lama		s12028355@stu.najah.edu	09999	1	1
Lama		LamaQaareeq@gmail.com	09878965	1	0
Bara		baraqawareeq@gmail.com	0592327744	2	2
wafaa		wafaaManal@gmail.com	099999	0	0
yafa		s12010800@stu.najah.edu	0345689	0	0
fadi		cgg70143@gmail.com	089997655	0	0

Figure 38 users

Logo	email	phone	orders taken	License	More..
	awrtani@gmail.com	0999	0	12	Delete
	Al-Titi Bridge Taxi@gmail.com	09888777	0	10	Delete
	Mobile@gmail.com	098667	1	15	Delete
	Island@gmail.com	0987666	2	16	Delete
	University@gmail.com	0987666	1	16	Delete
	Brothers@gmail.com	0999775	0	17	Delete

Figure 39 taxi's







Hotels						Add hotel +
Name	Logo	email	phone	orders taken		
Yasmeen		Yasmeen@gmail.com	09878965	0		
Millennium		Millennium@gmail.com	0986778	0		
Jacir Palace Hotel		Jacir@gmail.com	09888	14		
Golden Tree Hotelwebp		Golden@gmail.com	099886	0		
Crystal		Crystal@gmail.com	099886	0		
PORTO & ALMIRA BEACH		PORTO@gmail.com	099886	0		

Figure 40 hotels

Ratings	
<p>Jerusalem Capital of Palestine</p> <p>★★★★☆</p> <p>lama alice</p>	<p>Jerusalem Capital of Palestine</p> <p>★★★☆☆</p> <p>Bara ali</p>
<p>Acre is an ancient port city in northern Israel, known...</p> <p>★★★★☆</p> <p>wafaa Great place</p>	<p>Acre is an ancient port city in northern Israel, known...</p> <p>★★★★☆</p> <p>lama woodswell</p>
<p>Acre is an ancient port city in northern Israel, known...</p> <p>★★★★☆</p>	<p>Acre is an ancient port city in northern Israel, known...</p> <p>★★★☆☆</p>

Figure 41 ratings

Hotel screens :

