An-Najah National University

Faculty of Engineering and Information Technology

Computer Engineering Department

Software Graduation Project

Tareeq | طريق

By

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Acknowledgement

In the name of God, the most gracious, the most merciful Praise be to God, thanks to whom we have arrived here. First of all, praise be to God who gave us the passion, strength and knowledge to complete this project. Today we write with our hearts feeling pain over what happened to our homeland and to our people in Gaza, the West Bank, and all over the country. To the pure souls of our martyrs, to our prisoners who suffer in the prisons of the brutal occupation, to every speck of dust in our beloved homeland, which has been suffering for hundreds of years. We dedicate this great effort to every prisoner, wounded and martyr, and to every Palestinian in the homeland and the diaspora.

We would also like to take the opportunity to thank everyone who supported and helped us while working on this project. We would like to thank our supervisor, Dr. Ashraf Armoush. We would also like to thank all the professors of the Computer Engineering Department because they have always been supportive of us. Thanks to our families who have always been a source of our strength and stability to complete the project, and to our friends who filled us with their encouraging words.

Disclaimer:

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Table of Contents:

Table of Figures:

Abstract:

Checkpoints set up by the Israeli occupation army restrict the movement of Palestinians and expose them to various forms of ill-treatment, including search, arrest, and violence. In addition, settlers take advantage of the protection provided by soldiers to attack Palestinians and their property, leading to further unrest. Since the beginning of the war, permanent and temporary checkpoints have increased, exacerbating the challenges faced by Palestinians. Palestinians face difficulties in moving between cities and villages, and often find checkpoints closed without prior notice. To address this issue, many are turning to Telegram or WhatsApp groups to receive updates about road conditions. However, repetitive conversations in these groups can distract from essential information. Given this reality imposed on us as Palestinians, we thought of solving this problem through an application that facilitates the movement of citizens in the West Bank with the least time and effort, by keeping users constantly informed of checkpoint updates. This saves users wasted time and useless waiting. The app provides a map showing the locations of checkpoints with several options to achieve this goal, including the ability for users to select any checkpoint on the map and view the latest updates based on information from other users who have passed through that checkpoint, as well as an expected wait time. Given the exceptional circumstances resulting from the occupation and increasing pressures, the application allows reporting of temporary checkpoints, providing greater benefit for users to follow actual emergency events. Since these checkpoints are not permanent, the application also allows reporting of their removal so that users can be notified of necessary updates on the map. To ensure the reliability of the information, reporting the addition or removal of a temporary barrier is not considered correct unless the request is repeated before it is approved. The application also provides a space for inquiries among users, as it allows them to inquire about specific paths, and receive responses from other users based on their actual experiences. Conducted research on similar applications and found two, Waze, which was developed by people from the Israeli occupation, and Azmeh. To make our application stand out, we aimed to develop it with the Palestinian identity, to enable users to interact and inquire, and to facilitate access to current and urgent information in the fastest possible way.

Chapter 1: Introduction

1.1 STATEMENT OF PROBLEM:

The mobility of Palestinians in the West Bank is severely restricted by checkpoints established by the Israeli occupation army. These checkpoints not only impede free movement but also subject Palestinians to various forms of ill-treatment, including searches, arrests, and violence. The presence of settlers, who often attack Palestinians and their property under the protection of soldiers, exacerbates the situation. Since the onset of the current conflict, the number of permanent and temporary checkpoints has increased, making travel between cities and villages even more difficult. These checkpoints are often closed without prior notice, adding to the unpredictability and frustration faced by Palestinians. While some turn to Telegram and WhatsApp groups for updates on road conditions, the repetitive conversations in these groups can dilute essential information, leading to inefficiency and further delays.

1.2 PROJECT OBJECTIVE:

- **Facilitate Movement:** Develop an application that helps Palestinians navigate the West Bank with minimal time and effort by providing real-time updates on checkpoint statuses.
- **Enhance User Communication:** Create a platform for users to inquire about specific routes and receive responses based on actual experiences, fostering a community-driven support system.
- **Monitor Temporary Checkpoints:** Allow users to report the addition and removal of temporary checkpoints.
- **Credibility of Information:** The primary goal is to avoid false reports. Therefore, a report about the addition or removal of a temporary checkpoint is not accepted unless it is confirmed by multiple users.
- **Reduce Wait Times:** Provide expected wait times at various checkpoints to help users plan their journeys more efficiently and avoid unnecessary delays.
- **Ability to Inquire About the Best Route to a Specific Destination:** The platform is designed to enable users to help each other by suggesting the best routes to specific destinations based on their real experiences. As Palestinians, we do not choose the shortest route in terms of distance, but rather the easiest route in terms of time, avoiding hassles and checkpoints.

1.3 PROJECT SCOPE:

The project will encompass the following:

- **Development of a Mobile Application:** A user-friendly interface for Android and iOS devices that displays a map of the West Bank with real-time checkpoint information, including markers representing checkpoint locations.
- **User Reporting System:** A mechanism for users to report the status of checkpoints, including new temporary checkpoints and their removal, with a verification process to ensure data accuracy.
- **Continuous Updates with Media Attachments:** Users can continuously update the status of checkpoints and attach photos, providing more detailed and accurate information.
- **Automated Wait Time Calculations:** The application will automatically calculate and display the expected wait times at various checkpoints as users pass through them, without requiring manual input.
- **Checkpoint Status Updates:** Continuous updates on the status of permanent and temporary checkpoints, ensuring the map reflects the most current and accurate road conditions.
- **Inquiry and Response Feature:** A space for users to ask questions about specific routes and receive responses from the community based on their actual experiences.
- **Notification System:** Alerts to notify users when someone responds to their route inquiry or live question about the status of a specific checkpoint, helping them avoid delays and reroute as necessary.

1.4 PROJECT IMPORTANCE:

The application addresses a critical need for Palestinians living under occupation, offering several significant benefits:

- **Improved Mobility:** By providing up-to-date information on checkpoint statuses, the application helps reduce travel time and uncertainty, making it easier for Palestinians to move between cities and villages.
- **Safety and Efficiency:** Real-time updates and reliable information help users avoid dangerous or heavily congested checkpoints, enhancing their safety and travel efficiency.
- **Community Support:** The inquiry and response feature fosters a sense of community, enabling users to share their experiences and support one another.
- **Reduction of Stress and Frustration:** Knowing the status of checkpoints in advance reduces the stress and frustration associated with unexpected delays and closures.
- **Adaptation to Changing Conditions:** The ability to report temporary checkpoints and their removal ensures the application remains relevant and useful in the ever-changing landscape of the West Bank.

1.5 ORGANIZATION:

This report highlights the process of the research and the practical side of creating "Tareeq App". Therefore, the report will consist of the following parts, which are:

- **Chapter 1**: is the introduction chapter It states the importance of the project, the objectives, the Scope of the project, and its importance.
- **Chapter 2:** is the literature review, projects, and articles from around the world will be further investigated to learn more about how this project was implemented what was their recommendations, and what enhancement features can be added.
- **Chapter 3:** is the methodology chapter, which outlines what was followed to create the system, and it discuss the constraints and limitation faced by the project.
- **Chapter 4:** is the result and discussion, it investigates the final result of the project and what was the outcome.
- **Chapter 5:** is the conclusion and recommendation, it highlight the conclusion of the project and suggest recommendation for any further research and projects.

Chapter 2: Literature Review

Navigation in the West Bank is fraught with challenges due to numerous military checkpoints that restrict movement and expose Palestinians to delays and potential harassment. Therefore, many applications have been developed in the world to address similar issues related to road conditions in general, and the condition of checkpoints in particular.

This literature review contains existing applications that give real-time updates on road conditions and navigation obstacles, focusing on their features, methodologies, and user engagement strategies. By studying these applications, we aim to identify best practices and areas for improvement that can help develop our own application tailored to the unique circumstances of the West Bank and for Palestinian people.

2.1. WAZE: REAL-TIME TRAFFIC AND ROAD INFORMATION [1]

Waze is a popular navigation application developed by an Israeli company, based on the data that users enter to know the status of the roads. It also enables users to report traffic congestion or accidents. The goal of the Waze application is to show general traffic status. Because it was developed by the Israeli occupation developers, it provides useless information to the Palestinian because it considers the Palestinian areas in which the Palestinian people live to be dangerous areas and that the areas they occupied and settled illegally are safe areas, which is not the case for the Palestinian. Because in Palestine, when you want to go to any path, the traffic crisis is not only what you want to know, but what is most important is knowing the status of the checkpoints and which of them can be passed through. Our application is specific to the checkpoints and harassment that our Palestinian people go through, as our application will focus on the locations The checkpoints show the traffic situation and the expected waiting time, which helps in facing the difficult, unique and unexpected challenges of the Palestinians.

2.2. AZMEH: REAL-TIME TRAFFIC CONDITIONS AT MILITARY CHECKPOINTS [2]

It is an application developed by Palestinian volunteers. Its primary goal is to show the status of checkpoints. It allows Palestinians to know whether the Israeli checkpoints across the West Bank are experiencing crowding or closures.

This is done by allowing users to publish an update about checkpoint status. The goal of our application is similar to the “Azmeh” application, as the common goal goes beyond simply knowing the daily rush hour, to touch the heart of the suffering of every Palestinian on whom this reality was imposed.

Our “Tareeq” application provides, in addition to the status of checkpoints, the expected time to wait at this checkpoint automatically without the need to enter information from the user, unlike the “Azmeh” application, which only provides information based on user updates, in addition to that our application provides a map that shows checkpoint locations with the ability to inquire about specific paths and immediate inquiries about the status of a specific checkpoint while giving other users the opportunity to participate and help with their actual and real experiences,

thus increasing the solidarity of the Palestinian community in order to face the challenges imposed on us.

Chapter 3: Methodology

3.1. TOOLS, TECHNOLGIES, ARCHITECTURE, AND PROGRAMMING LANGAUGE

3.1.1. TOOLS

In order to complete this project in the best way, we used a set of tools that helped us complete this project in the correct way.

- **Visual Studio Code:** We use it as our primary integrated development environment (IDE) for programming, editing, and debugging purposes, for both front-end and back-end code. [3]
- **Android Studio:** It is used as an emulator to simulate and test the mobile application and how it works in reality. [4]
- **XAMPP:** Used for local development and testing of server-side applications, including a MySQL database to manage and store main application data. [5]
- **Postman:** we use it to test different APIs to ensure the reliability of our application by serving different HTTP requests and responses. [6]
- **GitHub:** To facilitate code sharing, saving, collaboration and version control, allowing organized work and effective tracking of code modifications. [7]
- **Google Cloud:** It is used for cloud storage to save image data, instead of saving it in the main database in order to avoid the high pressure resulting from storing images, and to provide reliable and scalable storage solutions. [8]
- **Firebase:** Implemented real-time notifications, ensuring users get timely updates. [9]
- **Google Maps:** Integrated to display checkpoint locations and provide navigation, tracking features within the app. [10]

3.1.2. ARCHITECTURE OVERVIEW

The architecture of this project is structured around the Model-View-Controller (MVC) pattern, complemented by a layered approach that enhances modularity and scalability. In the backend, the application is organized into distinct layers: models, routers, and controllers. **Models** define the data schema and business logic, ensuring robust data management and integrity. **Routers** handle incoming requests and direct them to appropriate **controllers**, which orchestrate interactions between models and views. This separation of concerns facilitates efficient request handling and promotes code reusability. On the frontend, views are composed using modern frameworks to deliver a dynamic user experience, while API services abstract backend interactions. This architecture not only

supports the separation of business logic, presentation, and data access but also enhances maintainability and enables seamless integration of new features.

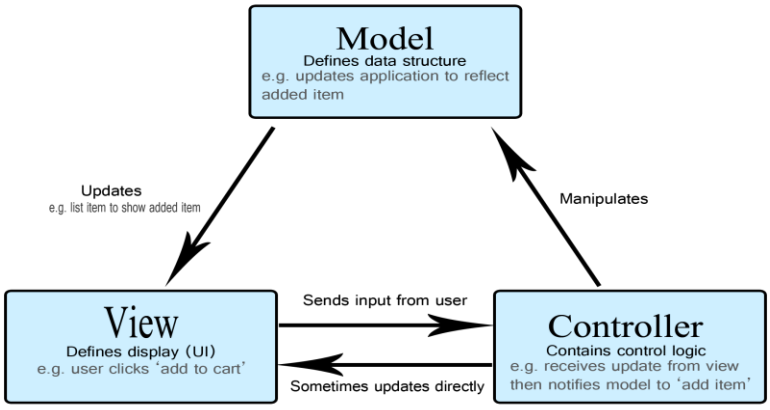


Figure 1Model–view–controller

3.1.3. PROGRAMMING LANGAUGE:

3.1.3.1 Frontend Framework:

- Flutter: We used the filter to develop the front-end of this project, for both mobile and web.
  We chose the flutter because it is capable of creating multi-platform, high-performance applications without relying on web display methods. The flutter uses its own display engine to ensure coordinated interfaces across different platforms. It also facilitates the possibility of converting the project to fit screens of different sizes, such as mobile and web.
- Dart programming language: The flutter uses Dart as its programming language, which was developed by Google. This language is considered suitable for developing mobile and web applications due to its power, object-oriented principles, and asynchronous programming features.

3.1.3.2 Backend Development:

- Node.js with Express.js: In order to develop the backend for this project, we used Node.js, for the many benefits it provides and ease of use, as it is similar to JavaScript. It is also considered better in terms of performance compared to traditional languages such as PHP in dealing with asynchronous operations, so make the response times be faster.
- Express.js Framework: is a simple web framework, which built on top of Node.js. it is providing essential features for develop web applications and powerful APIs, and It make the process simple for handling of HTTP requests and responses, provides

efficient routing mechanisms for orchestrating application endpoints, and facilitates middleware integration to enhance resiliency.

- Middleware support: we use middleware components in Express.js to deal and handle tasks such as implementing additional functionality during request processing, and parsing HTTP request structures. This middleware architecture enhances code organization and maintainability, and reduces boilerplate code.

3.1.3.3 Database Administration:

We use in this project MySQL with Sequelize, MySQL was chosen because we have relational data and MySQL was relational database management system, and Sequelize was used as an ORM (Object Relational Mapping) tool, to facilitate interactions with the database.

- MySQL Database: we use it for its performance, reliability, and scalability in working with relational data. It provides robust support for SQL queries and transactions, ensuring data integrity and reliability.
- SQL Queries and Transactions: Sequelize allows an application to transactions, and execute SQL queries in efficient way. Taking advantage of MySQL's capabilities to manipulate, retrieve, and analyze complex data.
- Schema management: Sequelize makes it easy to seamlessly manage schema, including data modeling, data migration, and schema synchronization with the application data model. This ensures that the database schema evolves consistently with changes in application requirements.
- Integration with Node.js: By integrating with Node.js, Sequelize is well compatible with the asynchronous and event-driven architecture of Node.js, resulting in improved performance and scalability of server-side applications.

3.2. DATABASE IMPLEMENTAION

3.2.1. ENTITY RELATIONSHIP (ER) DIAGRAM

In the Tareeq application, we need to store a lot of relational data. We built databases, tables, and relationships based on the project requirements. In addition, storing images in the project is done by storing them in Google Cloud and storing the link only in the main database, which leads to reducing pressure on the database.

The ER diagram visually represents the database schema, depicting relationships and constraints between tables. as in Figure ##. This diagram effectively displays the underlying data model, detailing tables, columns, data types, and their interconnections, providing a comprehensive overview of the database structure.

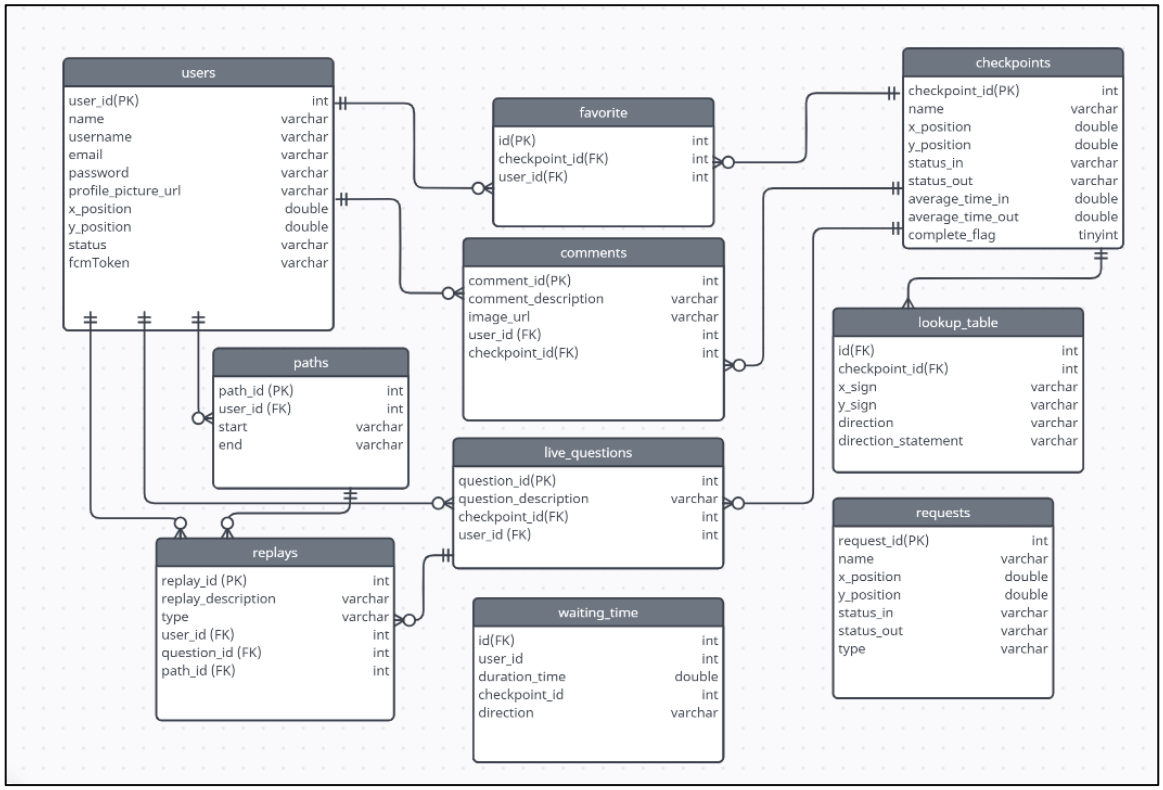


Figure 2 ER diagram

3.3. FEATURES IMPLEMENTATION

3.3.1. MOBILE APPLICATION

The primary goal of our “Tareeq” application is to make it easier for citizens to follow the conditions of checkpoints anywhere and easily, and since the mobile phone is the easiest for people to use, the Tareeq application was developed to be a mobile application, so that users can use the application easily and anywhere, in accordance with the goal of the application.

In addition, the application provides the ability to use it via the web, as we will mention later.

In our application there are two types of users, the user who uses the application in order to know the conditions of the checkpoints and use the features available in the application, and the second user is the administrator. We will start with the user, then the administrator.

3.3.1.1 Use “Tareeq” as a USER:

- Welcome Page & Authentication Pages

Initially, when opening the application, a welcome page will appear, and by clicking on “**ابدأ**”, the user will be taken to the login page.

The user has two possibilities: Either this is the first time he enters the application and he does not have an account, and in this case, he needs to create an account, by clicking on “**إنشاء حساب**” to move to the page for creating a new account, or if he previously had an account, and he wants to log in using it, he can do that in the login page.

Figure 3 welcom pge

Figure 4 Login & signup page

In order to create a new account, we need some information, and if there are any errors, the application will alert the user.

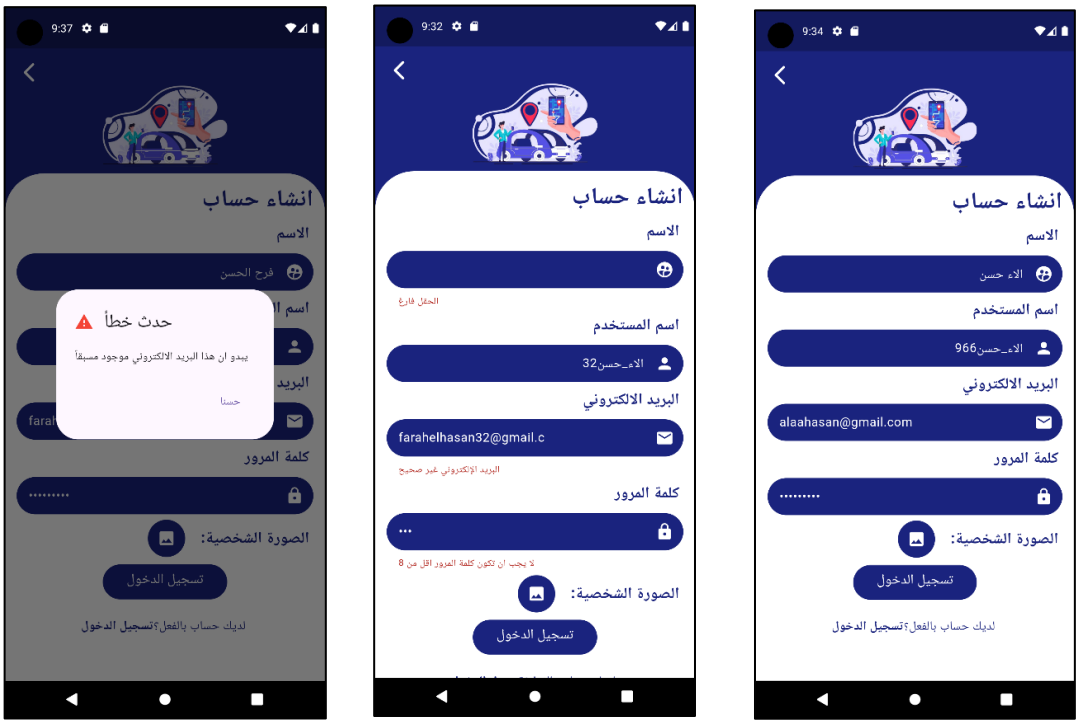


Figure 5 creat new account

Also to access the application, the information must be correct, and if there are any errors, the application will alert the user.

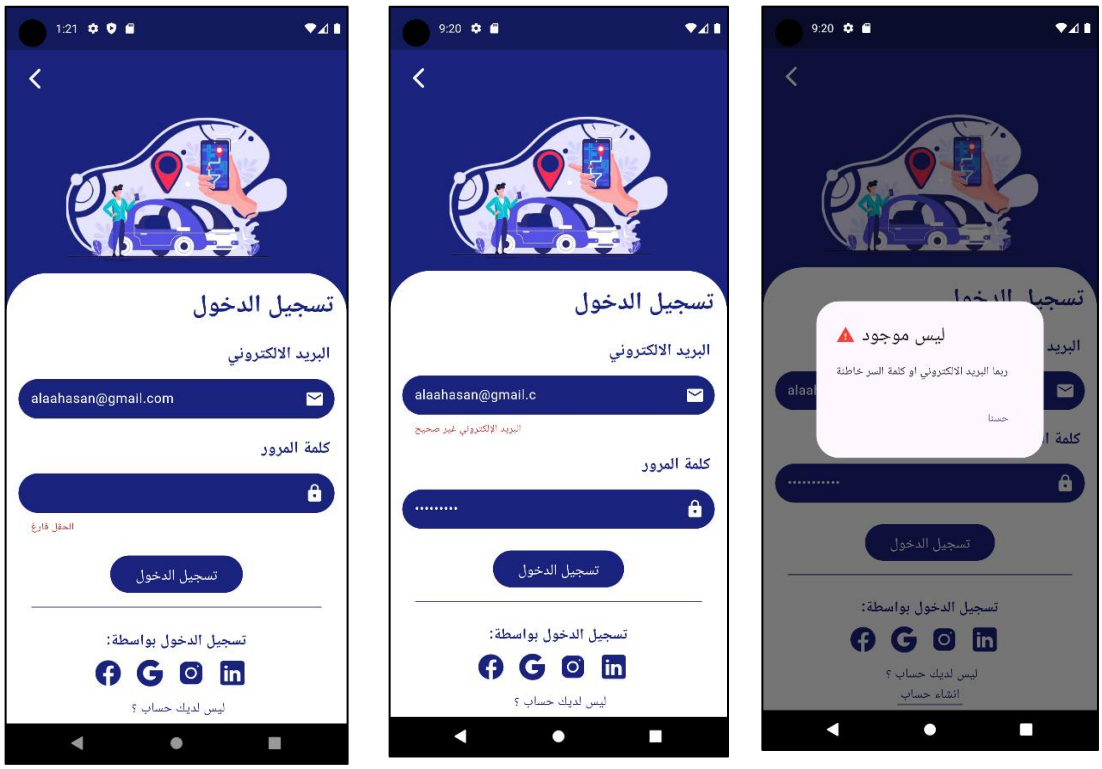


Figure 6 Login as a user

- Home Page (Map Page)

After creating an account and logging in using it, the application will ask the user to allow him to activate the device's location.

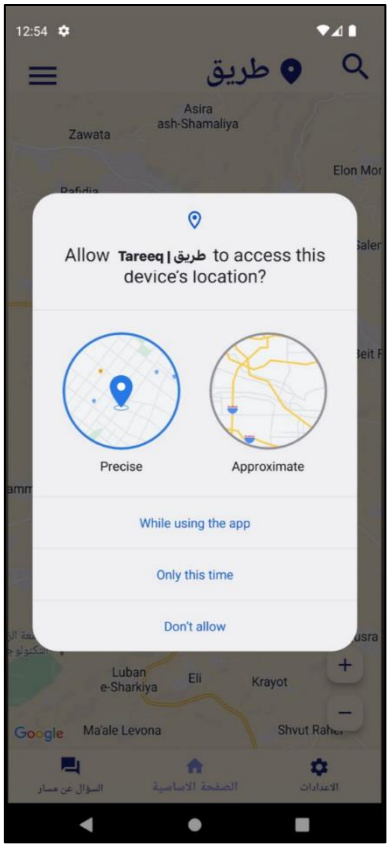


Figure 7 Location Service Enabled

After approval, the home page will appear to the user, which is a map on which there are markers based on the locations of the checkpoints, along with their name, in addition to several buttons.