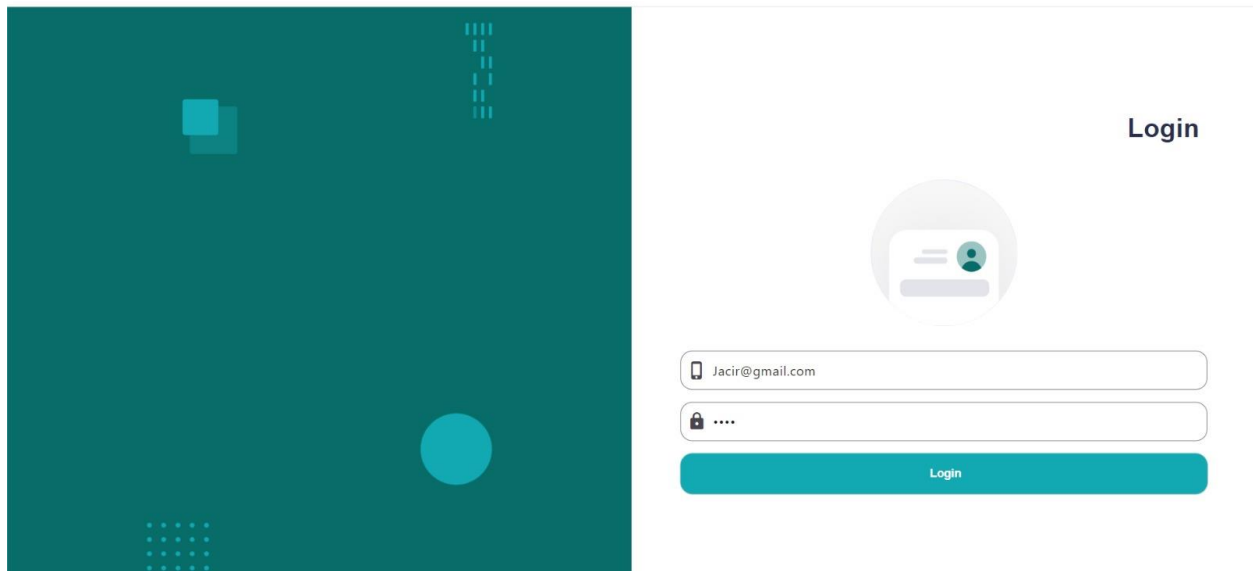


Figure 42 hotel log in

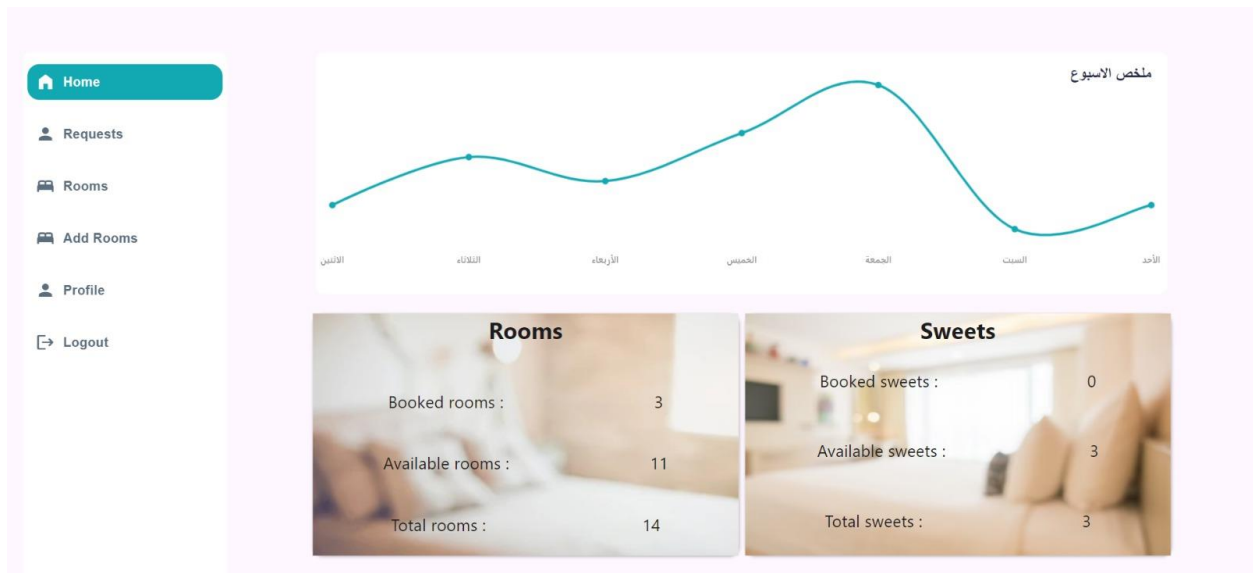


Figure 43 home page

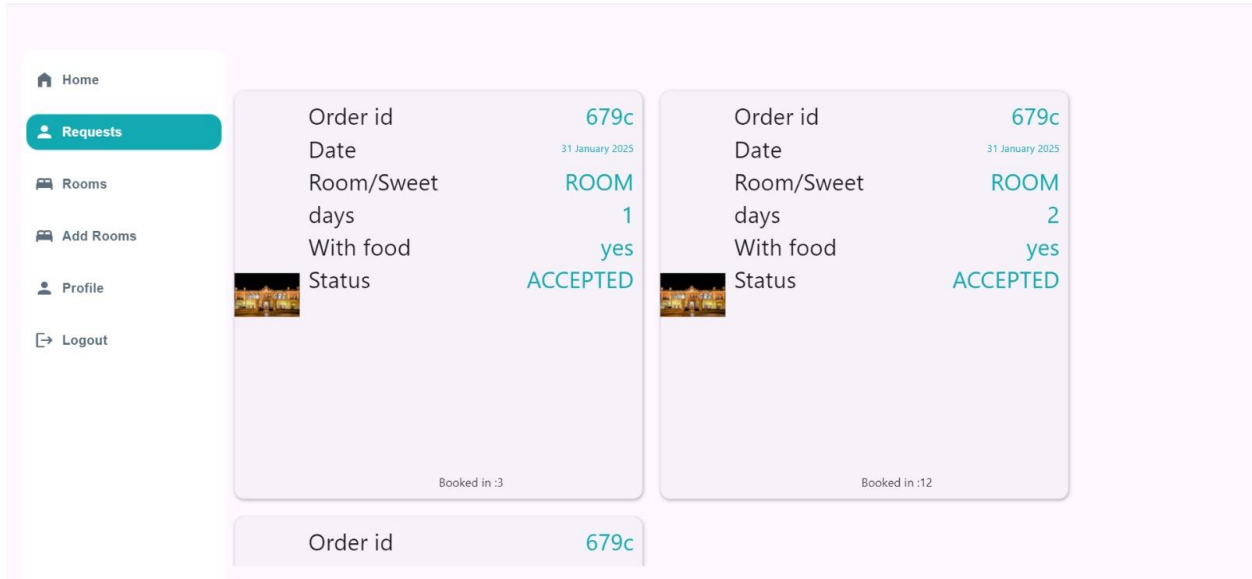


Figure 44 requests

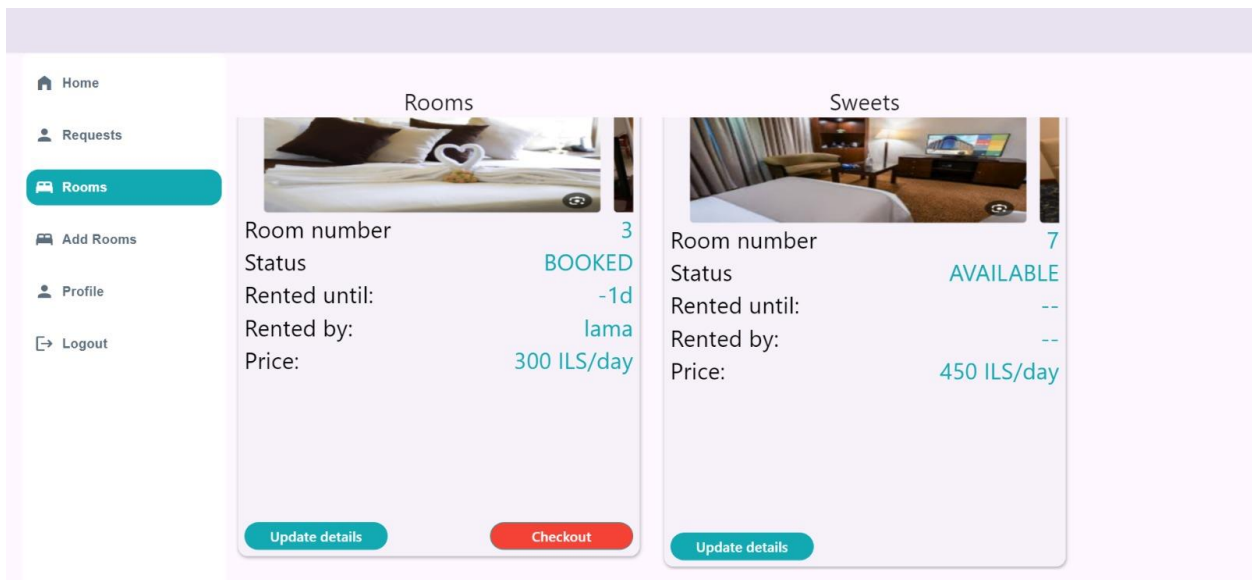


Figure 45 rooms

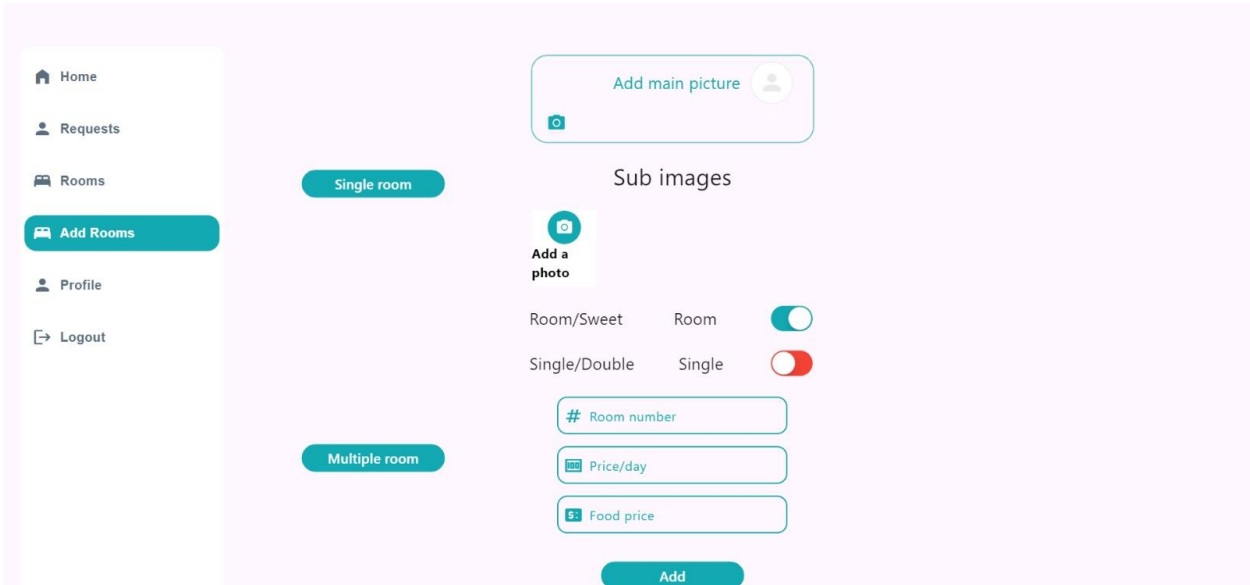


Figure 46 add rooms

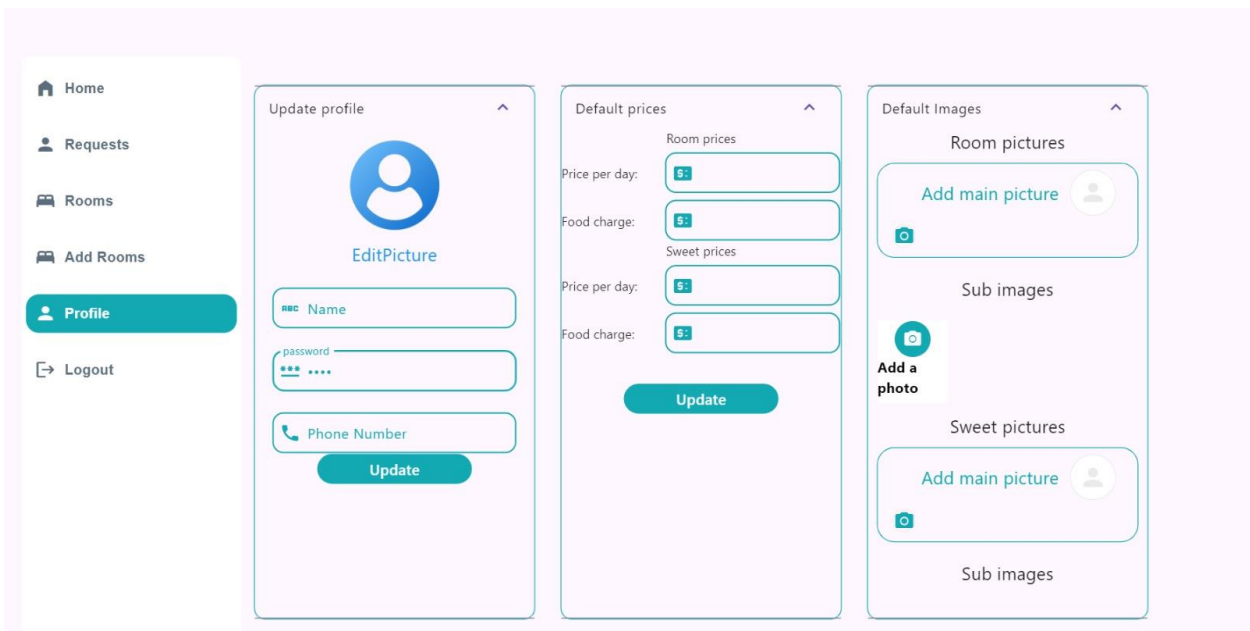


Figure 47 profile

5 Results

The application provides services to tourists from booking a hotel, specifying the number and type of rooms, and specifying with or without breakfast, and a taxi can be provided, as our application is equipped with a GPS system to track the tourist's movement during his travel; to show the hotels near him, and he can request a taxi based on the real world to manage taxi requests based on the tourist's current location, as the request is sent via the socket to the nearest available taxi, and in the event of no response within a certain time, the request is automatically sent to the second closest car, and in the event of no response again, it is sent to the third closest car, and so on until the request is successfully confirmed, where when the request is successful, the rest of the requests that have reached the taxis are automatically