(Red Marker is represent the user location)

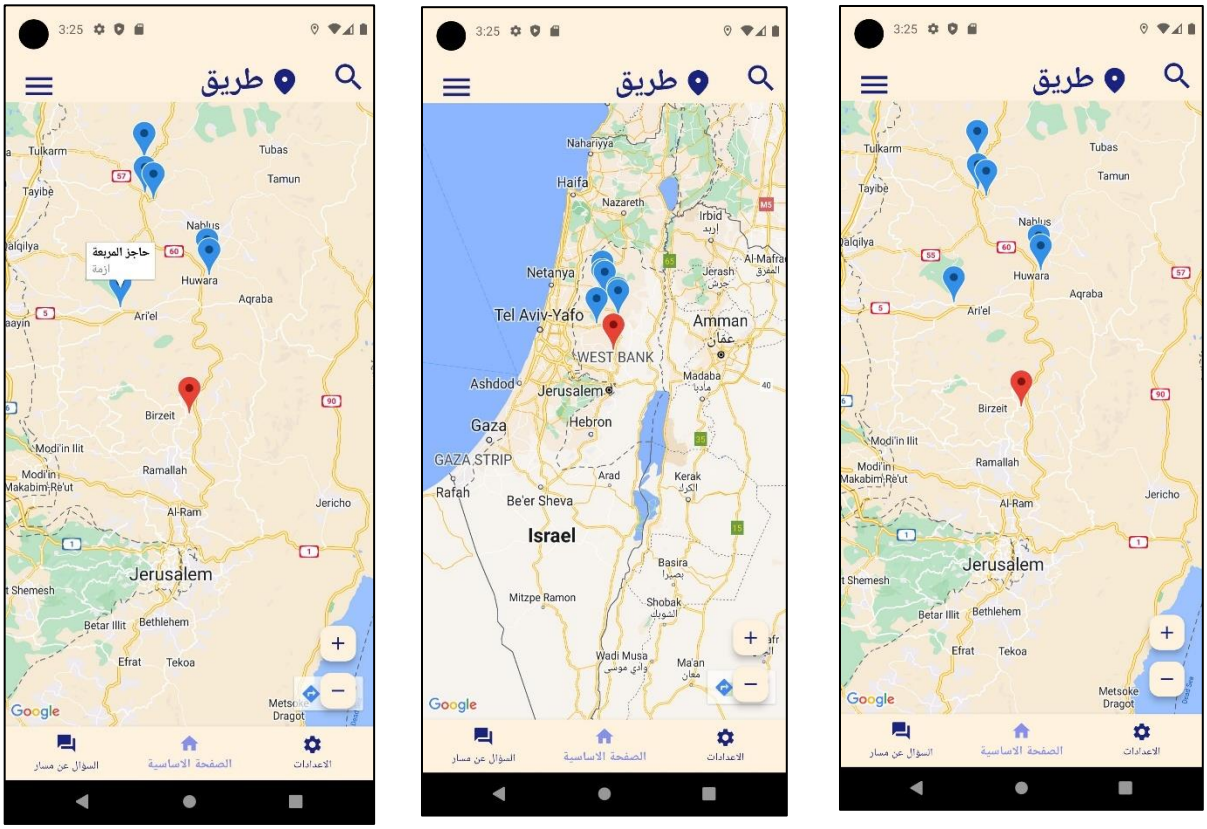


Figure 8 Mappage with markers for checkpoints

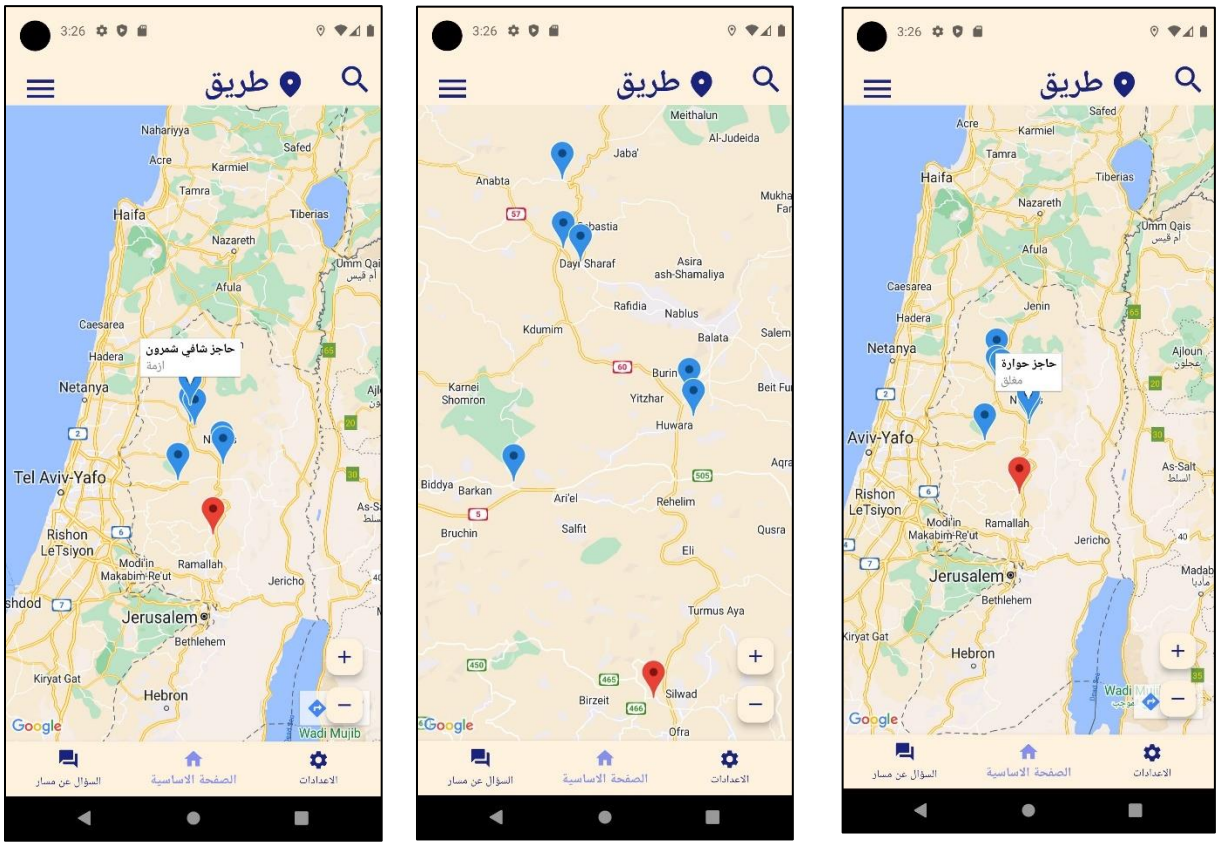


Figure 9 Infowindow for some checkpoints

The home page contains several sections:

1. The first section is the bottom section, which contains three taps
   If we press the right button"الإعدادات ", we will go to settings.
   The button in the middle "الصفحة الرئيسية" takes us back to the home page
   The button on the left "استفسار عن مسار" will take you to the route inquiry page
2. As for the upper section, we have two things. The drawer on the left if you click on it, we will see a list through which you can go to several pages, and the search icon, which allow users to search about checkpoints.
3. The last section on the home page is the map section with the locations of the checkpoints, and two button, zoom-in and zoom-out. When you click on any of the checkpoint's marker, we go to the "checkpoint Information" page.

- Settings Page

On the settings page, the application settings appear and enable the user to go to his personal account with the ability to modify his information.

Figure 10 Setting page

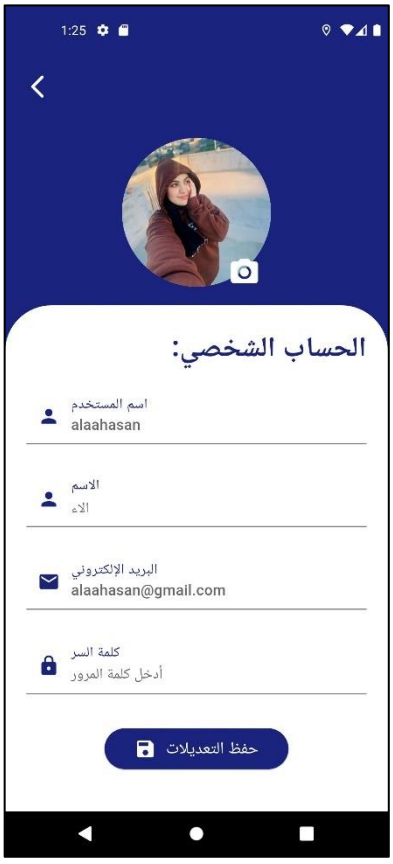


Figure 11 Profile page

- Route Inquiry Page

The user can inquire about a specific route that includes the starting and ending points, and allow other users to share their actual experiences and respond to inquiries.

Figure 13 Live question for checpoint

Figure 12 Add replay for questions

When any users replay on a question, the notification will receive to the user who create the question.

Figure 13 show notification when replay for the user who create the path question.

- Checkpoint Information Page

This page contains three tabs, the first displays the basic checkpoint information: the name of the checkpoint, the status of the checkpoint, and the expected time to wait in both directions, in and out. With the possibility of placing this checkpoint as favorites.

This information is obtained from the users' actual experience and without the need for them to enter any information. Rather, this information is taken every time the user passes through the checkpoint, so that the Tareeq application keeps checking the user's location along with the locations of the checkpoint, and when the user is heading towards the checkpoint and the distance become between the user and the checkpoint 1km, the timer starts, and when the user reaches the checkpoint and crosses it, the timer stops and stores the waiting time. Before displaying it in the application, an average calculation is made of the waiting times from a quarter of an hour from the last update, and then it is shown on the checkpoint information page. The status of the checkpoint is also determined based on the expected waiting time.

The checkpoint status was determined based on the expected waiting time as follows:

We assumed that cars drive at medium to slow speeds when approaching the checkpoint, so we considered that the speed of the car is approximately 60, 30 km/h or less, approximately, given that there is no crisis and the car is moving without stopping, so a distance of 1 km may take a minute or two. Or a little more, considering that the speed will not remain constant. Therefore, we assumed the following:

If the expected waiting time is 5 minutes or less, the checkpoint status is considered "the road is clear | سالكة".

From 5-15 minutes, the state of the checkpoint is considered "slow walking | سير بطيء".

From 15-30 minutes, the state of the checkpoint is considered a "crisis | أزمة".

For 30 minutes or more, the state of the checkpoint is considered a "suffocating crisis | أزمة خانقة".

The waiting time for any direction at the checkpoint is determined by using the Lookup Table, so that when you want to move towards a certain checkpoint towards entering the city of Nablus, for example (and here the direction is considered an "in"), the coordinate readings on the map follow a specific path, either increasing or decreasing. This information is saved in the Lookup Table, and through it, the application can determine the path that the current user is taking, whether it is the direction of "in" or "out". It is stored in the Lookup Table that the "in" path for this particular checkpoint has the coordinates increasing or decreasing. When measure the waiting time for a specific user The look-up table is reviewed to determine the path from which this reading was taken, in which direction ("in" or "out"), and then the waiting time is recorded and the calculation process is completed to determine the expected average time to wait at this checkpoint in the direction of "in" or "out".

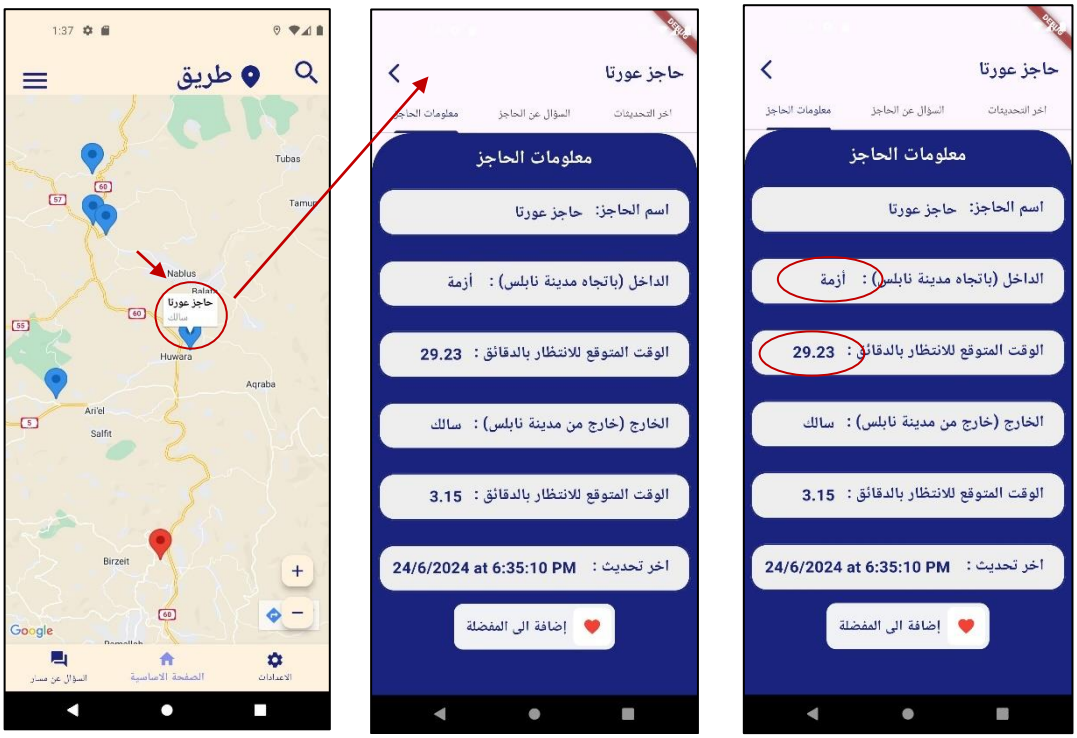


Figure 14 checkpoint information page

If the user moves in a specific path, the waiting time is measured, and then the average time for this new reading is calculated with the last readings of a quarter of an hour, and then the checkpoint expected waiting time is updated. Depending on the time, the status of the checkpoint is also updated.

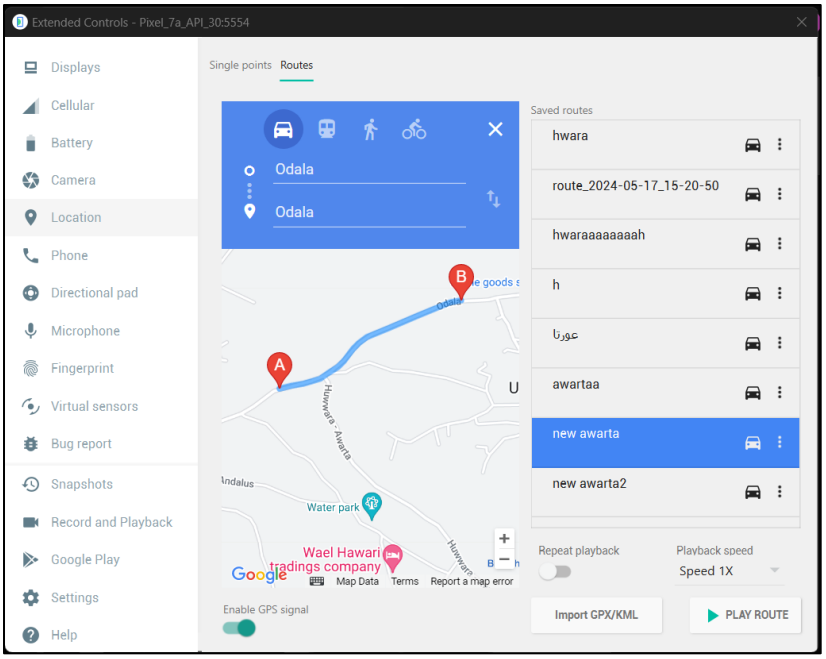


Figure 15 Route for path that pass from one of the checkpoint

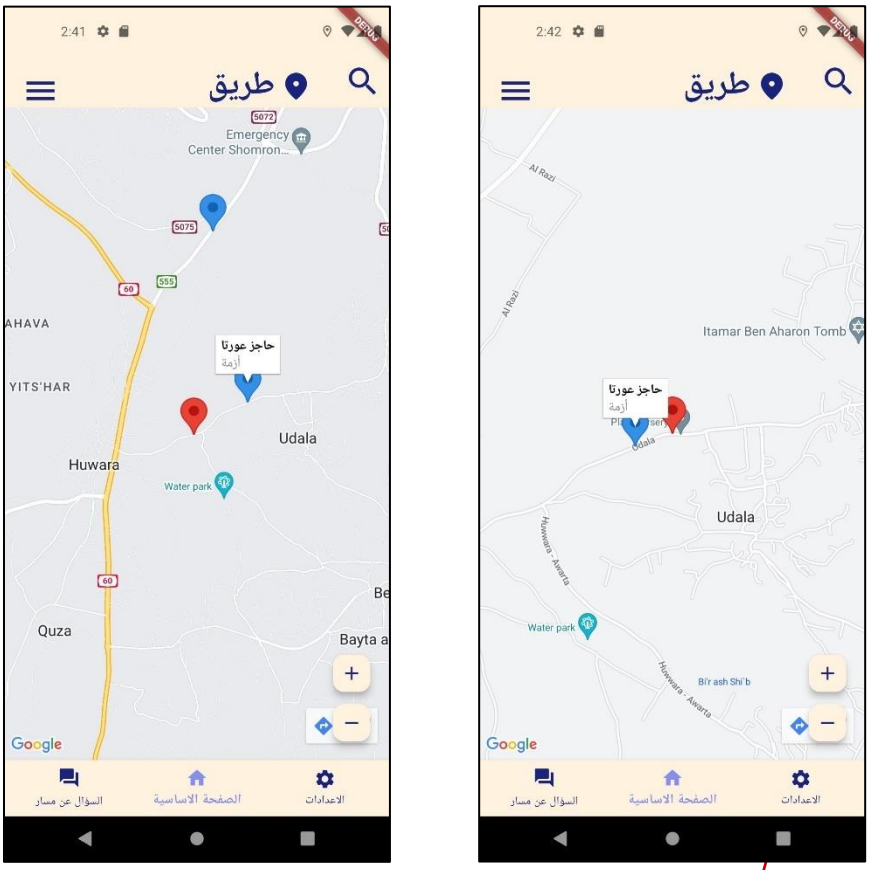


Figure 16 The marker for our position change

Figure 17 The status of the checkpoint after calculate the average time by our application

The second tab is where users can directly inquire about the checkpoint (if it was last updated a long time ago), and users can reply and comment on the question.

The user who posts a question can delete or edit it, and the other users can also delete or edit their comment in the post

When any users comment on a post, the notification will receive to the user who create the question.

Figure 19 add question about checkpoint

Figure 18 Edit question

Figure 20 Delete question

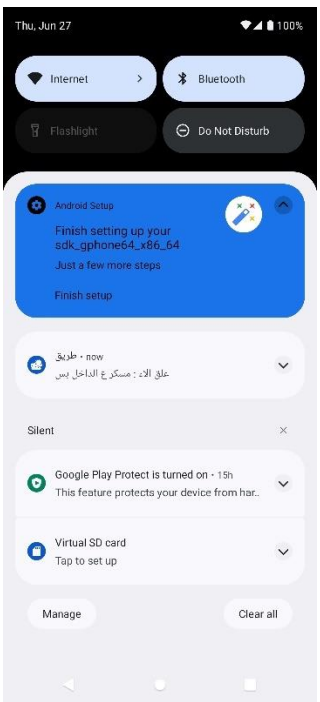


Figure 21 show notification when replay for the user who create the live question.

The last tab gives users a space to share their actual experiences when they pass through the checkpoint, so they can know other information in addition to the information in the first tab with the ability to add a photo to make their experience more reliable for other users, and this photo will store in cloud.

When any user adds a comment to a particular checkpoint, the notification will reach all users who have set that checkpoint as a favorite.

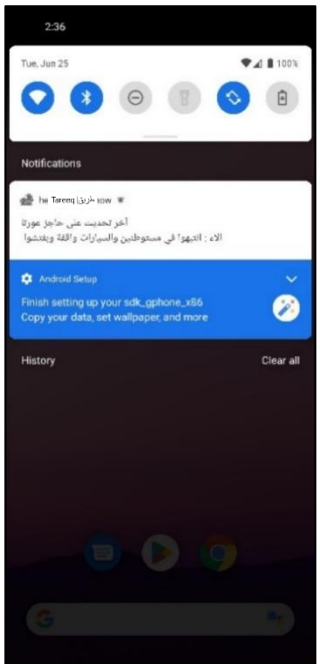


Figure 22 Add comments with images for specific checkpoint

Figure 21 show notification for the checkpoint that you add it as favourite

Figure 23 edit comments for specific checkpoint

Figure 24 Delete comments for specific checkpoint

- Drawer (list on the left of home page)

It was designed to make it easy for the user to access most of the features in the project. It contains several buttons:

1. About The Application:

When we click on it, we go to a page that shows information about the application and its developers.

Figure 25 Drawer in the user side

Figure 26 About Tareeq|طريق

2. Go To Home Page:

It takes us back to the home page.

3. Account Information:

Through it, the user can view his personal information (profile).

He can also modify his personal information and change the photo.

4. Inquiry About a Route:

It takes us to a route inquiry page, where on this page users are able to inquire about the best route to go from a specific point to another specific point, and here we do not mean the shortest distance, but rather the best route based on the checkpoint and their

condition. By benefiting from the actual experiences of other users, they can respond and advise the user which path he should take to reach it in the easiest way.

5. Evaluation: Through it, the user can evaluate his experience in using the Tareeq application.

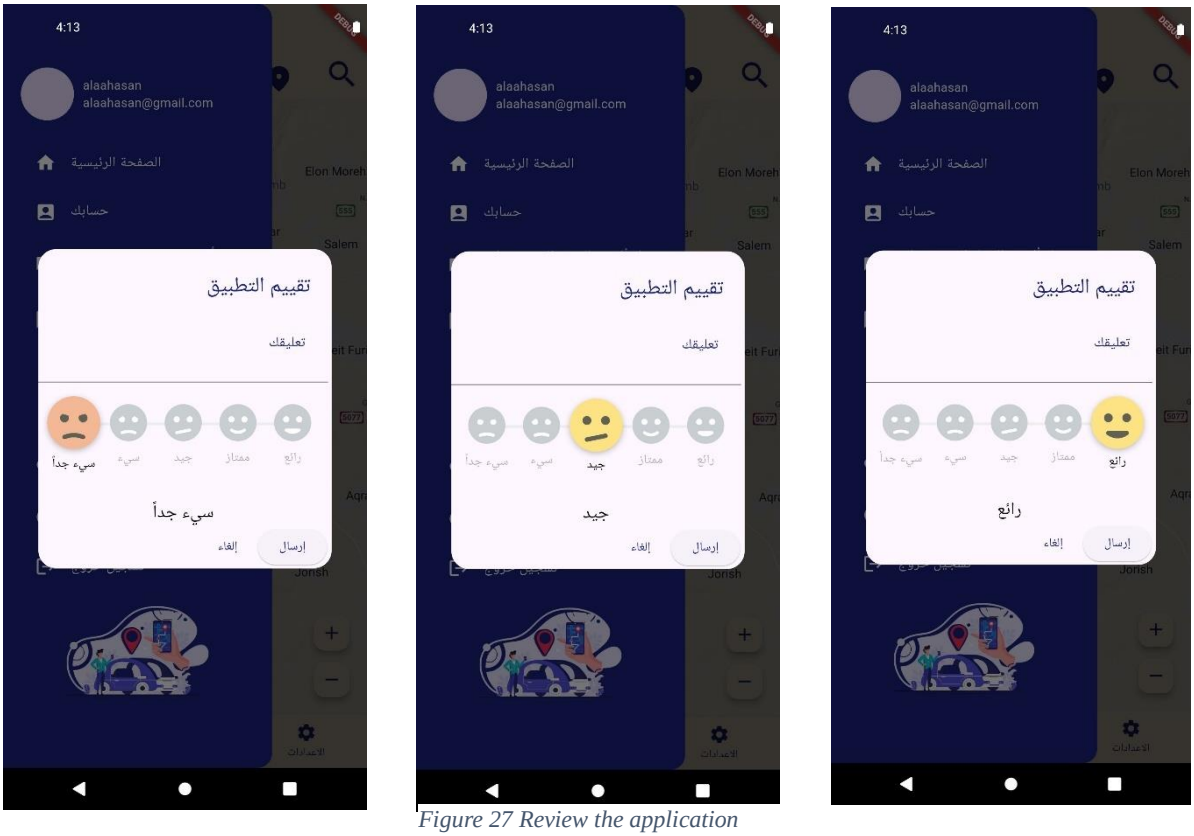


Figure 27 Review the application

And also, the user can search.

Figure 29 Search about checkpoint that you want it from the map

Figure 28 Filter Search

6. Add a Temporary Checkpoint:

The application allows users to add temporary checkpoints to make the application more effective. The user enters the name of the checkpoint and the location is taken according to the location in which it is located. This is for the sake of credibility. You must be at the checkpoint to report, and a report is not accepted from a single user. Rather, he must come. At least two reports at the same checkpoint to be accepted and shown on the map.

7. Removing a Temporary Checkpoint:

Because these checkpoints are temporary, the application also provides the possibility of reporting if the checkpoint is removed, and also at least two reports must come.

Figure 30 Add Temporary checkpoint

Figure 31 Remove Temporary checkpoint

8. Go To Favorites:

Through it, the user can see his favorite checkpoint.

If we click on any checkpoint from the list, we go to the information for this checkpoint.

9. Sign Out:

When the user wants to sign out.

Figure 32 Favourite checkpoints

Figure 33 After click at any checkpoint

3.3.1.2 Use “Tareeq” as an ADMIN:

- Home Page

While you are an administrator in the Tareeq application, you can see and do several things. After logging in through your account to the application as an administrator, the admin will see the main page, which is three tabs from the top.

The first tab:

it shows a list of the names of checkpoint added to the application. With the possibility of deleting it, and when we click on any checkpoint, we will go to the information page for this checkpoint with the possibility of modifying it. Also, the Complete checkpoint Information button may appear for the names of some temporary checkpoint that have been added by users. When you click on it, the admin will go to a page in order to complete the information about determining directions to the checkpoint. Adding a temporary checkpoint by users is done without the admin’s approval, but rather automatically (but according to the conditions of at least two reports on the same barrier). Once a temporary checkpoint is added, the barrier becomes available on the map and is available for users to add the latest updates to it from their experiences or inquire about anything they want about this checkpoint, but in order for the checkpoint to be able to activate the feature of calculating the expected time of waiting in both directions, "in" and "out", it requires the admin to specify directions according to the coordinates on the map so that the application can then calculate the expected time of waiting in both lanes correctly and effectively (add information to lookup table).

Figure 35 Admin page

Figure 34 List of checkpoints

Figure 36 Update the information about checkpoint

Figure 38 Succes update

Figure 37 Complete the inforamtion about the temporary checkpoint

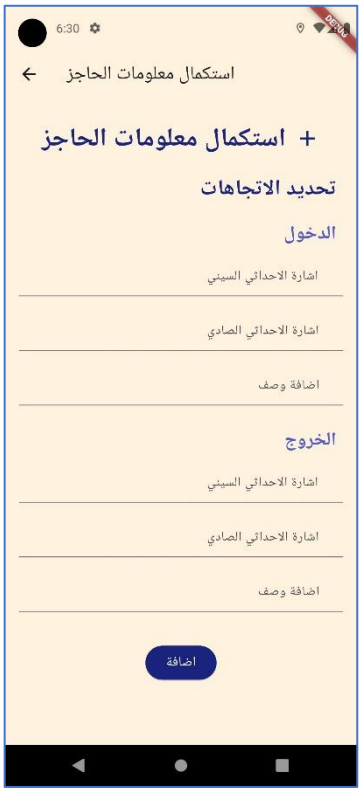


Figure 39 Complete information page

The second tab:

It shows these checkpoints on the map with markers, with ability to search about specific checkpoint.

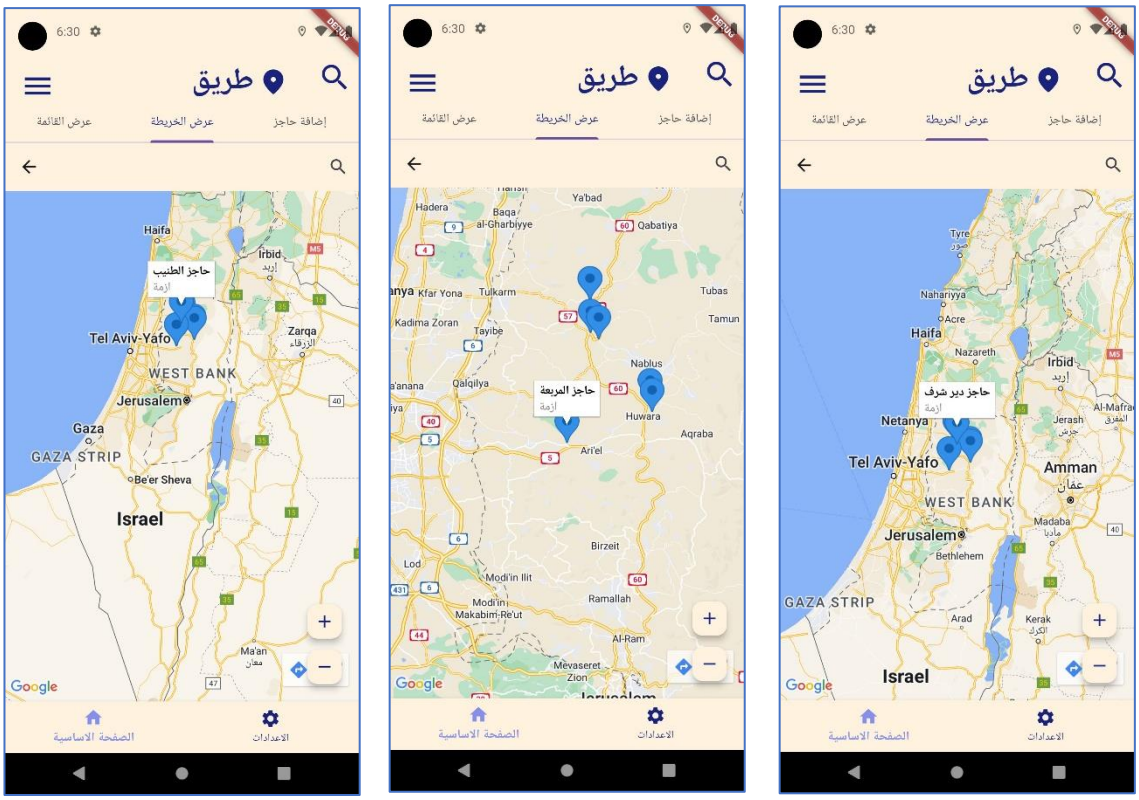


Figure 40 Second tap that show map page

The third tab:

Enables the administrator to add a new checkpoint to the application.

The administrator can also view his personal profile, and modify the information as is available with a regular user.

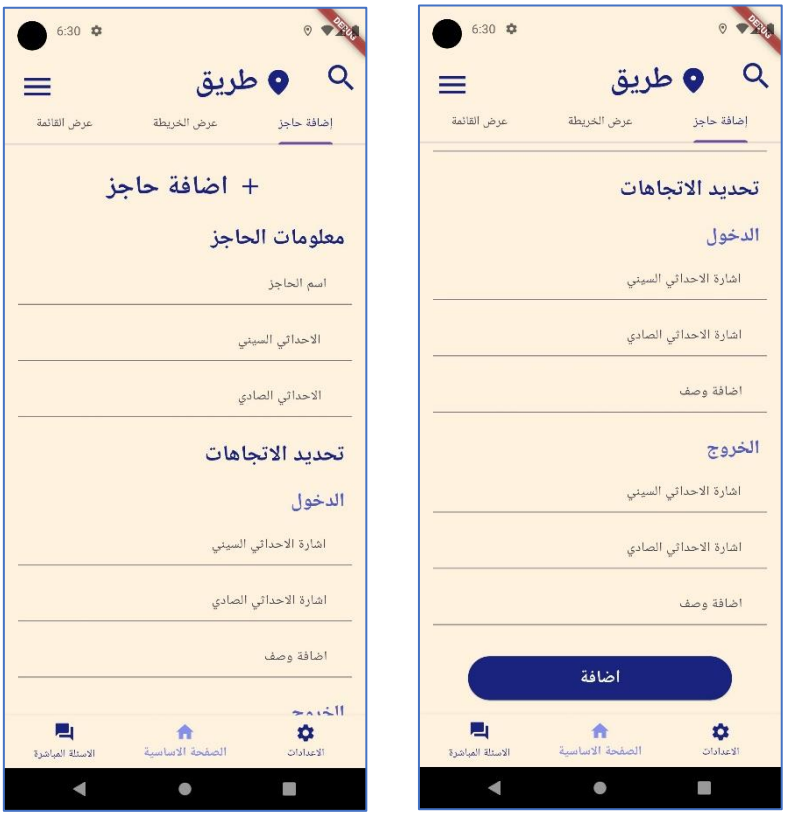


Figure 41 Add new checkpoint

The administrator can also search for a specific checkpoint, and go to the settings page via the second tab at the bottom of the home page, through which he can also view his personal profile and modify the information as in a regular user.

- Setting Page

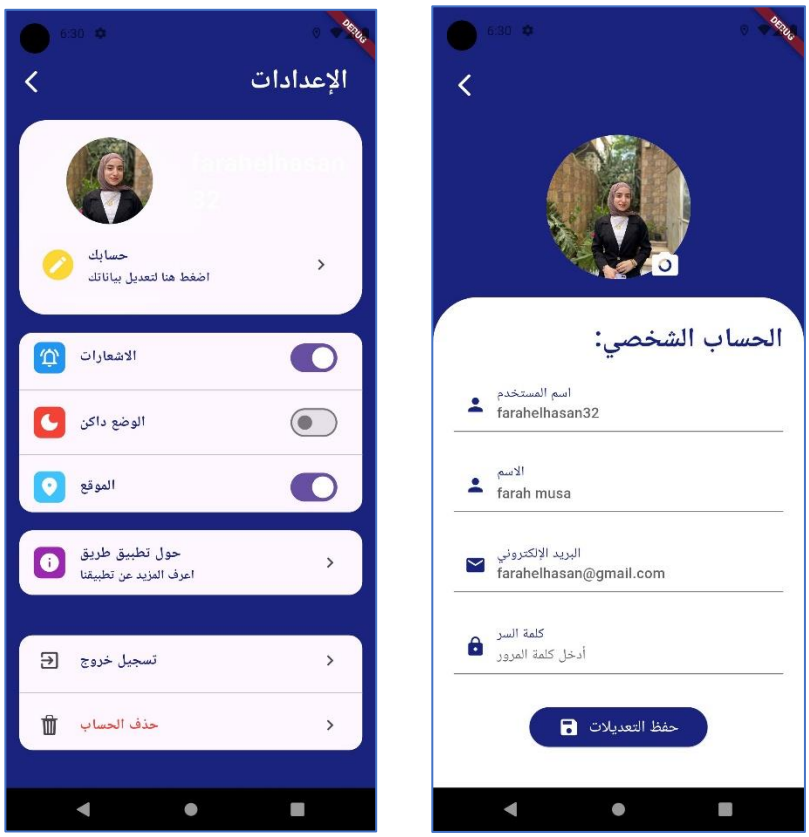


Figure 42 Settings and profile page

- Drawer (list on the left of home page)

Through drawer, you can also return to the home page, access your personal account, access a page about the Tariq application, in addition to the ability of see user reviews about the Tariq application and see their comments to improve the application as users see it based on their experience.

Figure 43 Drawer session

3.3.2. WEBSITE

As we mentioned at the beginning, the Tareeq application can also be used using the web. The website includes all the features available in the mobile app

Since Tarqeq's main goal is to track checkpoint conditions, the website could be better for the admin than the users.

3.3.1.1 Use "Tareeq" as a USER:

- Welcome Page & Authentication Pages

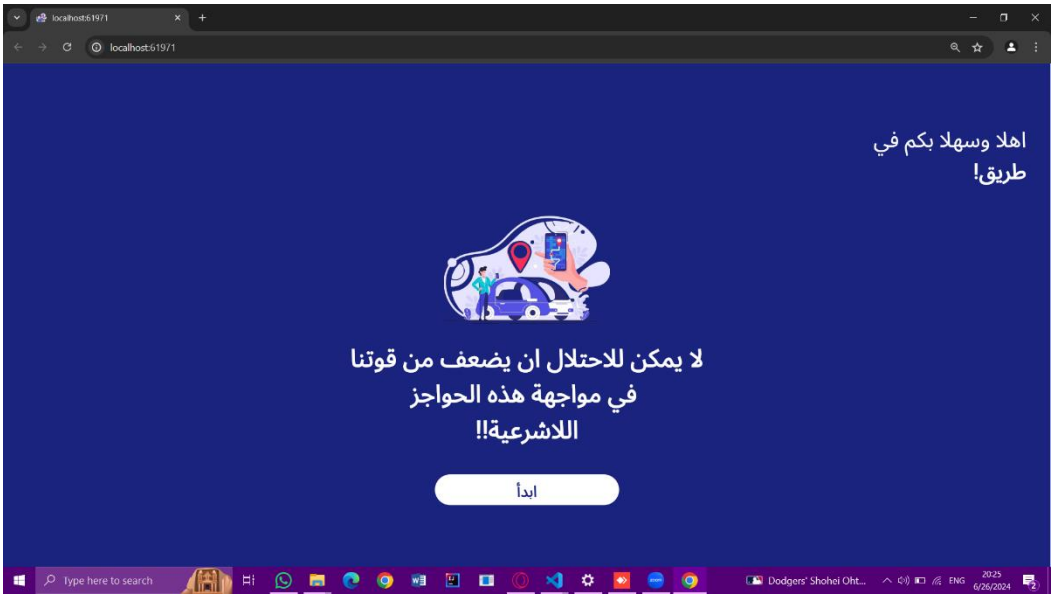
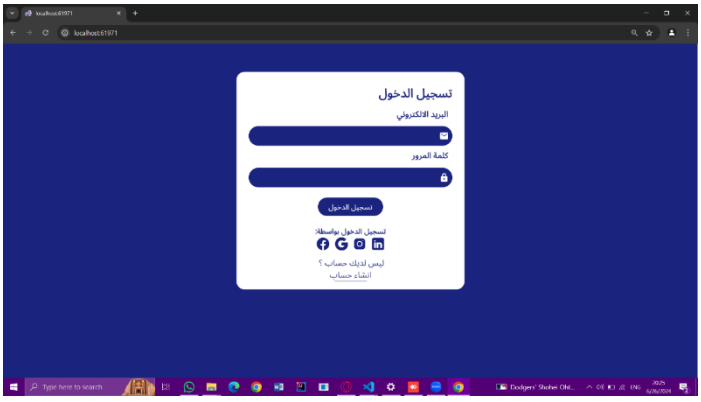
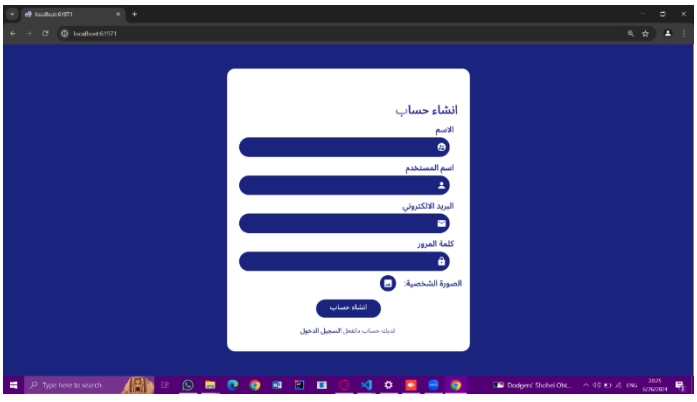
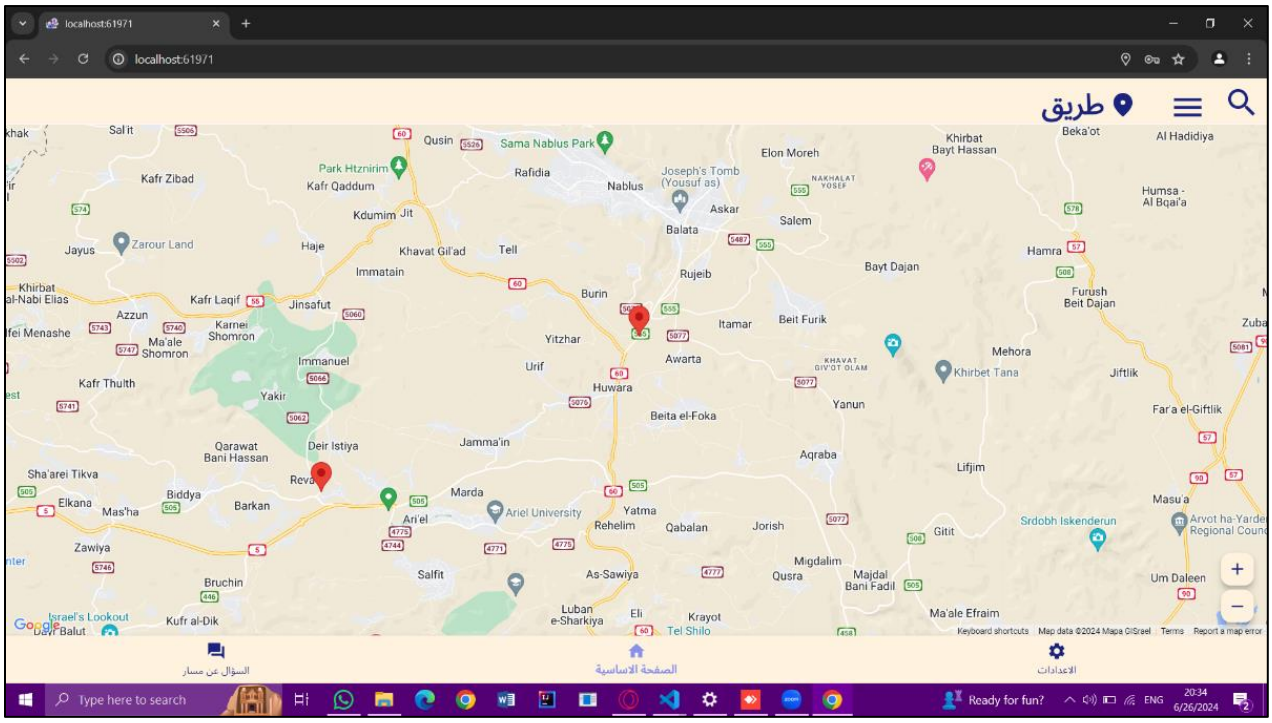


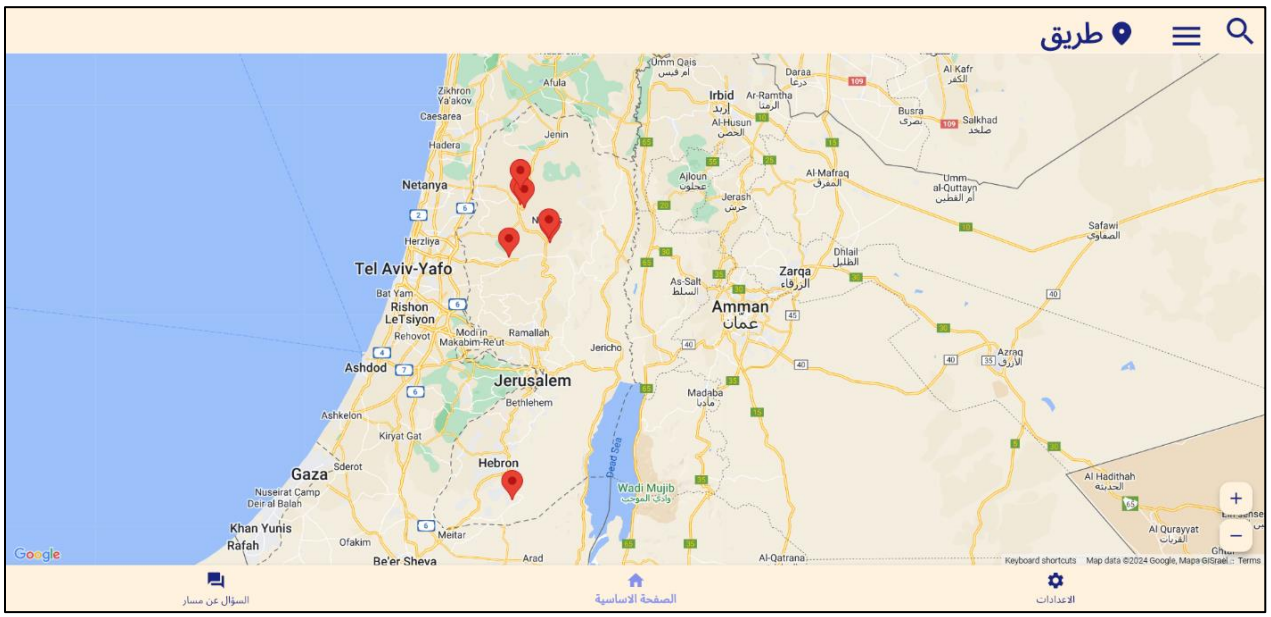
Figure 44 Welcom page website





- Home Page (Map Page)





- Search

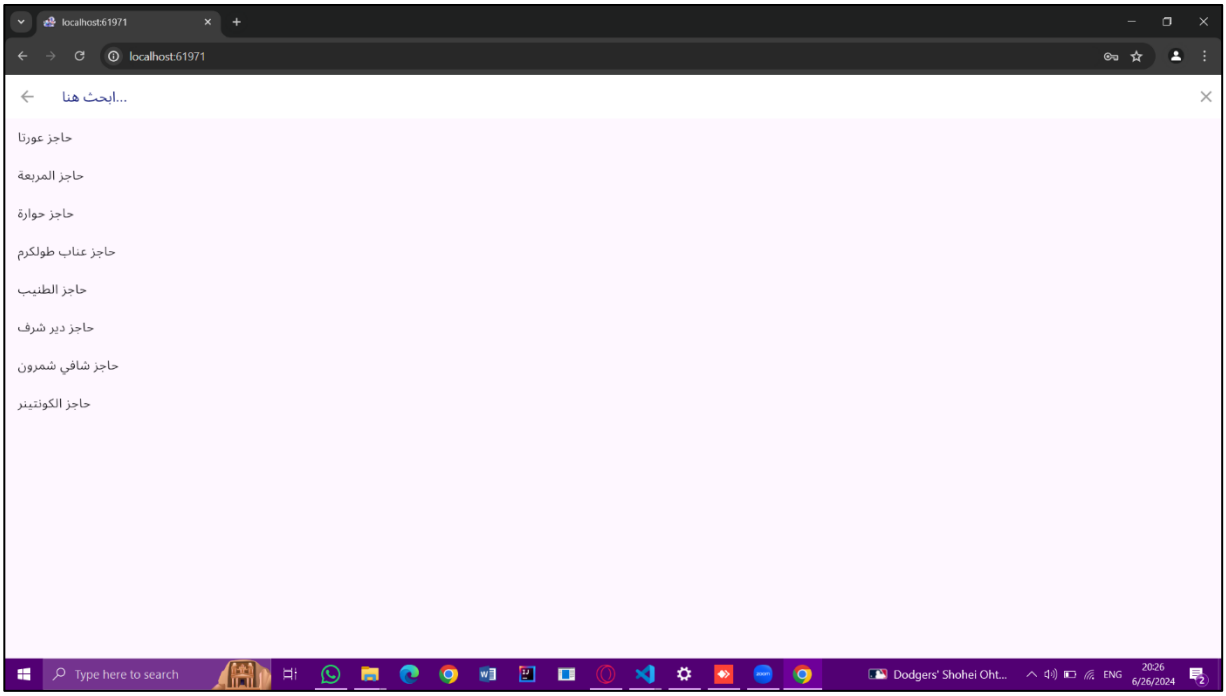
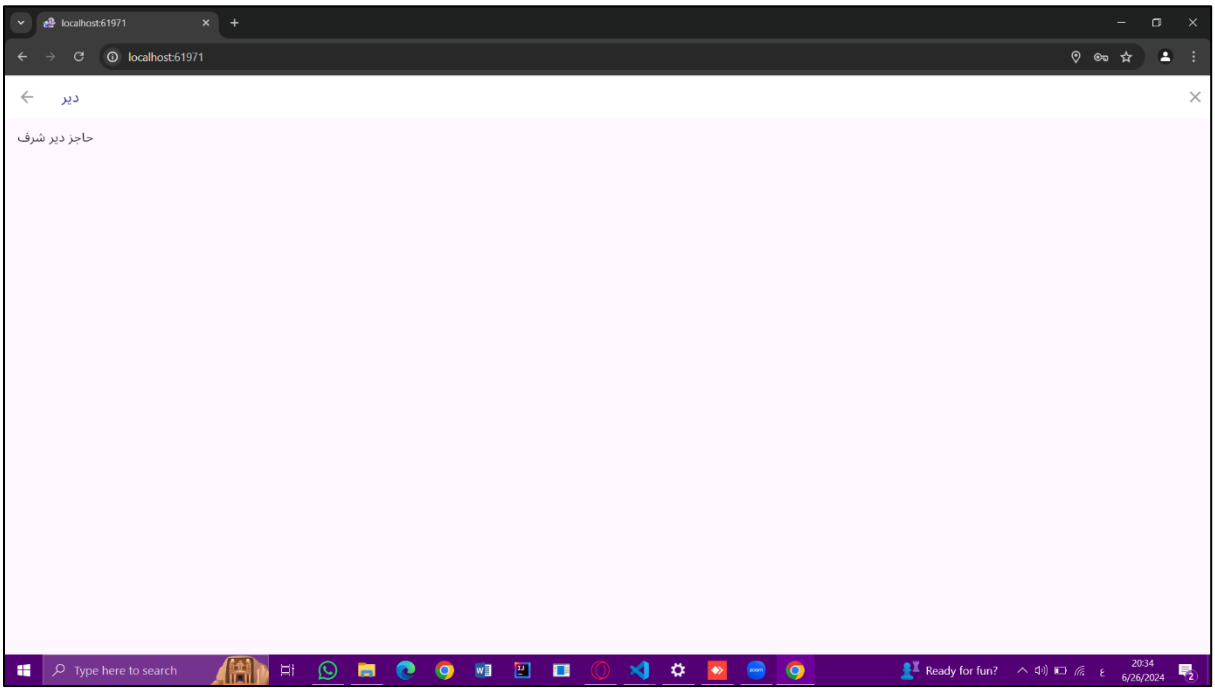


Figure 45 Search in map page



When we pressed to a checkpoint form search list, we will go to location of this checkpoint.

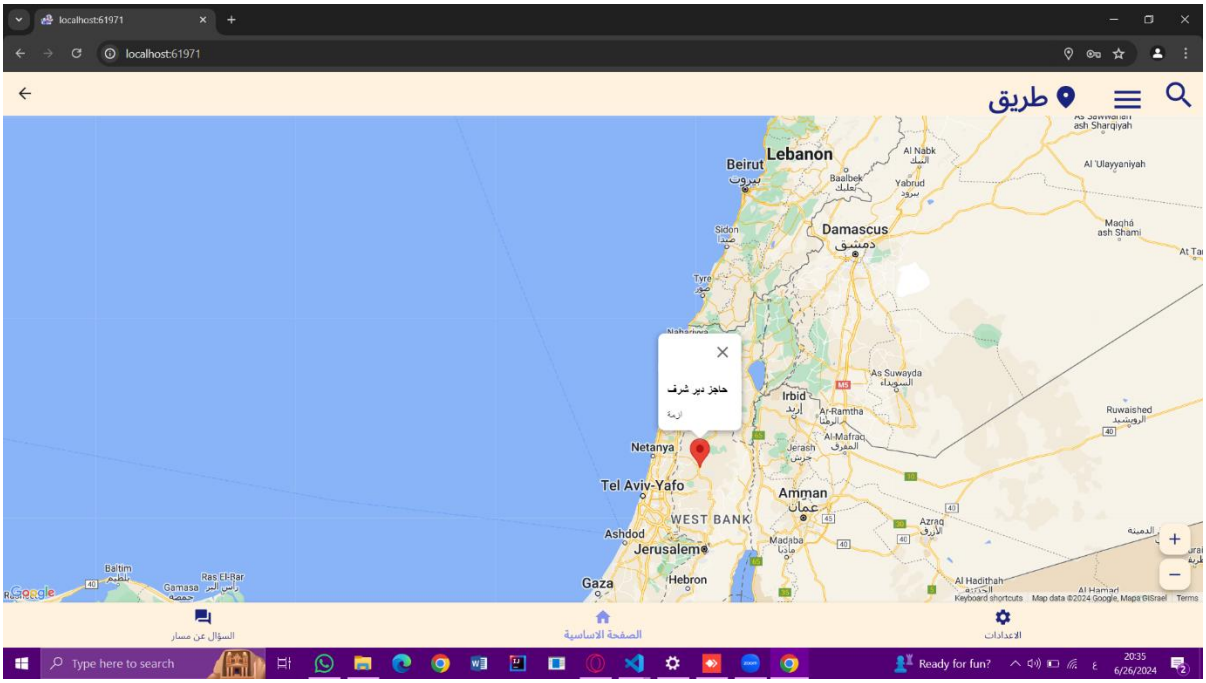
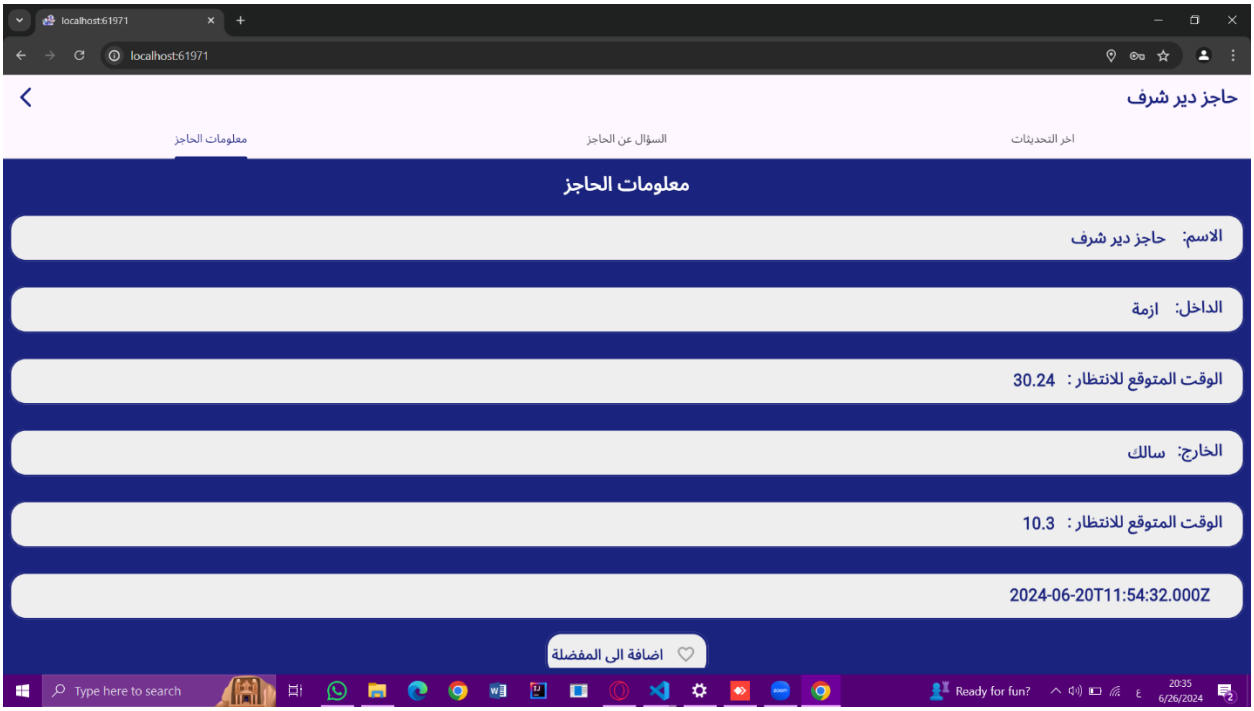
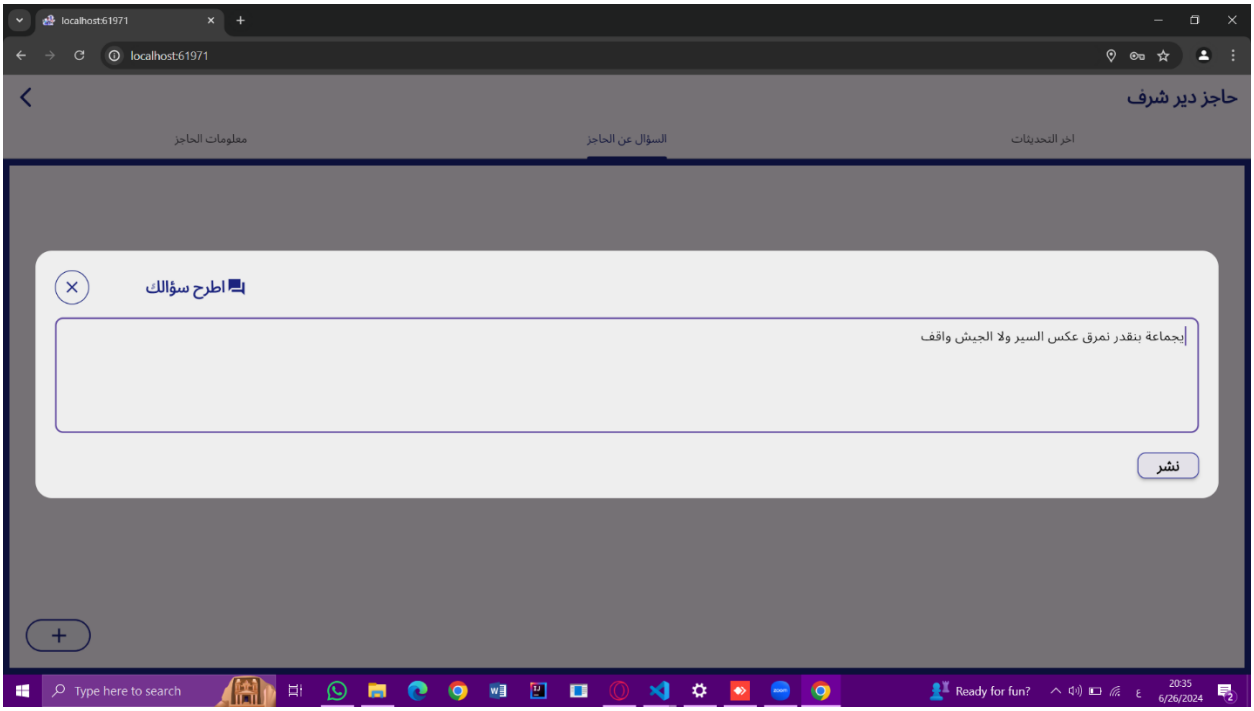