canceled. The application displays tourist places based on the highest user ratings, then the lowest and so on, and they are displayed on the map with the highest-rated comment for these places displayed on the map to facilitate decision-making. A secure payment feature was provided to users with a points collection system to create discounts for users, and thus the application succeeded in meeting most of the needs of tourists, in addition to the fact that the program is easy to operate and use. In this project, we learned many skills such as: mobile phone programming, and we learned how to cooperate as a team.

6 Discussion

Jawla is a comprehensive and effective system that helps tourists meet their basic needs during their travel, by enabling them to book hotels and taxis in addition to viewing the most important tourist sites in Palestine. The system also includes an easy-to-use payment method, which enhances the user experience.

In conclusion We were able to build the project successfully and it proved to be an effective tool to help and guide tourists without any problems in terms of functionality, performance or safety, and we also developed our ability to self-learn.

7 Conclusion

At the end of this project, we were able to develop an easy-to-use tourism application, to explore tourist places and book hotels and taxis effectively, using the Flutter framework and the Dart programming language.

TypeScript was used to keep the code organized and facilitate the process of maintaining and developing the code.

We used MongoDB to manage the database effectively.

The project has proven its ability to meet the needs of tourists by using the Global Positioning System (GPS) to track the tourist's location and display tourist sites and hotels and request a taxi according to his current location, as well as by displaying the most rated tourist places for tourists.

Future work: To improve the application in the future, we aspire to develop the application

1-Support browsing and navigation without an Internet connection: so that the tourist can access maps and information without the Internet. (keep alive service)

2-Add a currency converter.

3-Provide additional services such as: booking tourist activities .

8 References

[1] Flutter. (2023, 01 14). Flutter architectural overview. Retrieved from :
<https://docs.flutter.dev/resources/architectural-overview>

[1] Ts.ed. (2023, 01 13). Ts.ed overview. Retrieved from :
<https://tsed.io/getting-started/>