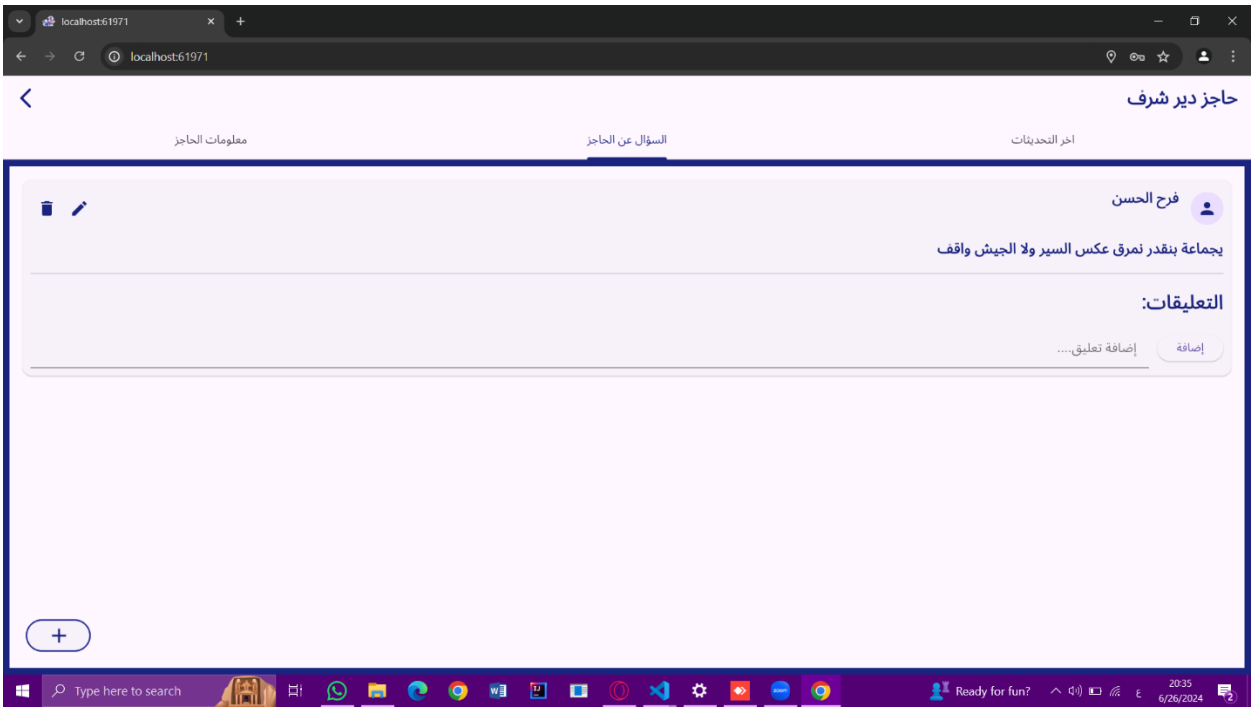
Figure 46 Result of searching

- Checkpoint Information Page




localhost:61971
حاجز دير شرف
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
معلومات الحاجز
الاسم: حاجز دير شرف
الداخل: ازمة
الوقت المتوقع للانتظار : 30.24
الخارج: سالك
الوقت المتوقع للانتظار : 10.3
2024-06-20T11:54:32.000Z
اضافة الى المفضلة
Type here to search
Ready for fun?
20:35
6/26/2024


localhost:61971
حاجز دير شرف
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
اطرح سؤالك
يجماعة بنقدر نمرق عكس السير ولا الجيش واقف
نشر
Type here to search
Ready for fun?
20:35
6/26/2024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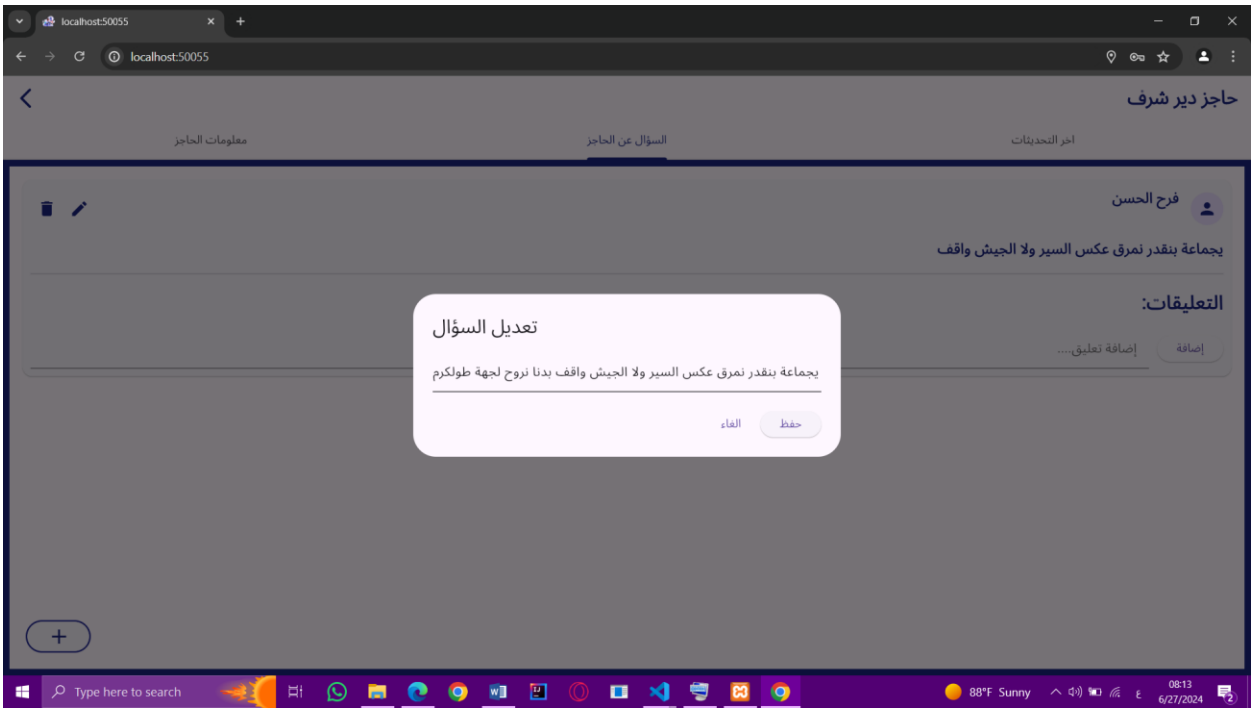
حاجز دير شرف
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
فرح الحسن
يجماعة بنقدر نمرق عكس السير ولا الجيش واقف
التعليقات:
إضافة
إضافة تعليق....
Type here to search
Ready for fun?
20:35
6/26/2024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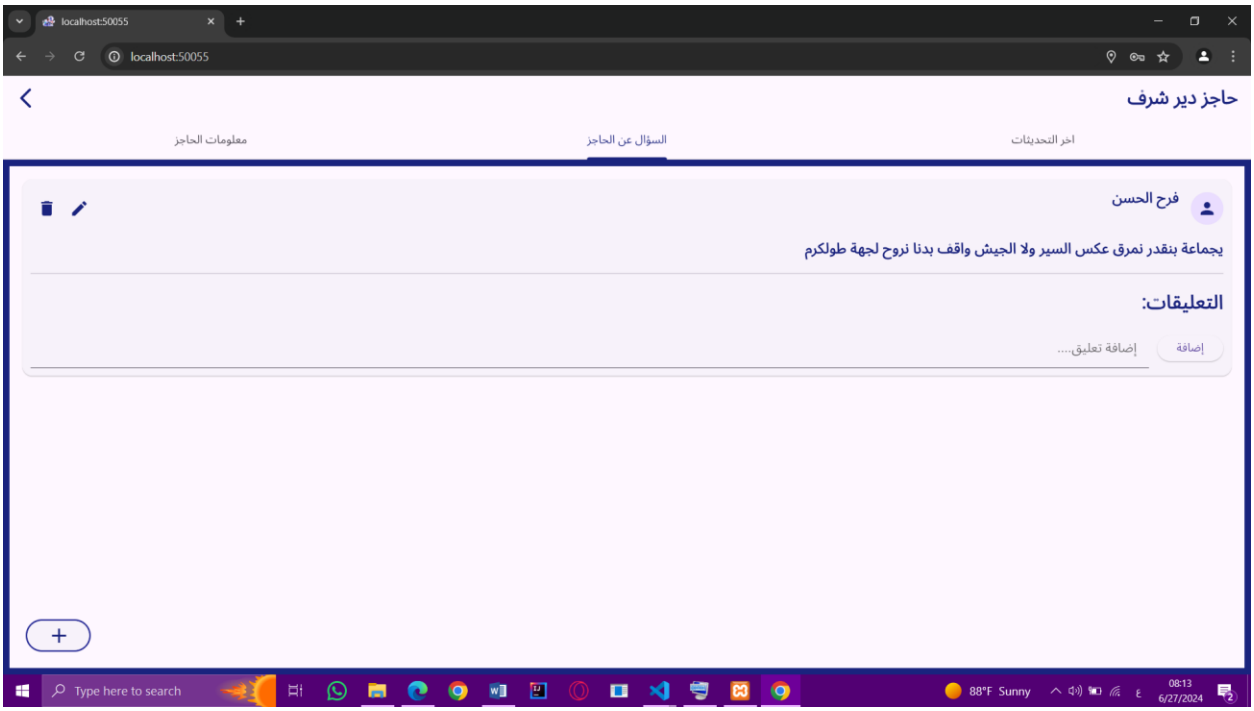
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
فرح الحسن
يجماعة بنقدر نمرق عكس السير ولا الجيش واقف
التعليقات:
إضافة
إضافة تعليق....
تعديل السؤال
يجماعة بنقدر نمرق عكس السير ولا الجيش واقف بدنا نروح لجهة طولكرم
حفظ
الغاء
Type here to search
88°F Sunny
08:13
6/27/2024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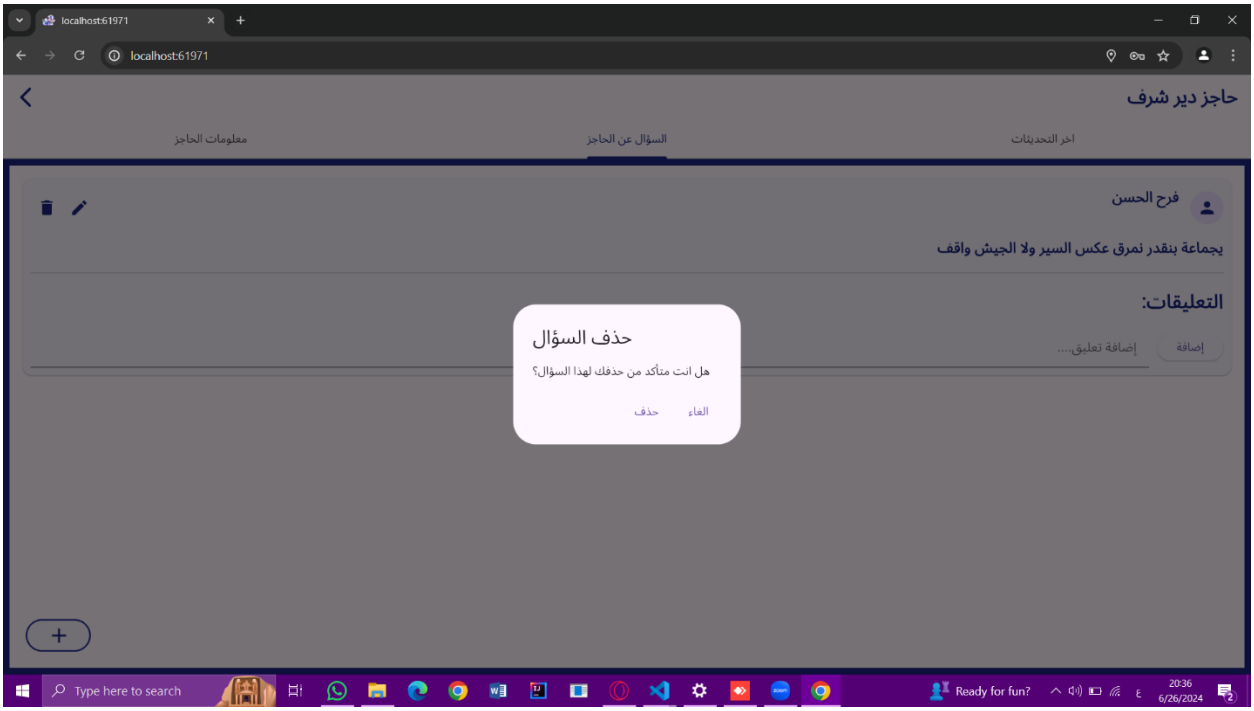
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
فرح الحسن
بجماعة بنقدر نمرق عكس السير ولا الجيش واقف بدنا نروح لجهة طولكرم
التعليقات:
إضافة
إضافة تعليق....
Type here to search
88°F Sunny
08:13
6/27/2024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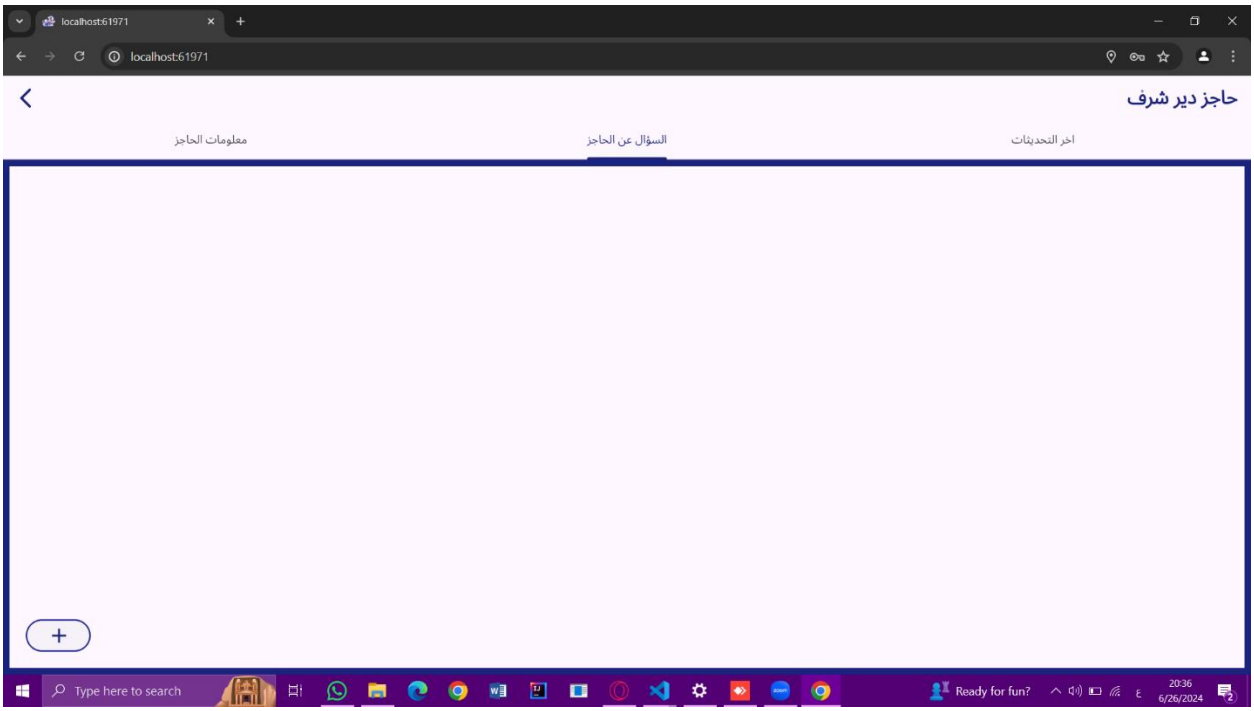
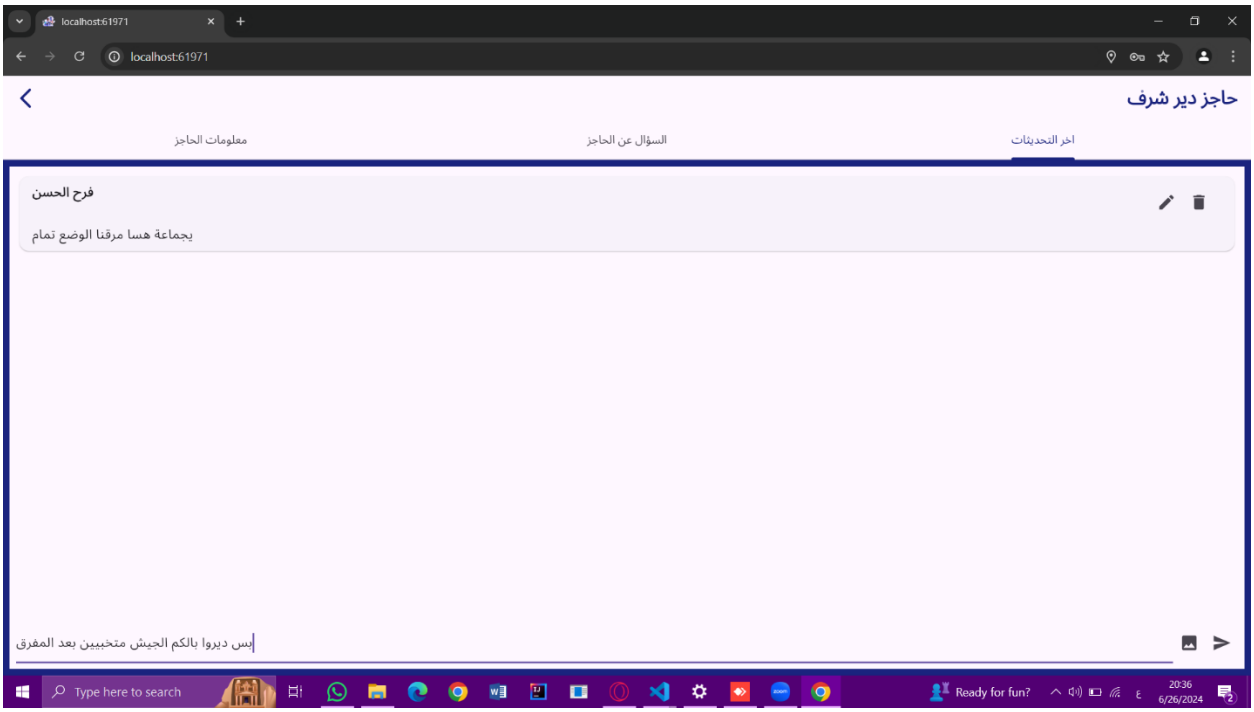
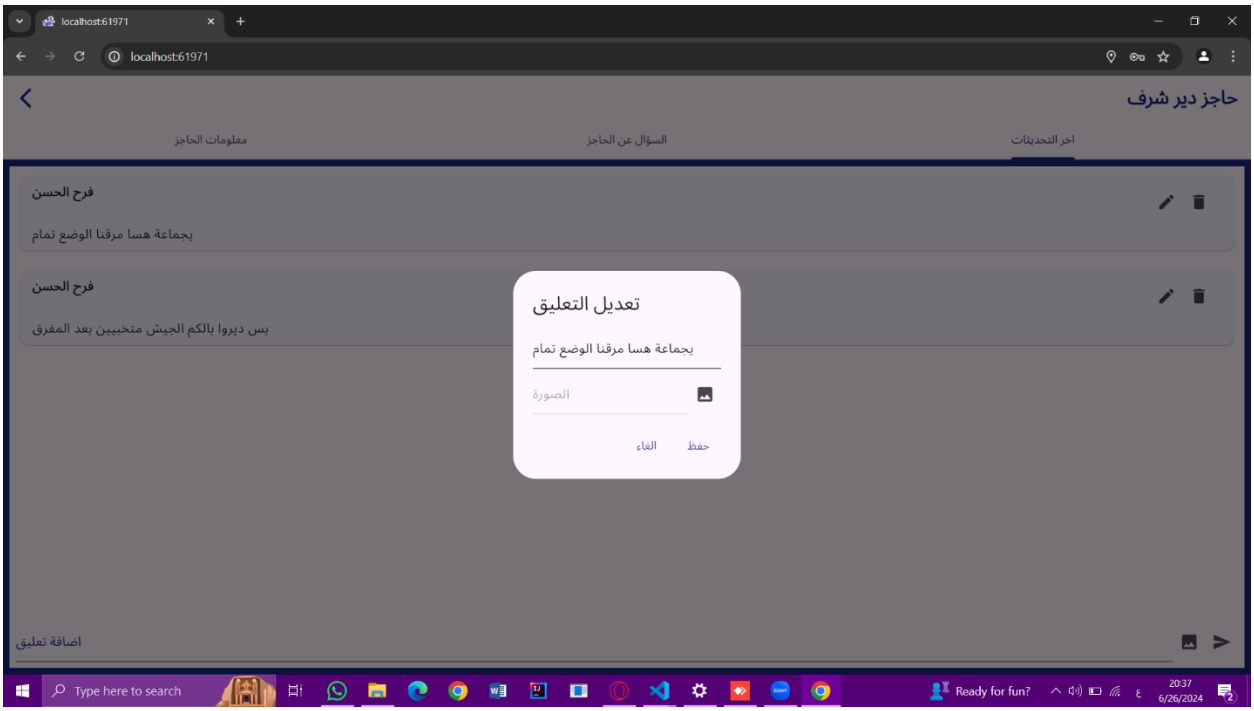
معلومات الحاجز
فرح الحسن
بجماعة بنقدر نمرق عكس السير ولا الجيش واقف
التعليقات:
إضافة
إضافة تعليق....
حذف السؤال
هل انت متأكد من حذفك لهذا السؤال؟
الغاء
حذف
Type here to search
Ready for fun?
20:36
6/26/2024


localhost:61971
حاجز دير شرف
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
Type here to search
Ready for fun?
20:36
6/26/2024


localhost:61971
حاجز دير شرف
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
فرح الحسن
يجماعة هسا مرقنا الوضع تمام
بس ديروا بالكم الجيش متخبيين بعد المفرق
Type here to search
Ready for fun?
20:36
6/26/2024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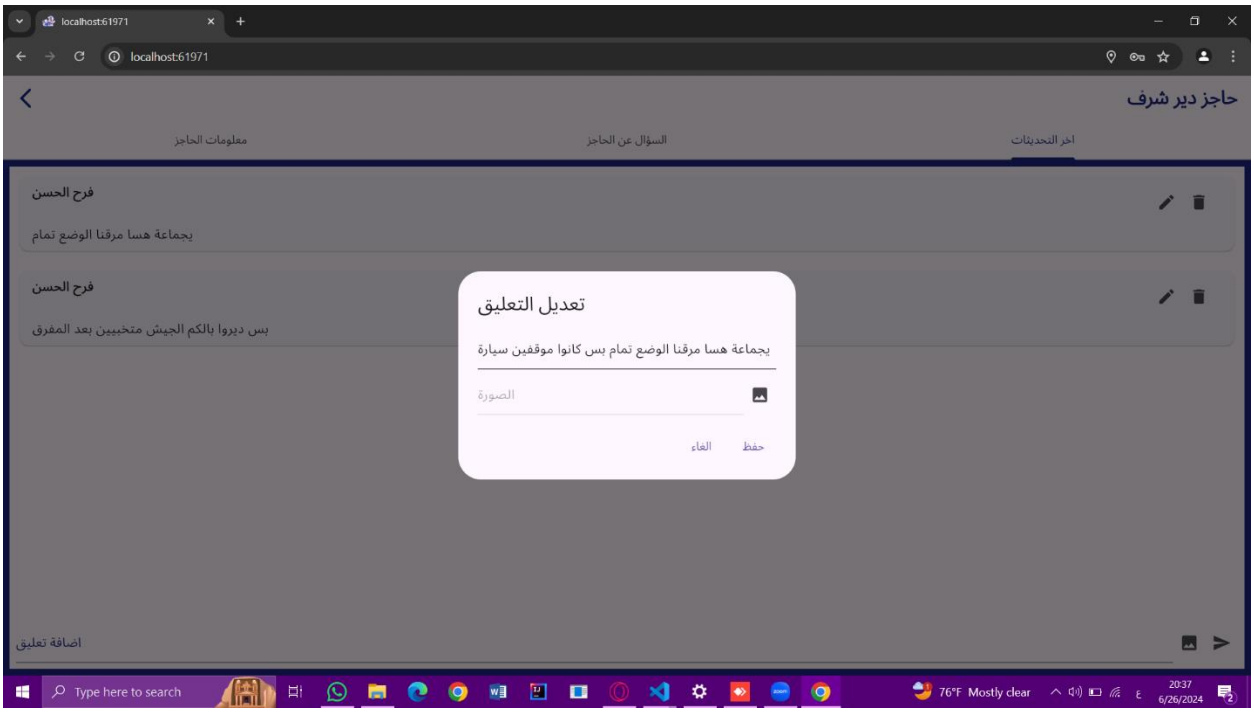
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
فرح الحسن
يجماعة هسا مرقنا الوضع تمام
فرح الحسن
بس ديروا بالكم الجيش متخبيين بعد المفرق
تعديل التعليق
يجماعة هسا مرقنا الوضع تمام
الصورة
حفظ
الغاء
اضافة تعليق
Type here to search
Ready for fun?
20:37
6/26/2024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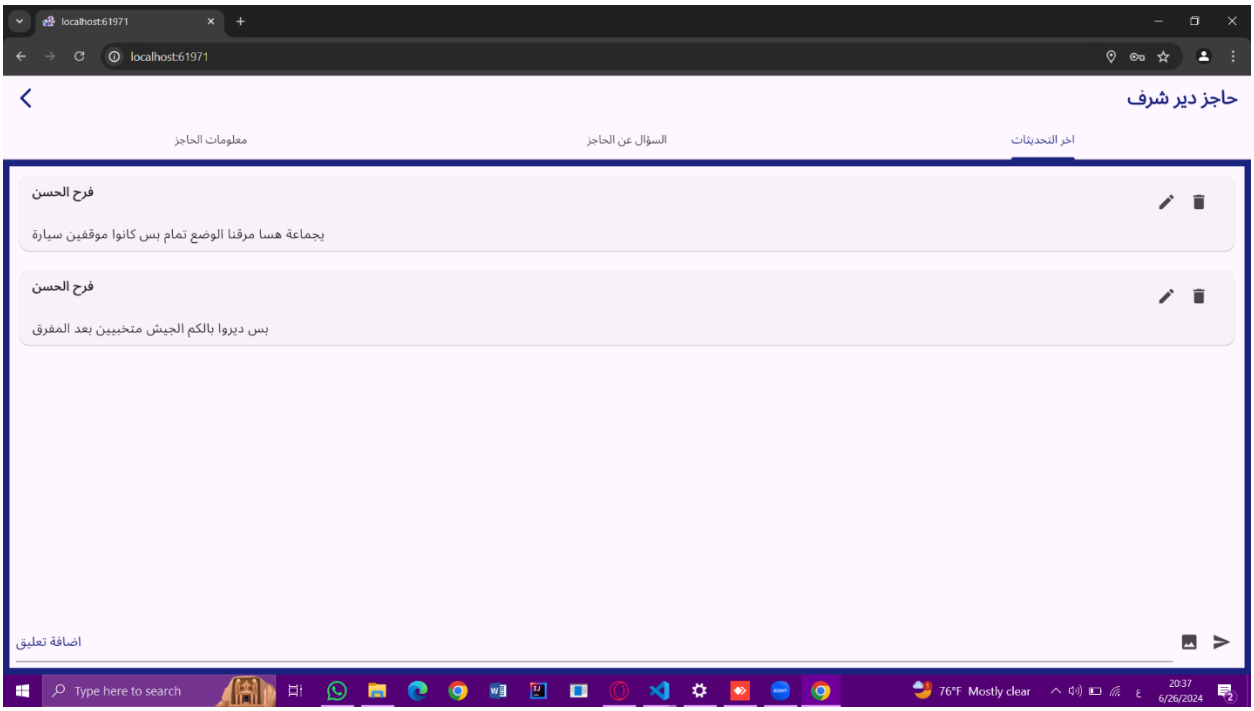
حاجز دير شرف
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
فرح الحسن
يجماعة هسا مرقنا الوضع تمام
فرح الحسن
بس ديروا بالكم الجيش متخبيين بعد المفرق
تعديل التعليق
يجماعة هسا مرقنا الوضع تمام بس كانوا موقفين سيارة
الصورة
حفظ
الغاء
اضافة تعليق
Type here to search
76°F Mostly clear
20:37
6/26/2024


localhost:61971
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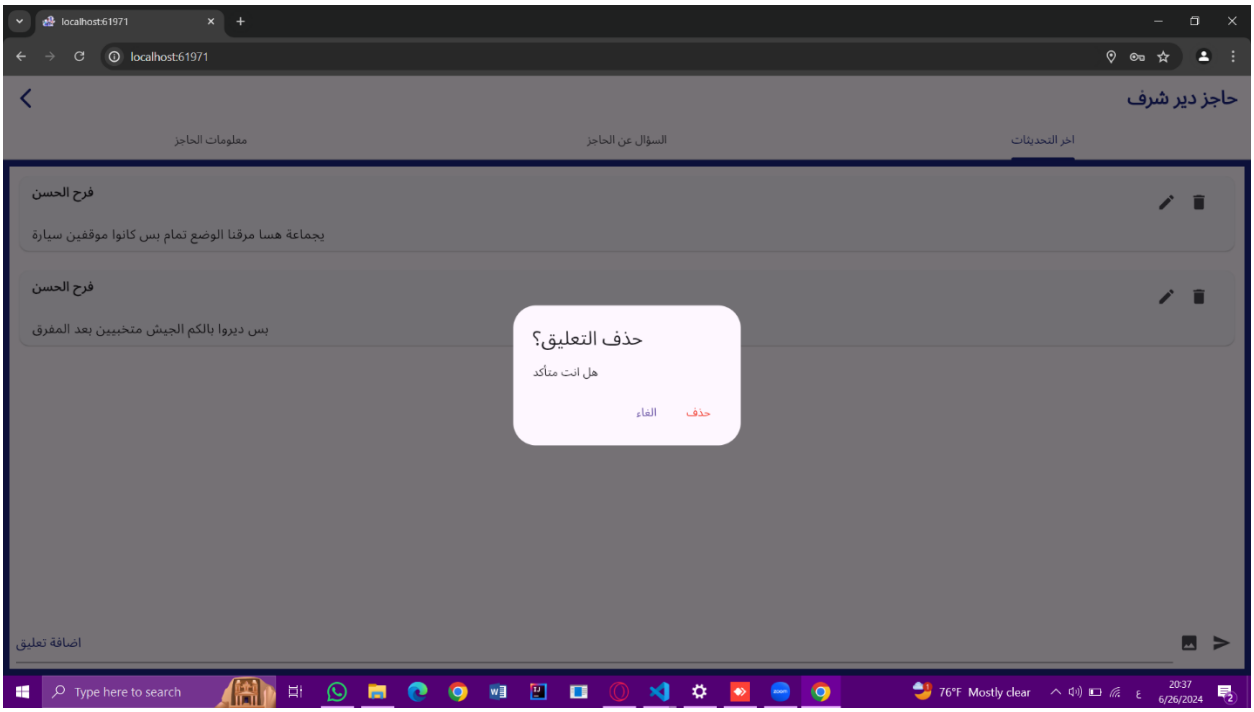
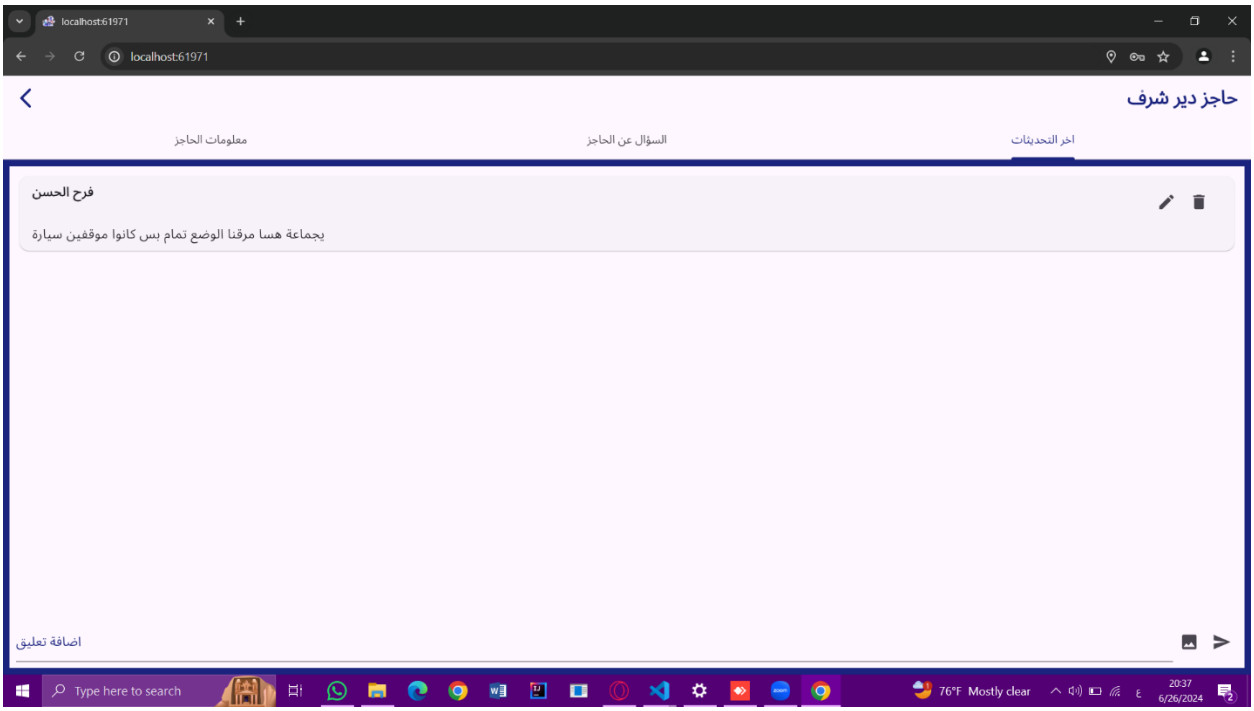
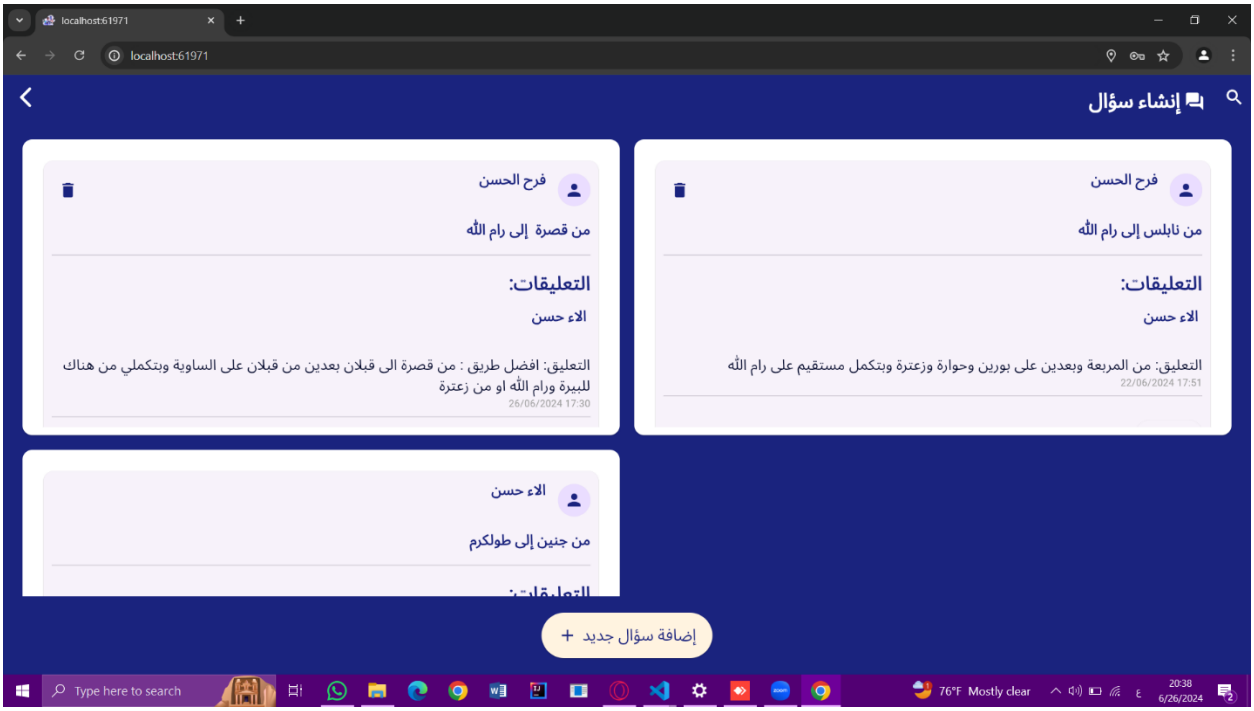
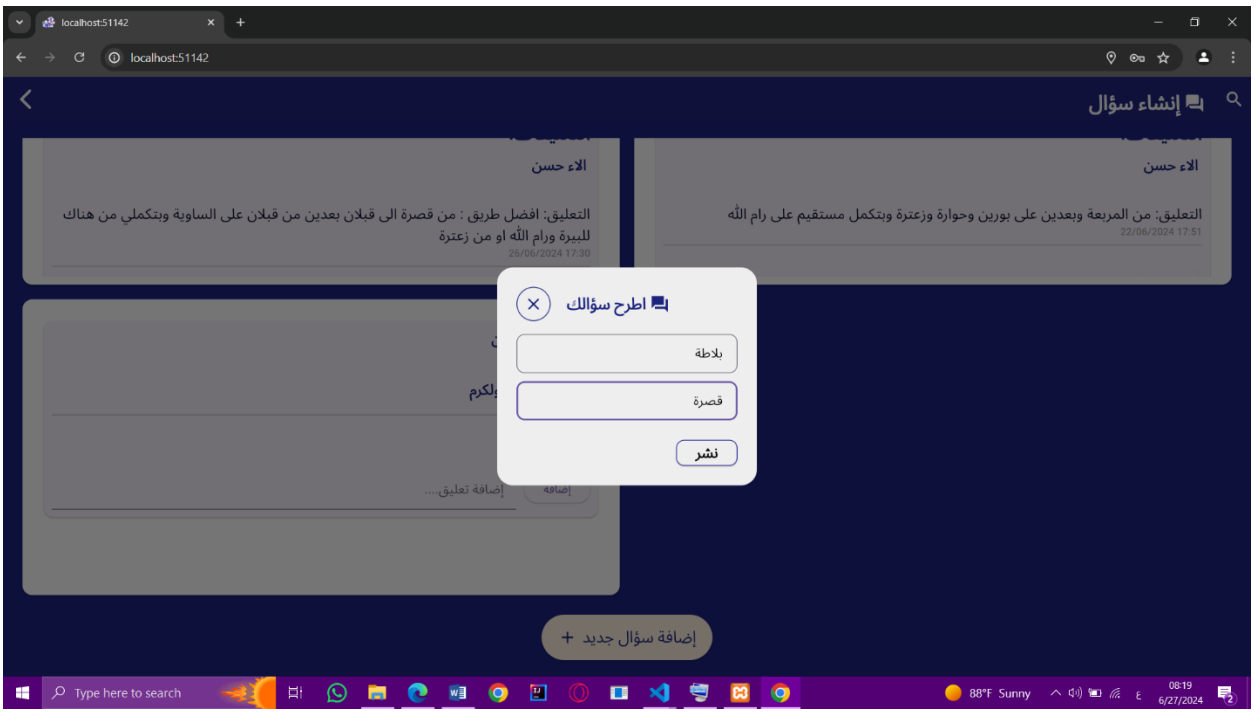
معلومات الحاجز
فرح الحسن
يجماعة هسا مرقنا الوضع تمام بس كانوا موقفين سيارة
فرح الحسن
بس ديروا بالكم الجيش متخبيين بعد المفرق
اضافة تعليق
Type here to search
76°F Mostly clear
20:37
6/26/2024

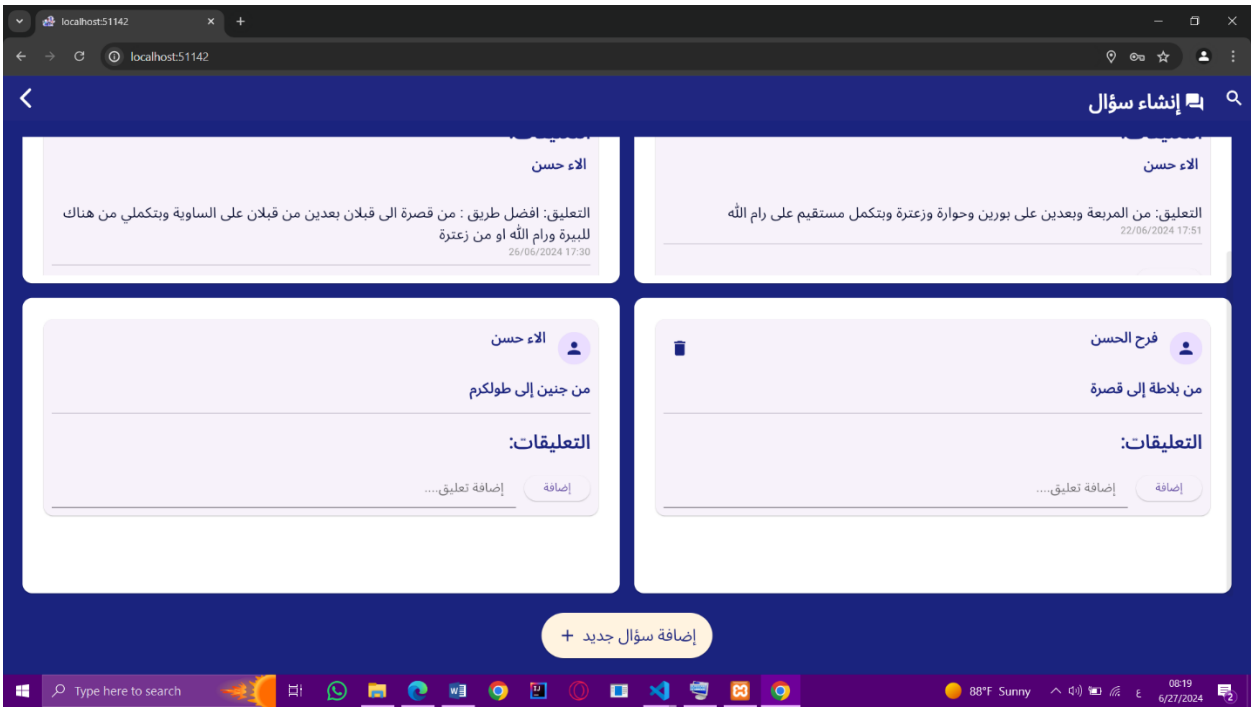

localhost:61971
حاجز دير شرف
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
فرح الحسن
يجماعة هسا مرقنا الوضع تمام بس كانوا موقفين سيارة
فرح الحسن
بس ديروا بالكم الجيش متخبيين بعد المفرق
حذف التعليق؟
هل انت متأكد
حذف
الغاء
اضافة تعليق
Type here to search
76°F Mostly clear
20:37
6/26/2024

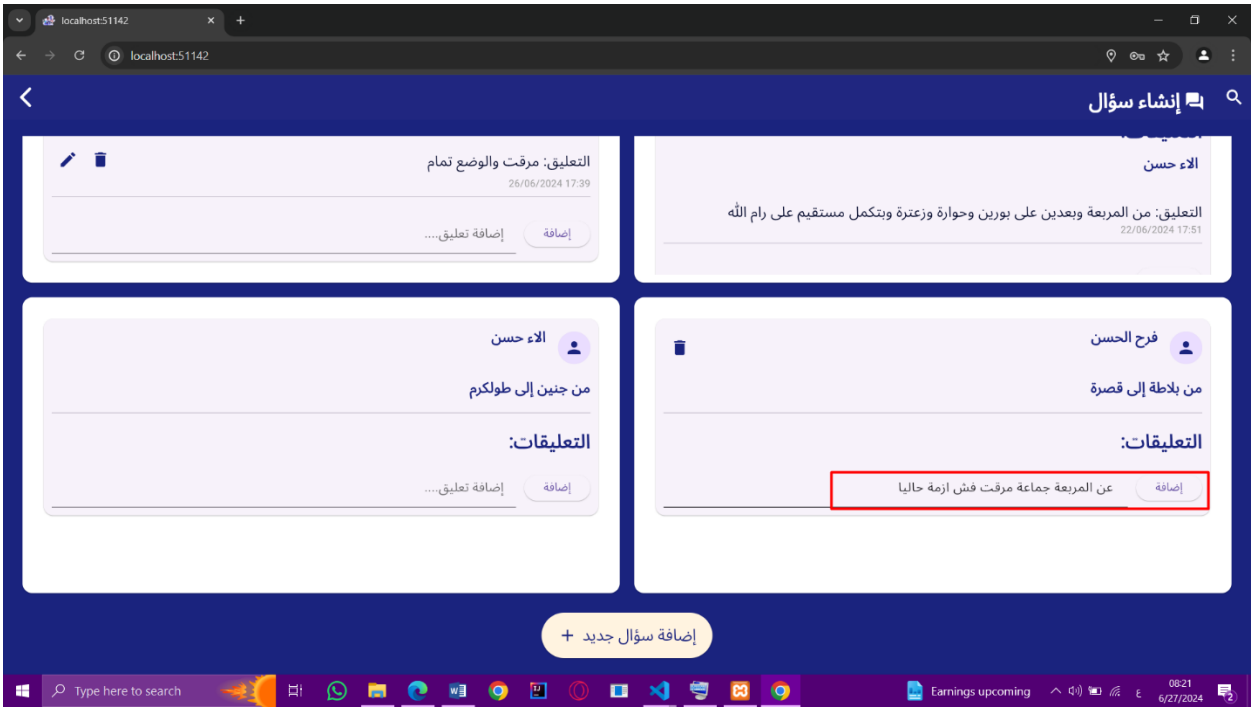

localhost:61971
localhost:61971
حاجز دير شرف
اخر التحديثات
السؤال عن الحاجز
معلومات الحاجز
فرح الحسن
يجماعة هسا مرقنا الوضع تمام بس كانوا موقفين سيارة
اضافة تعليق
Type here to search
76°F Mostly clear
20:37
6/26/2024

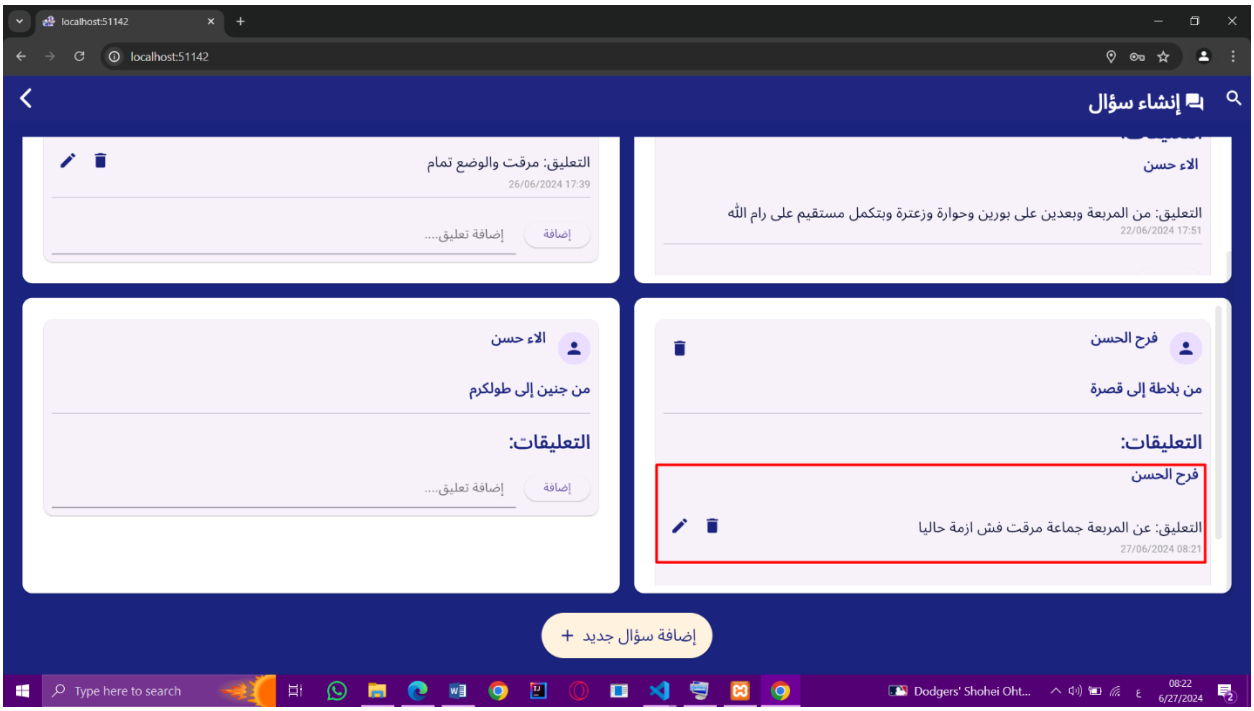
- Route Inquiry Page

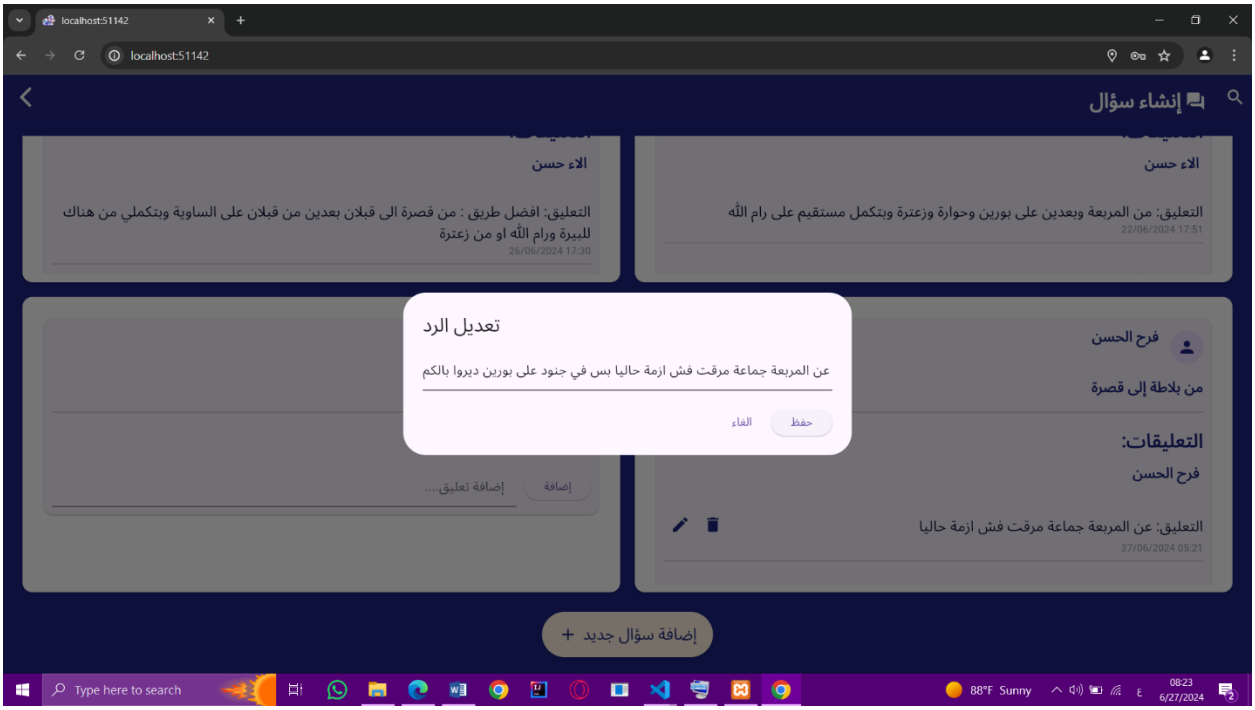


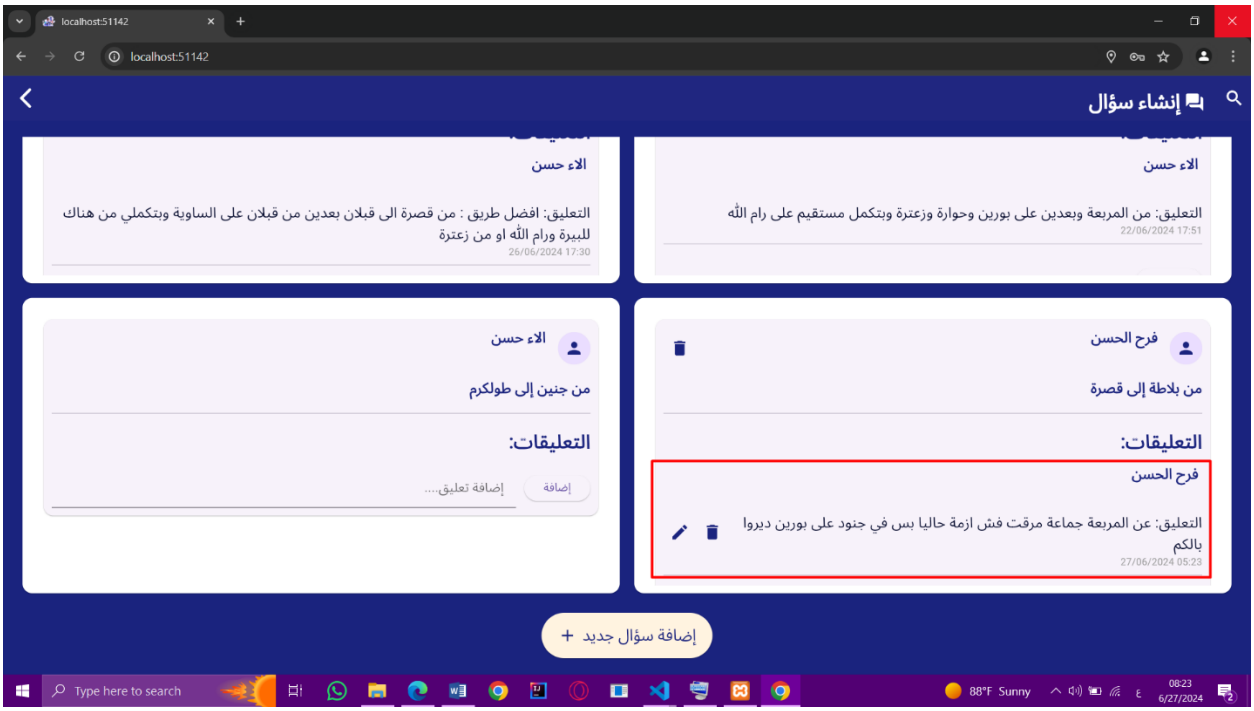


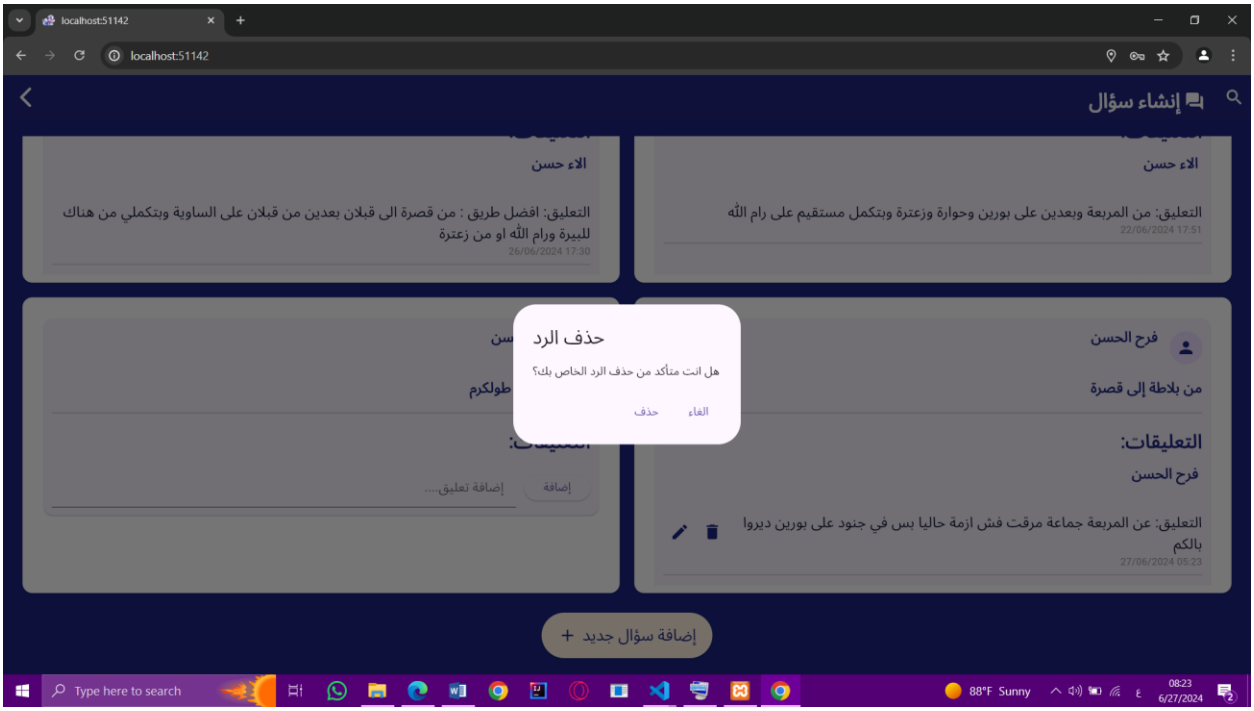

localhost:51142
إنشاء سؤال
الاء حسن
التعليق: من المربعة وبعدين على بورين وحوارة وزعترة وبتكمل مستقيم على رام الله
22/06/2024 17:51
الاء حسن
التعليق: افضل طريق : من قصرة الى قبلان بعدين من قبلان على الساوية وبتكملي من هناك للبيرة ورام الله او من زعترة
26/06/2024 17:30
فرح الحسن
من بلاطة إلى قصرة
التعليقات:
إضافة
إضافة تعليق....
الاء حسن
من جنين إلى طولكرم
التعليقات:
إضافة
إضافة تعليق....
إضافة سؤال جديد
Type here to search
88°F Sunny
08:19
6/27/2024


localhost:51142
إنشاء سؤال
الاء حسن
التعليق: من المربعة وبعدين على بورين وحوارة وزعترة وبتكمل مستقيم على رام الله
22/06/2024 17:51
التعليق: مرقت والوضع تمام
26/06/2024 17:39
فرح الحسن
من بلاطة إلى قصرة
التعليقات:
إضافة
عن المربعة جماعة مرقت فش ازمة حاليا
الاء حسن
من جنين إلى طولكرم
التعليقات:
إضافة
إضافة تعليق....
إضافة سؤال جديد
Type here to search
Earnings upcoming
08:21
6/27/2024


localhost:51142
إنشاء سؤال
الاء حسن
التعليق: من المربعة وبعدين على بورين وحوارة وزعترة وبتكمل مستقيم على رام الله
22/06/2024 17:51
التعليق: مرقت والوضع تمام
26/06/2024 17:39
إضافة
إضافة تعليق....
فرح الحسن
من بلاطة إلى قصرة
التعليقات:
فرح الحسن
التعليق: عن المربعة جماعة مرقت فش ازمة حاليا
27/06/2024 08:21
الاء حسن
من جنين إلى طولكرم
التعليقات:
إضافة
إضافة تعليق....
إضافة سؤال جديد
Type here to search
Dodgers' Shohei Oht...
08:22
6/27/2024


localhost:51142
إنشاء سؤال
الاء حسن
التعليق: من المربعة وبعدين على بورين وحوارة وزعترة وبتكمل مستقيم على رام الله
22/06/2024 17:51
الاء حسن
التعليق: افضل طريق : من قصرة الى قبلان بعدين من قبلان على الساوية وبتكملي من هناك للبيرة ورام الله او من زعترة
26/06/2024 17:30
تعديل الرد
عن المربعة جماعة مرقت فش ازمة حاليا بس في جنود على بورين ديروا بالكم
حفظ
الغاء
فرح الحسن
من بلاطة إلى قصرة
التعليقات:
فرح الحسن
التعليق: عن المربعة جماعة مرقت فش ازمة حاليا
27/06/2024 05:21
إضافة
إضافة تعليق....
إضافة سؤال جديد
Type here to search
88°F Sunny
08:23
6/27/2024


localhost:51142
إنشاء سؤال
الاء حسن
التعليق: من المربعة وبعدين على بورين وحوارة وزعترة وبتكمل مستقيم على رام الله
22/06/2024 17:51
الاء حسن
التعليق: افضل طريق : من قصرة الى قبلان بعدين من قبلان على الساوية وبتكملي من هناك للبيرة ورام الله او من زعترة
26/06/2024 17:30
فرح الحسن
من بلاطة إلى قصرة
التعليقات:
فرح الحسن
التعليق: عن المربعة جماعة مرقت فش ازمة حاليا بس في جنود على بورين ديروا بالكم
27/06/2024 05:23
الاء حسن
من جنين إلى طولكرم
التعليقات:
إضافة تعليق.....
إضافة
إضافة سؤال جديد
Type here to search
88°F Sunny
08:23
6/27/2024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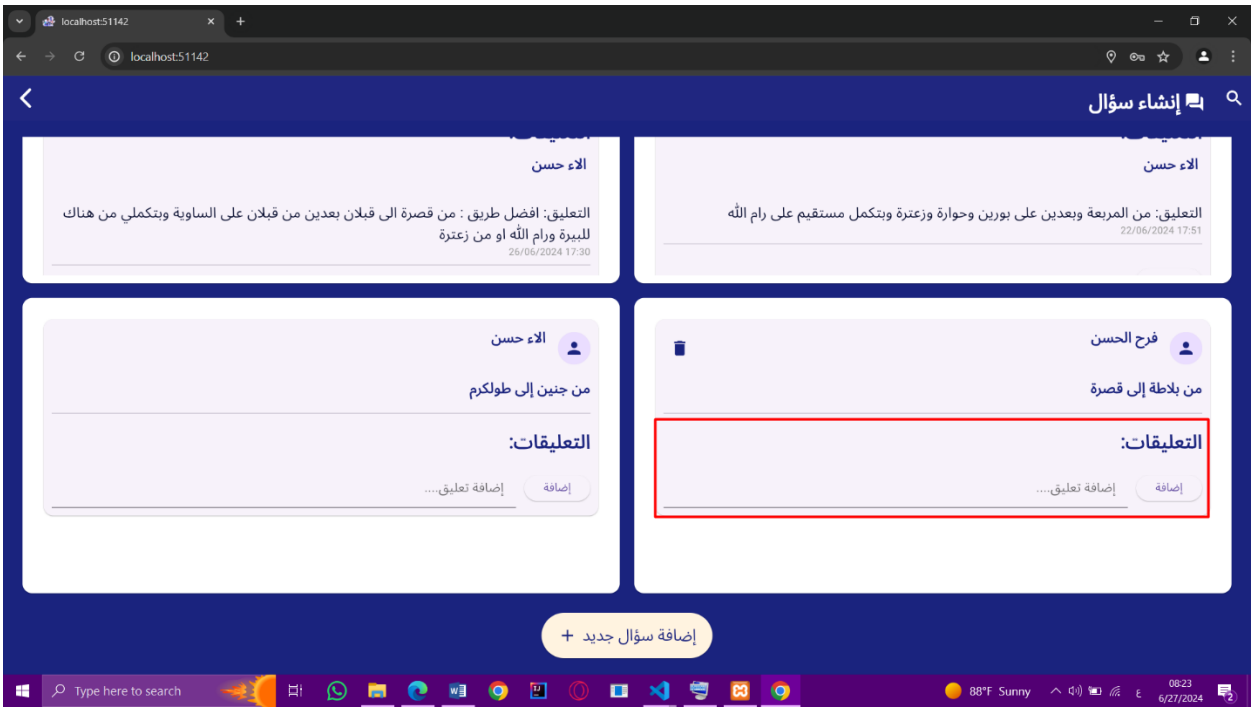
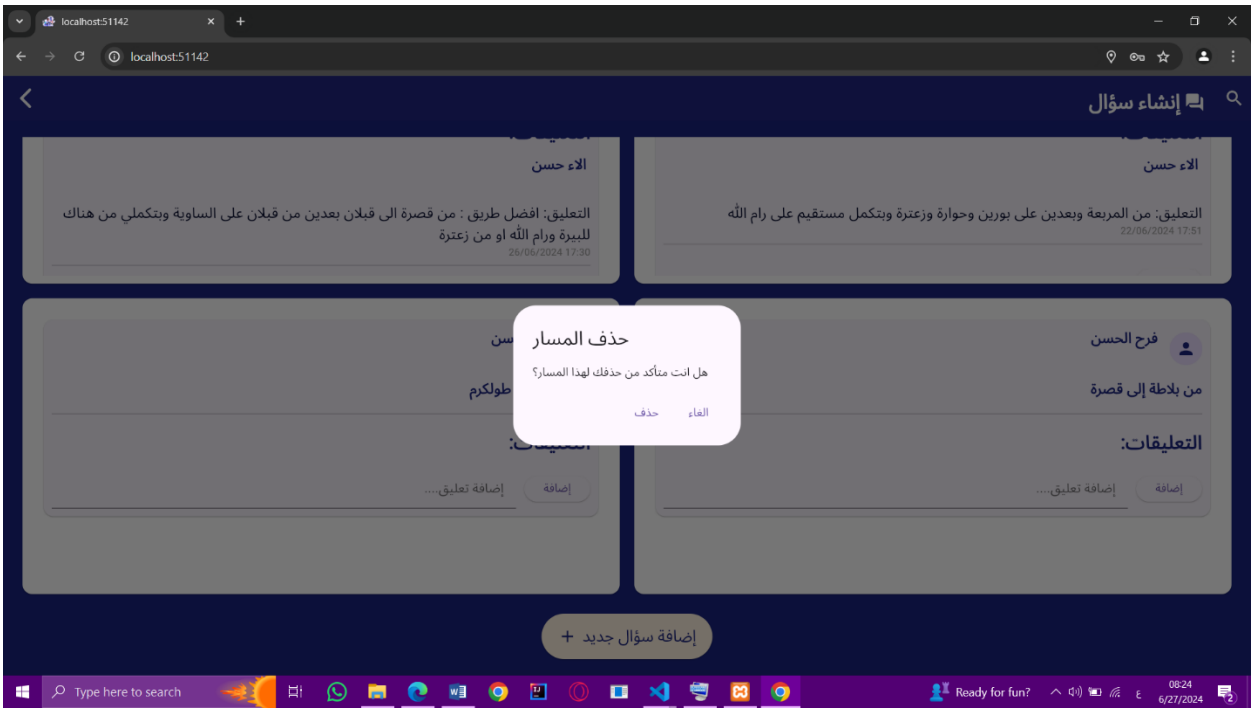
إنشاء سؤال
حذف الرد
هل انت متأكد من حذف الرد الخاص بك؟
الغاء
حذف
إضافة سؤال جديد
Type here to search
88°F Sunny
08:23
6/27/2024


localhost:51142
إنشاء سؤال
الاء حسن
التعليق: من المربعة وبعدين على بورين وحوارة وزعترة وبتكمل مستقيم على رام الله
22/06/2024 17:51
الاء حسن
التعليق: افضل طريق : من قصرة الى قبلان بعدين من قبلان على الساوية وبتكملي من هناك للبيرة ورام الله او من زعترة
26/06/2024 17:30
فرح الحسن
من بلاطة إلى قصرة
التعليقات:
إضافة
إضافة تعليق....
الاء حسن
من جنين إلى طولكرم
التعليقات:
إضافة
إضافة تعليق....
إضافة سؤال جديد
Type here to search
88°F Sunny
08:23
6/27/2024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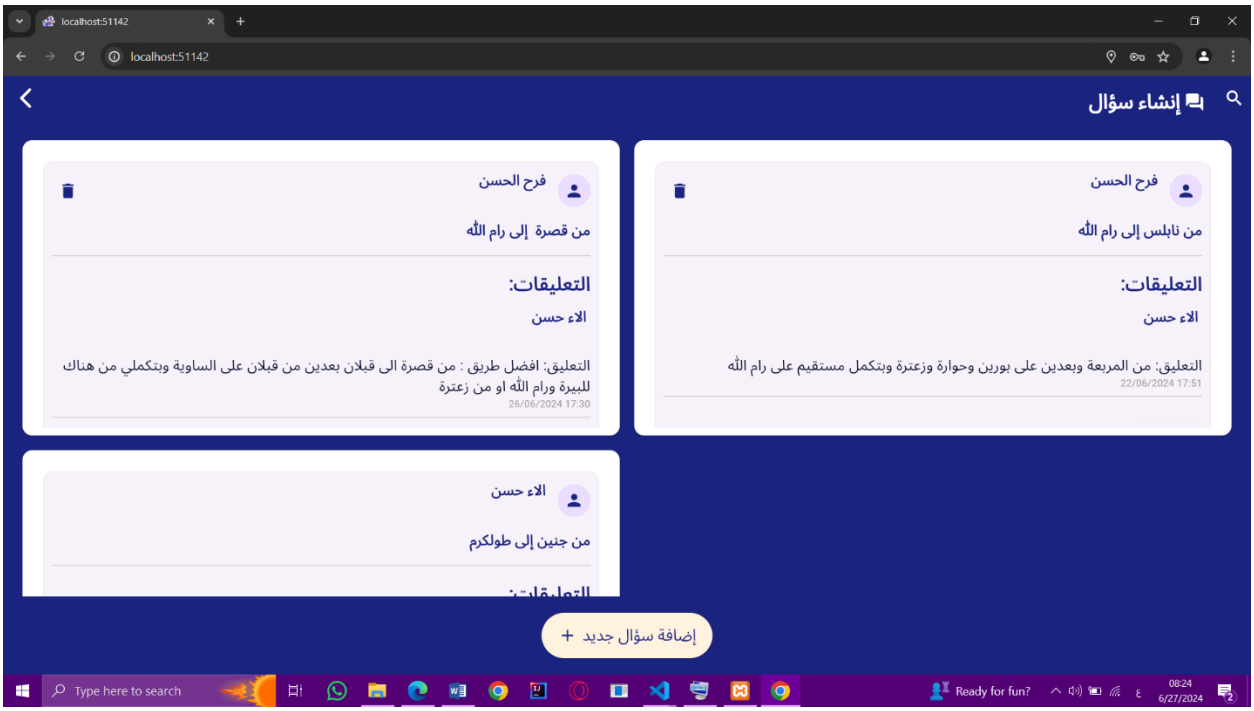
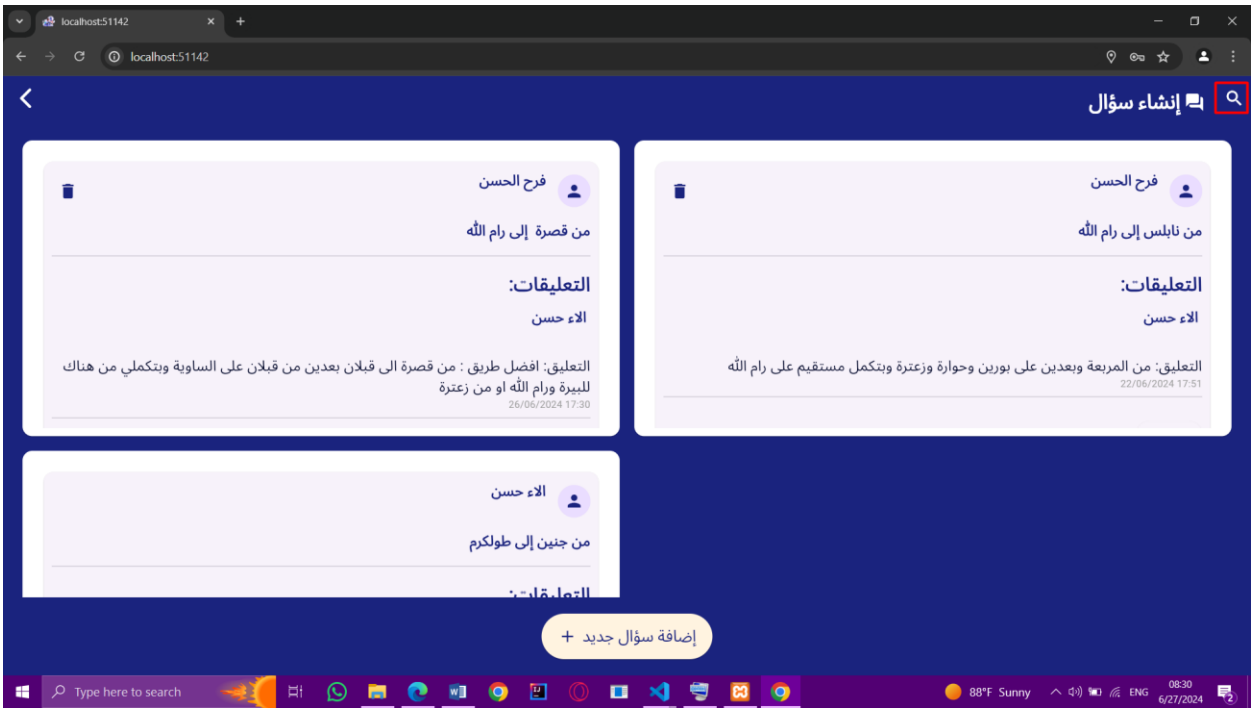
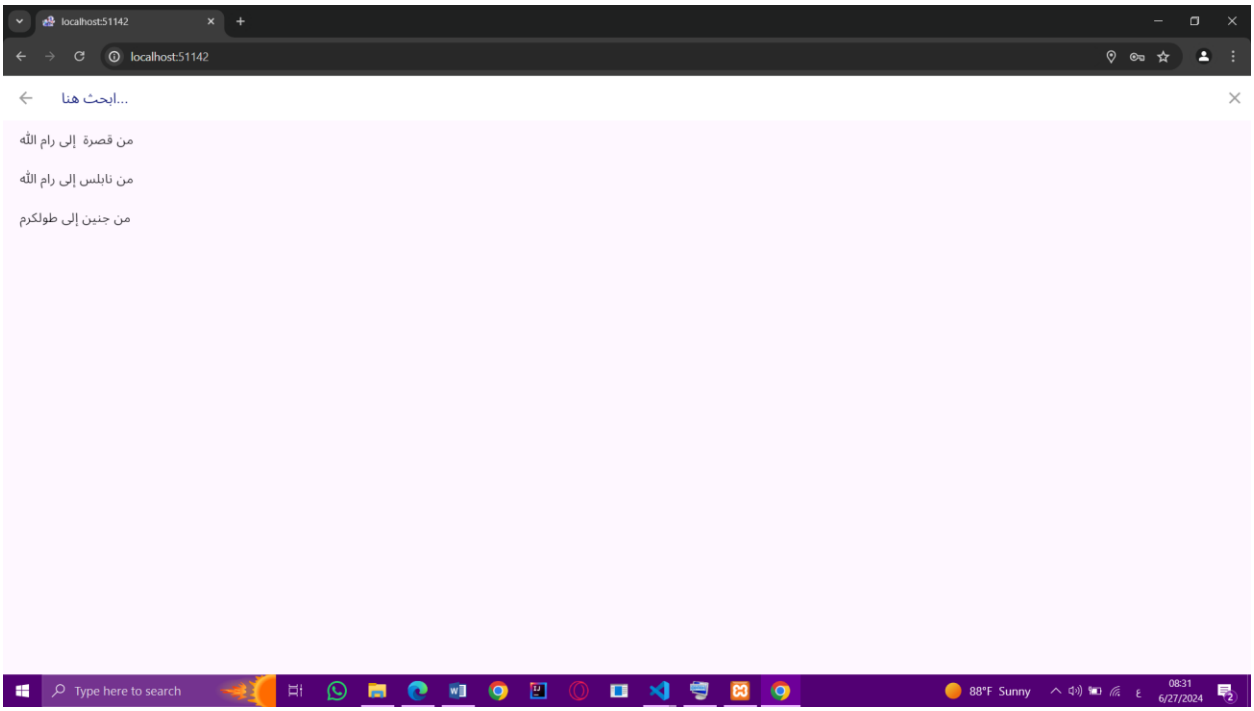
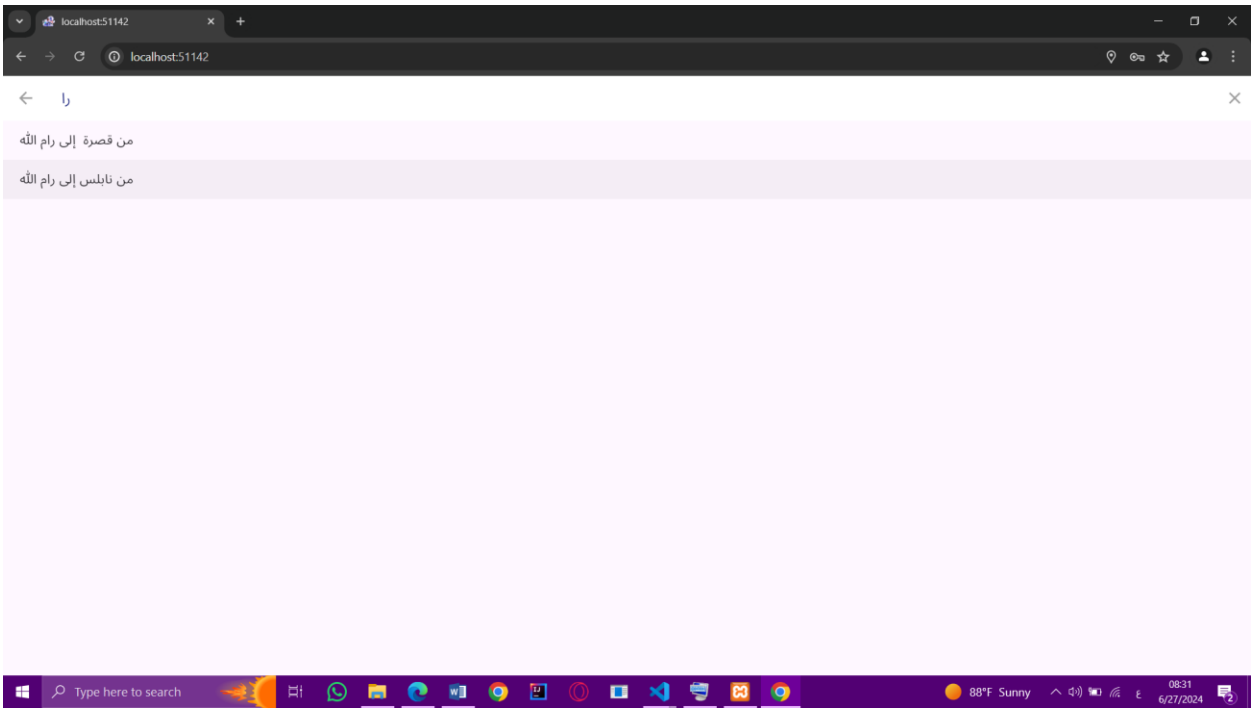
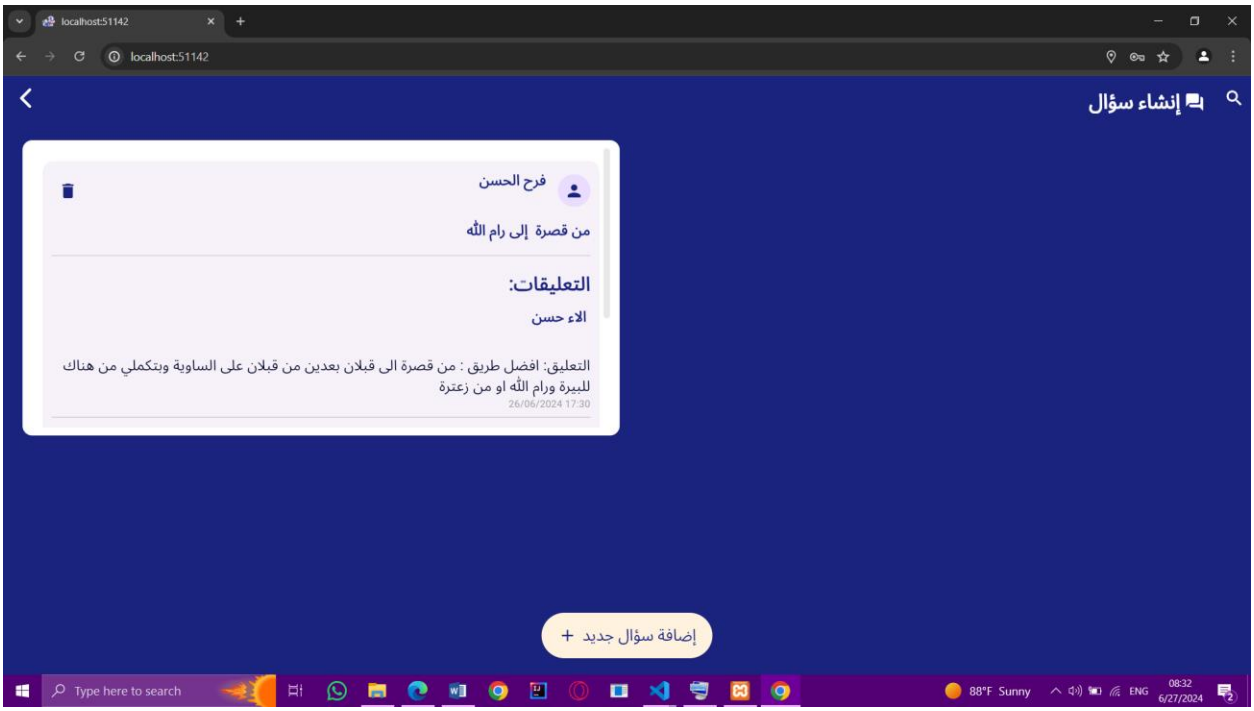
إنشاء سؤال
حذف المسار
هل انت متأكد من حذفك لهذا المسار؟
الغاء
حذف
إضافة سؤال جديد
Type here to search
Ready for fun?
08:24
6/27/2024


localhost:51142
إنشاء سؤال
فرح الحسن
من نابلس إلى رام الله
التعليقات:
الاء حسن
التعليق: من المربعة وبعدين على بورين وحوارة وزعترة وبتكمل مستقيم على رام الله
22/06/2024 17:51
فرح الحسن
من قصرة إلى رام الله
التعليقات:
الاء حسن
التعليق: افضل طريق : من قصرة الى قبلان بعدين من قبلان على الساوية وبتكملي من هناك للبيرة ورام الله او من زعترة
26/06/2024 17:30
الاء حسن
من جنين إلى طولكرم
التعليقات:
إضافة سؤال جديد
Type here to search
Ready for fun?
08:24
6/27/2024

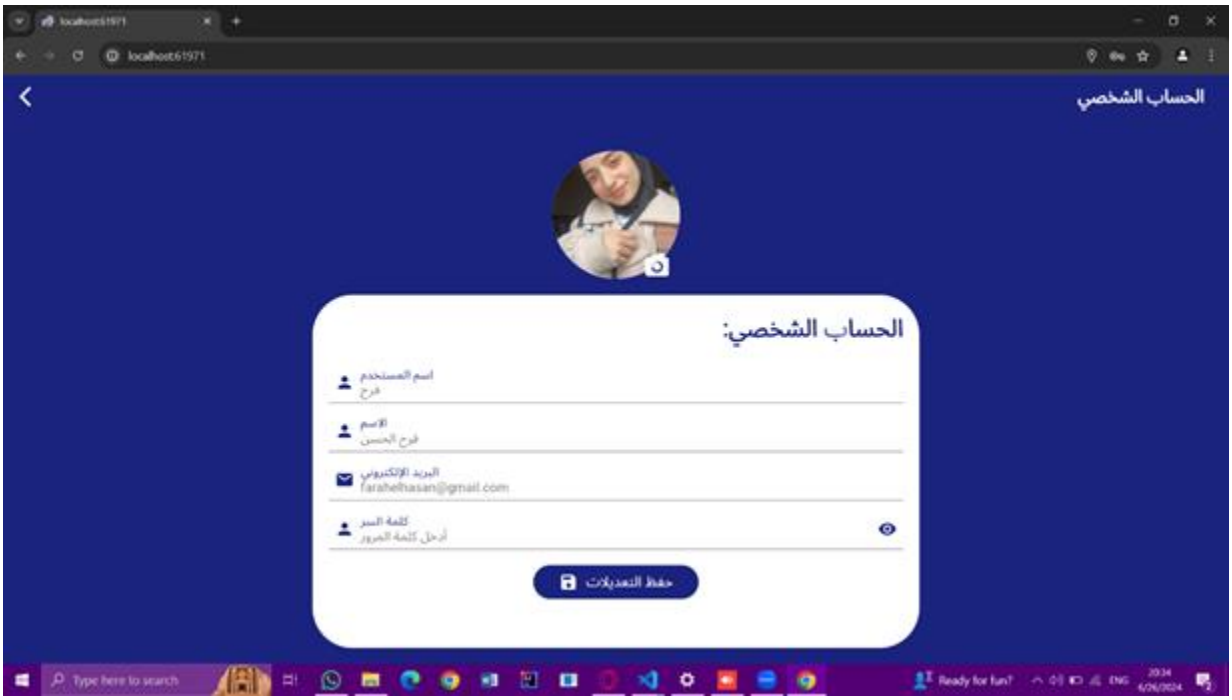

localhost:51142
إنشاء سؤال
فرح الحسن
من نابلس إلى رام الله
التعليقات:
الاء حسن
التعليق: من المربعة وبعدين على بورين وحوارة وزعترة وبتكمل مستقيم على رام الله
22/06/2024 17:51
فرح الحسن
من قصرة إلى رام الله
التعليقات:
الاء حسن
التعليق: افضل طريق : من قصرة الى قبلان بعدين من قبلان على الساوية وبتكملي من هناك للبيرة ورام الله او من زعترة
26/06/2024 17:30
الاء حسن
من جنين إلى طولكرم
التعليقات:
إضافة سؤال جديد
Type here to search
88°F Sunny
ENG
08:30
6/27/2024

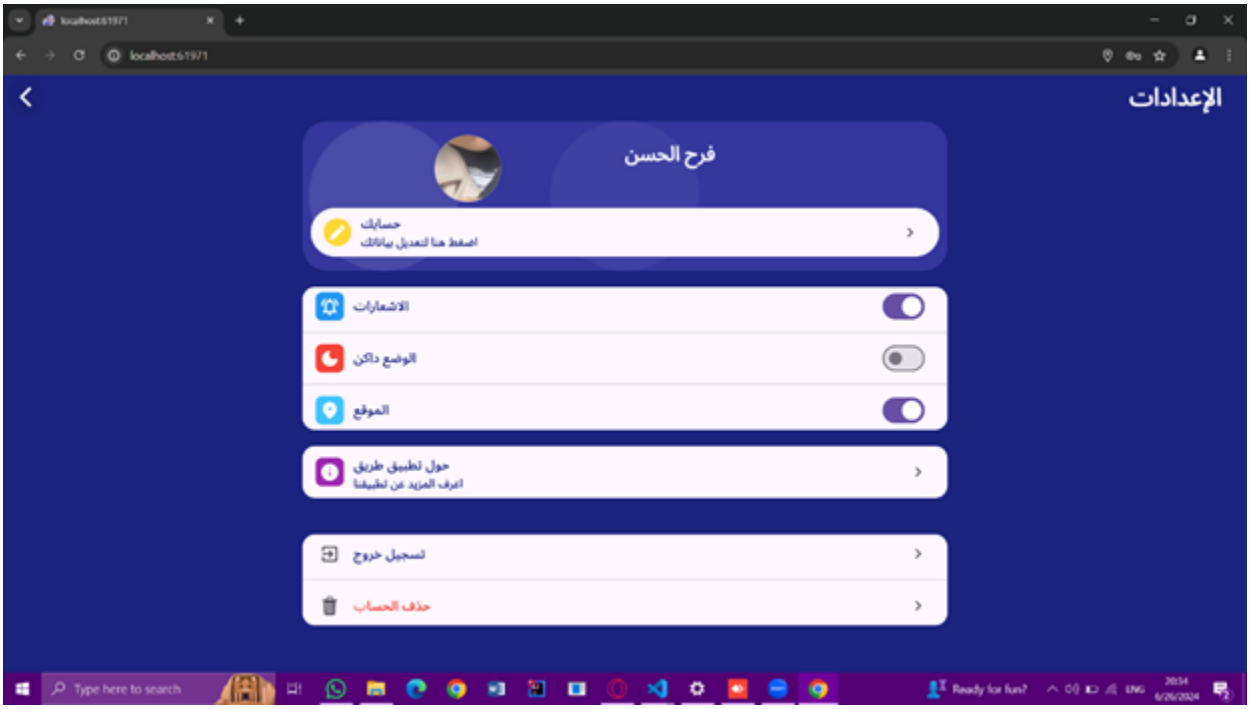

localhost:51142
localhost:51142
ابحث هنا...
من قصرة إلى رام الله
من نابلس إلى رام الله
من جنين إلى طولكرم
Type here to search
88°F Sunny
08:31
6/27/2024


localhost:51142
localhost:51142
را
من قصرة إلى رام الله
من نابلس إلى رام الله
Type here to search
88°F Sunny
08:31
6/27/2024

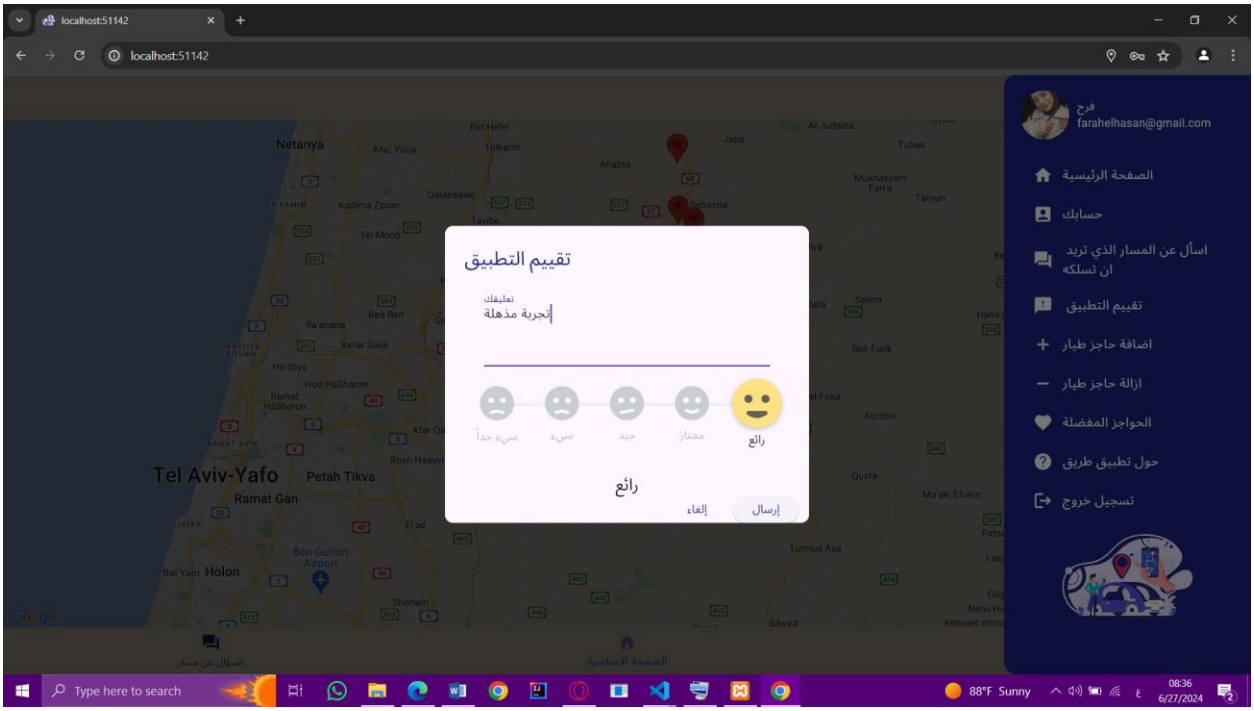


- Drawer (list on the left of home page)
  1. Settings Page

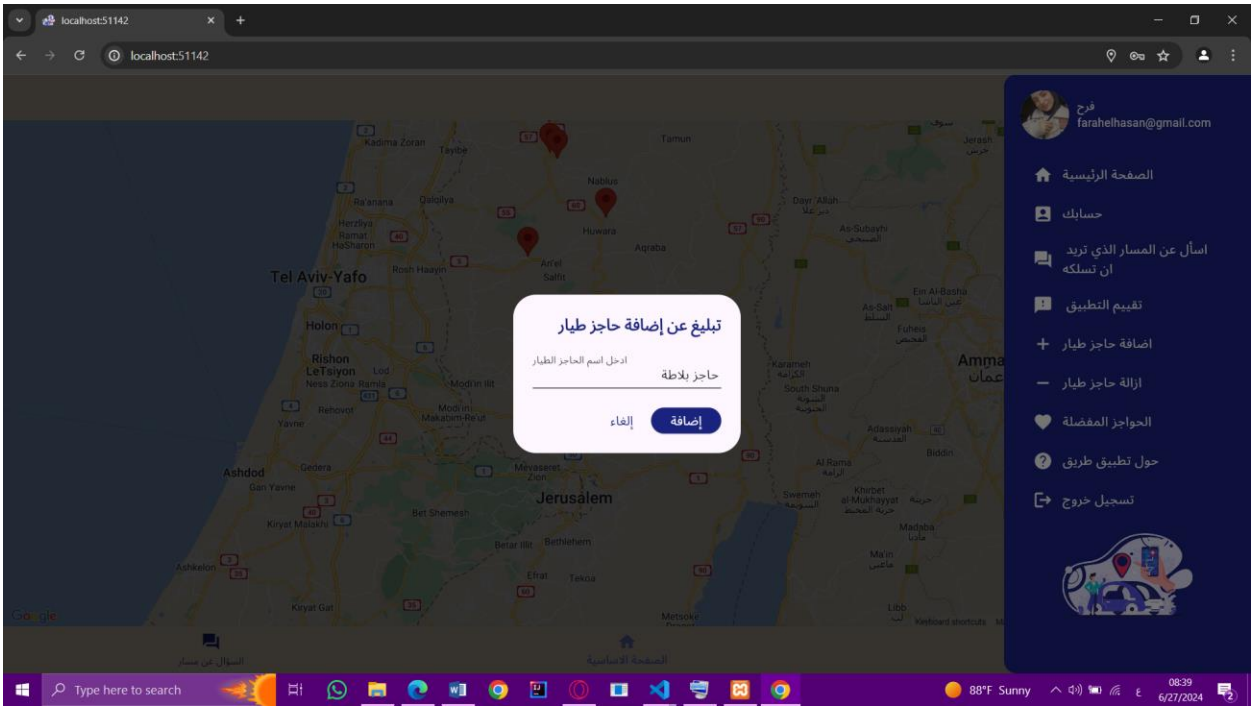


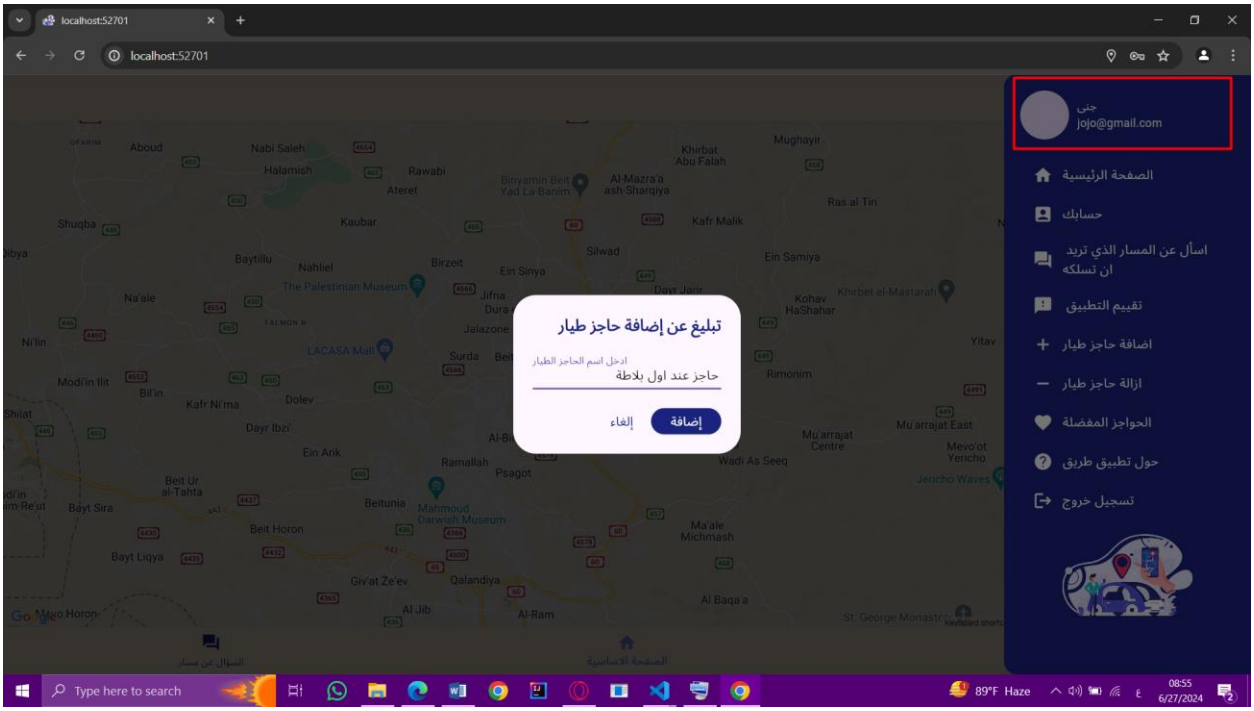


2. Evaluation

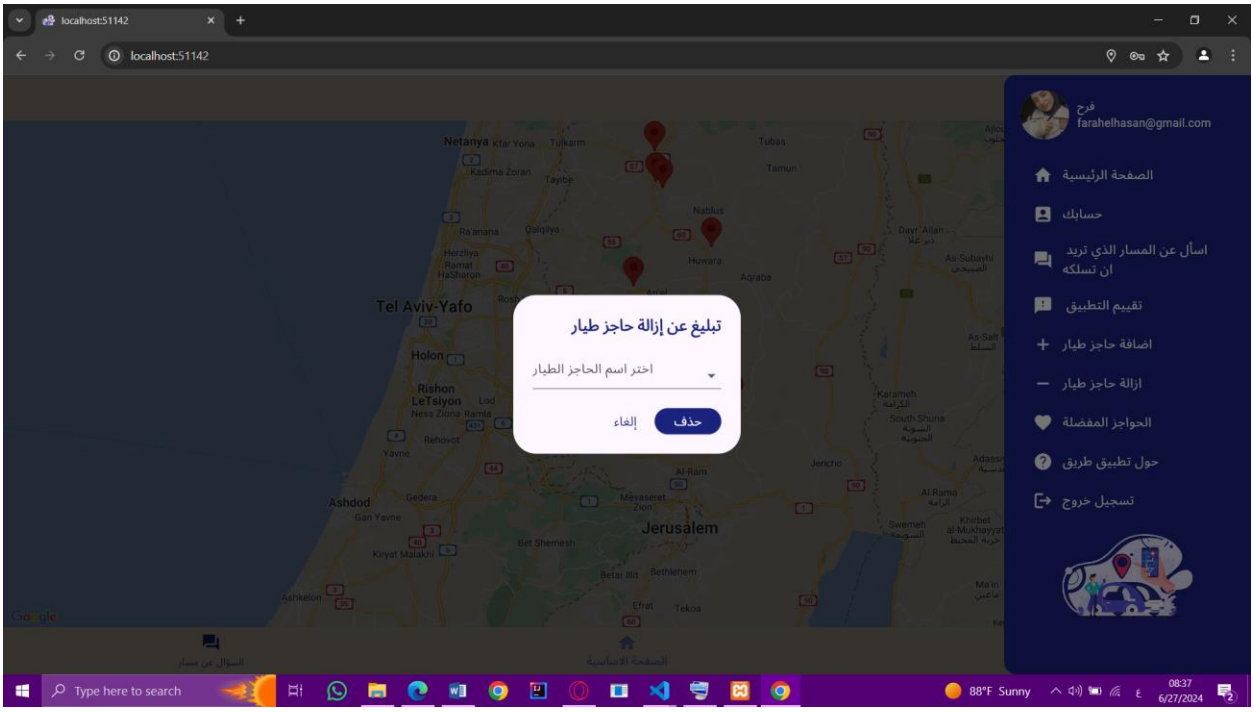


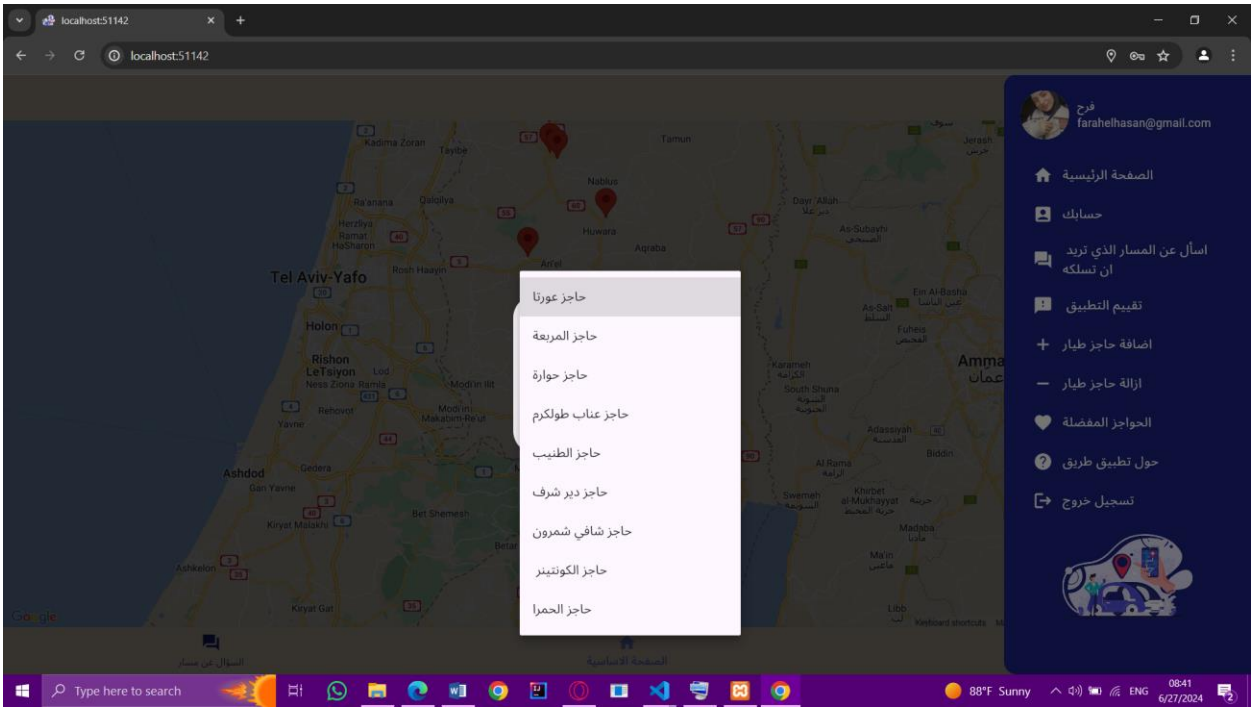
3. Add temporary checkpoint need two or more request to add it



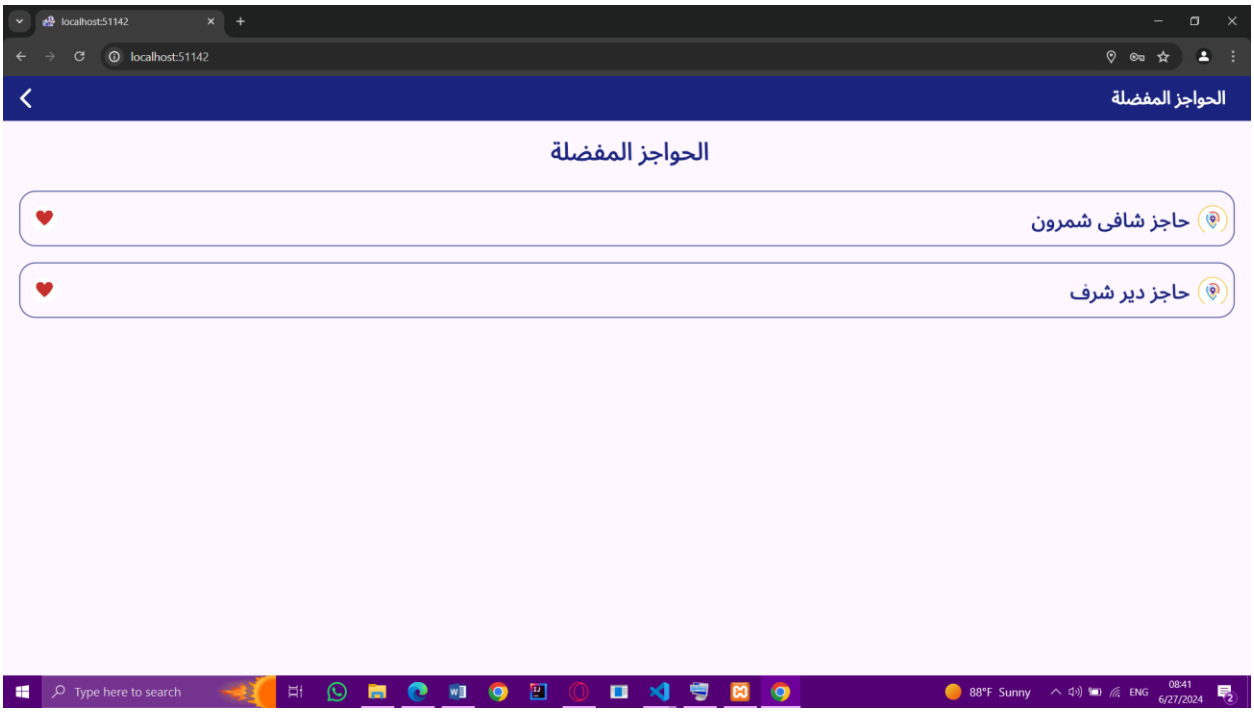


4. Remove temporary checkpoint.

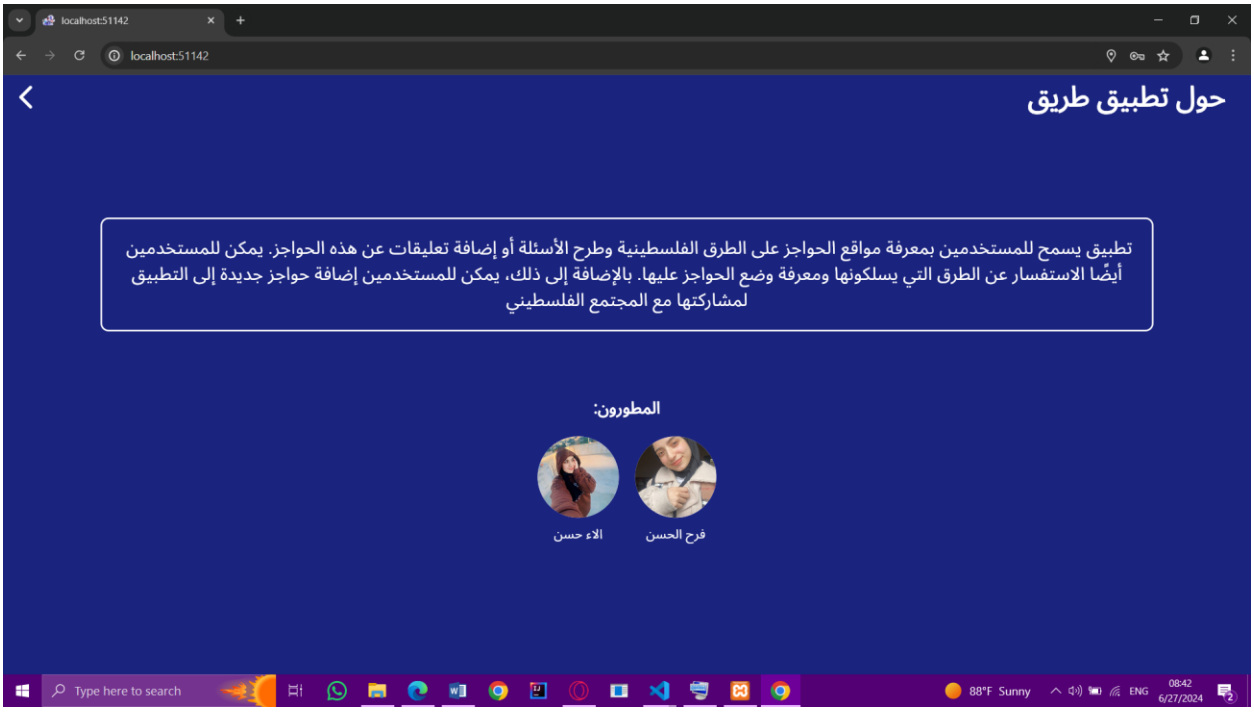




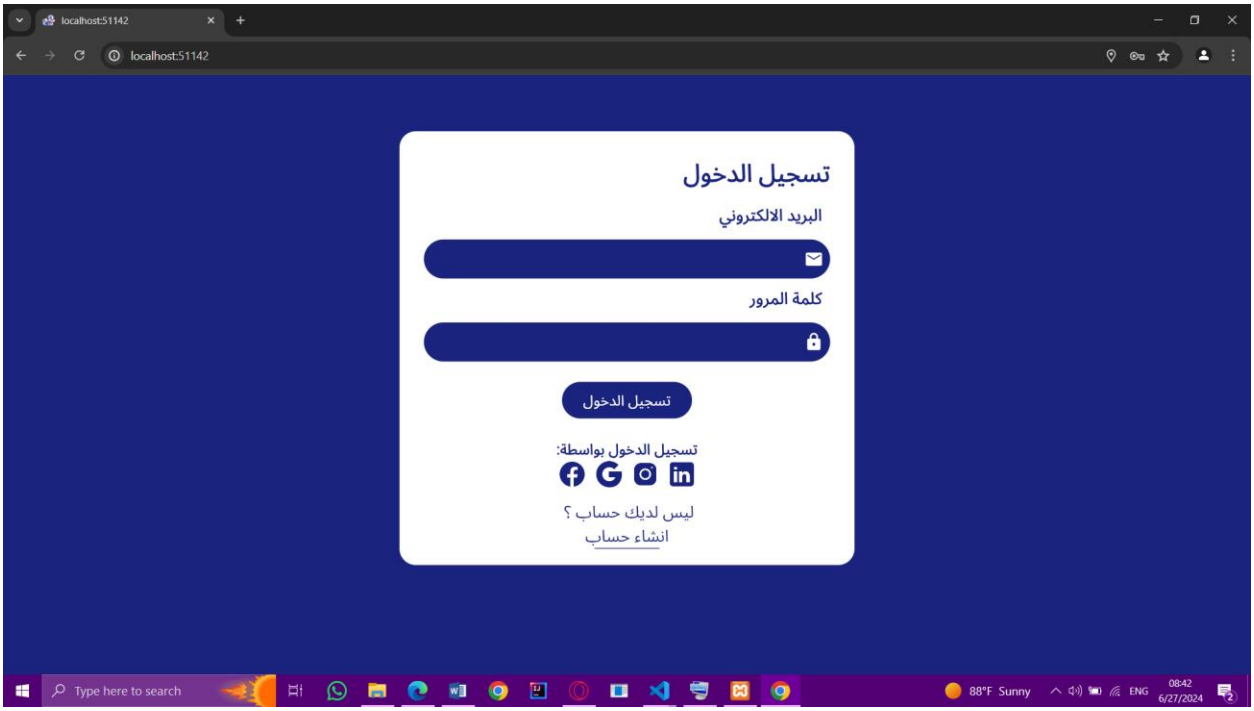
5. Favorite checkpoints



6. About Tareeq App

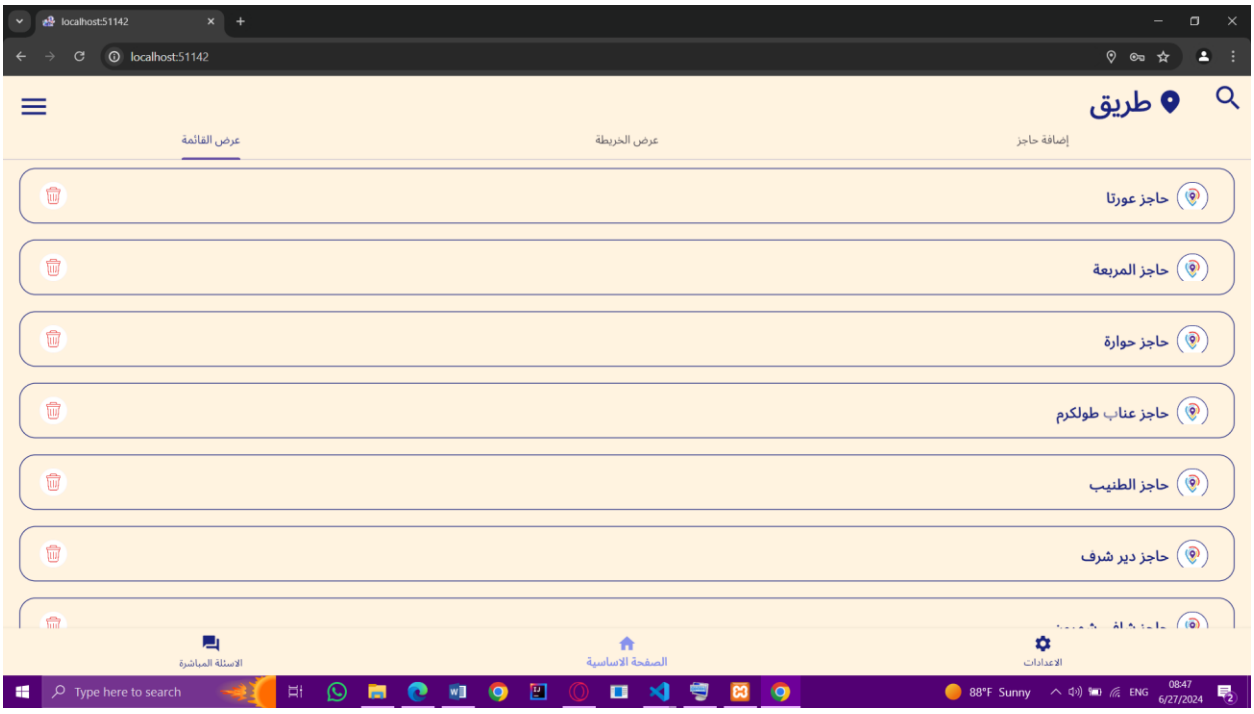


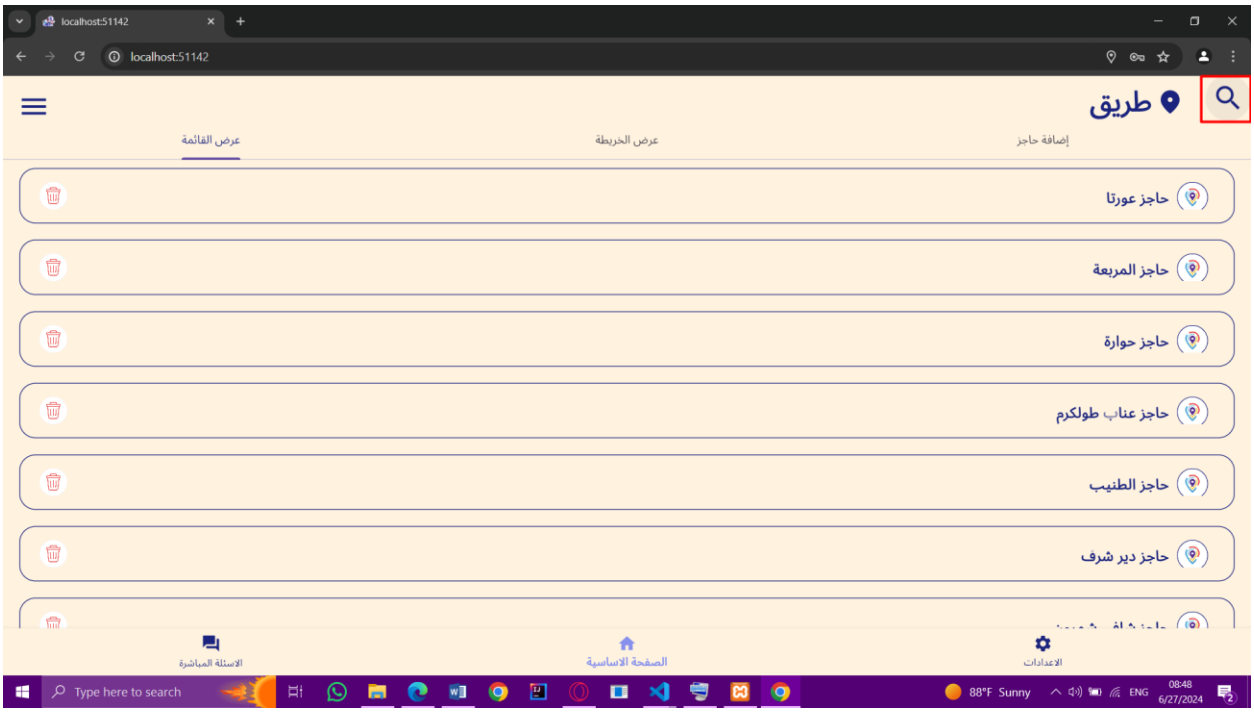
7. Logout, will then go to login page again.

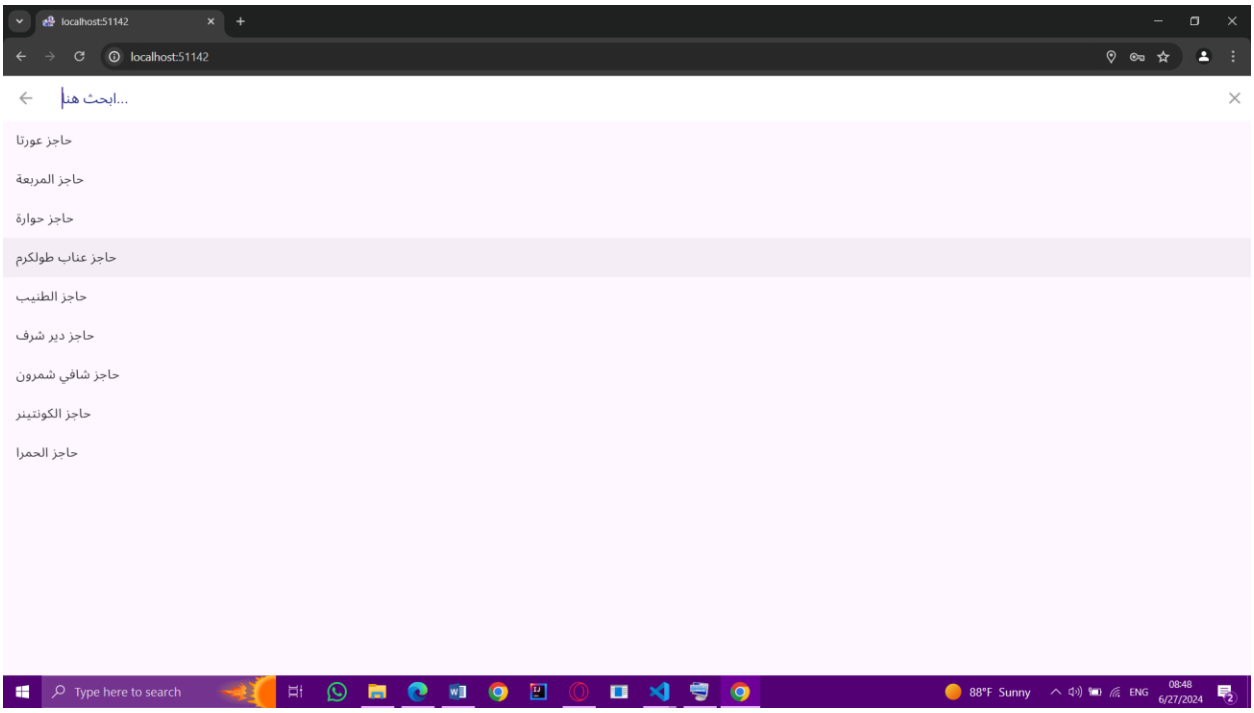


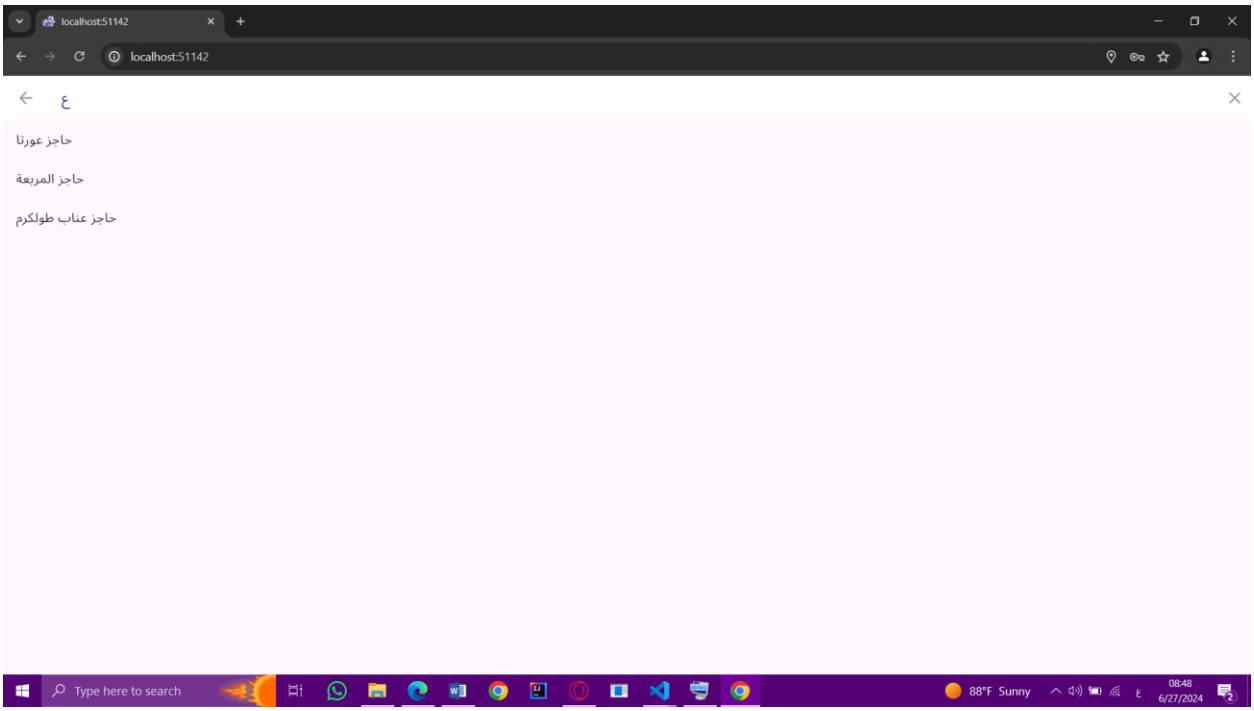
3.3.1.2 Use “Tareeq” as an ADMIN:

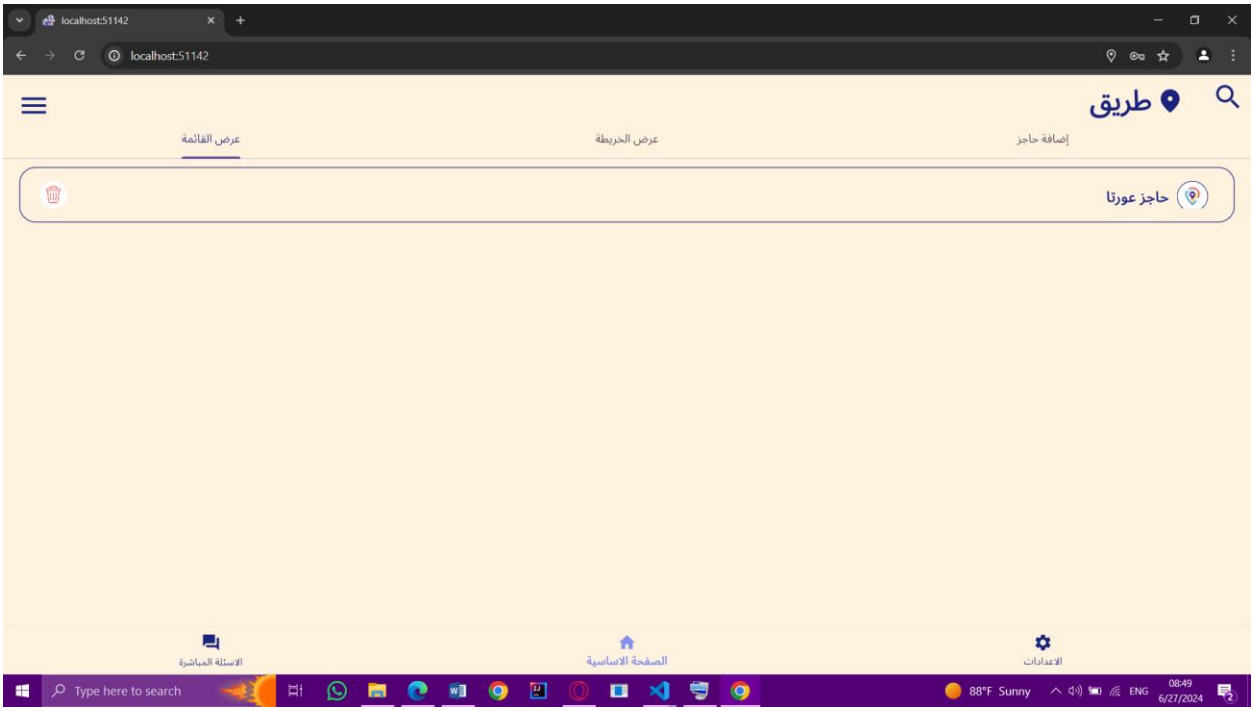
- Home Page (Map Page) : with tree taps.




localhost:51142
طريق
إضافة حاجز
عرض الخريطة
عرض القائمة
حاجز عورتا
حاجز المربعة
حاجز حوارة
حاجز عناب طولكرم
حاجز الطنيب
حاجز دير شرف
الاعدادات
الصفحة الاساسية
الاسئلة المباشرة
Type here to search
88°F Sunny
ENG
08:48
6/27/2024

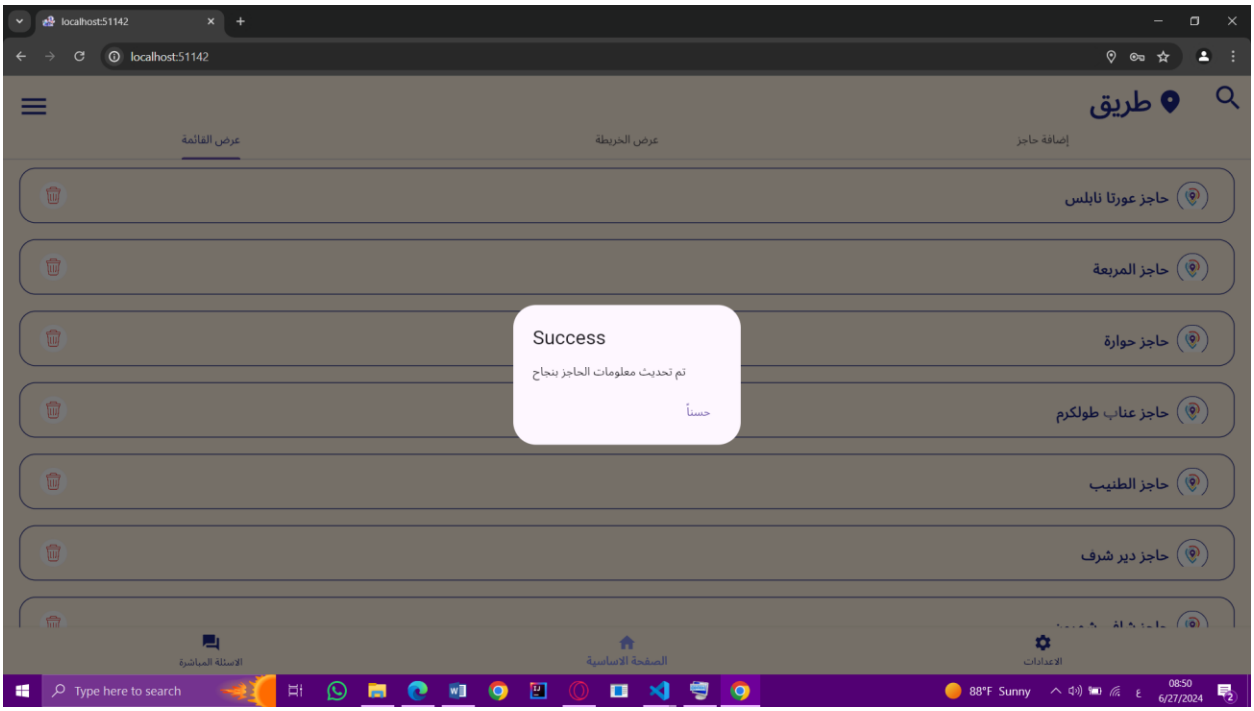

localhost:51142
ابحث هنا...
حاجز عورتا
حاجز المربعة
حاجز حوارة
حاجز عناب طولكرم
حاجز الطنيب
حاجز دير شرف
حاجز شافي شمرون
حاجز الكونتينر
حاجز الحمرا
Type here to search
88°F Sunny
ENG
08:48
6/27/2024

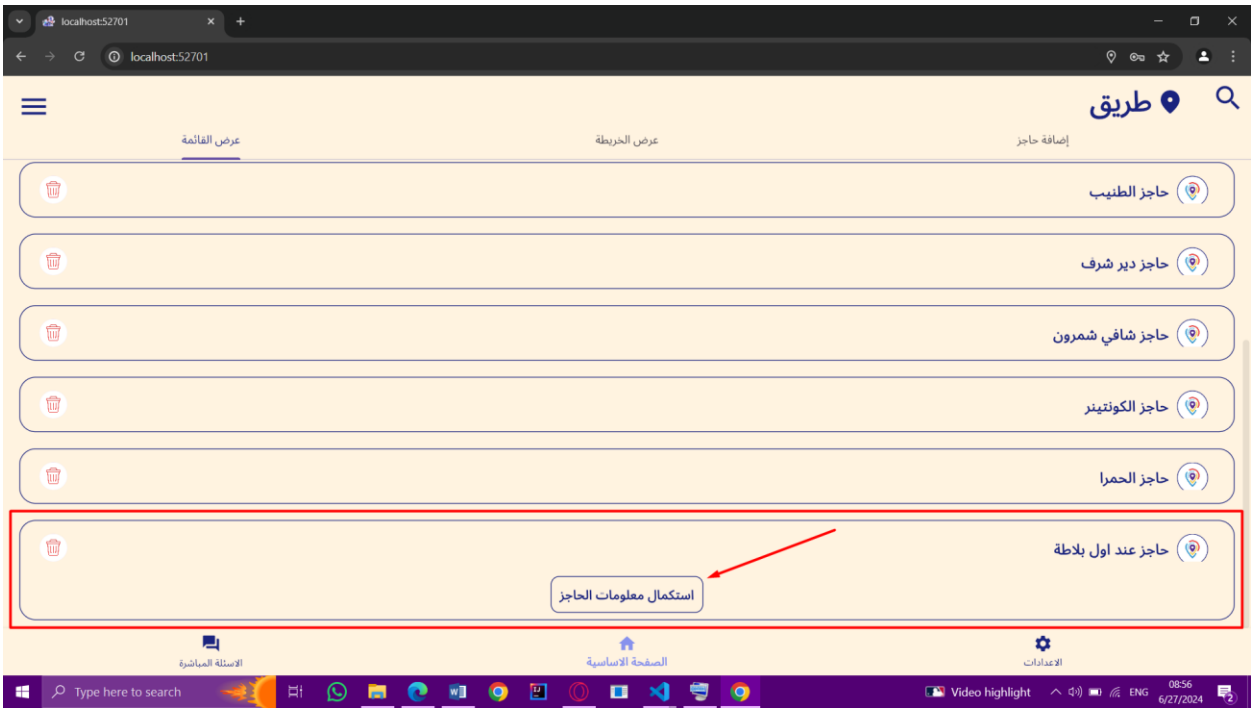

localhost:51142
localhost:51142
ع
حاجز عورتا
حاجز المربعة
حاجز عناب طولكرم
Type here to search
88°F Sunny
ع
08:48
6/27/2024


localhost:51142
localhost:51142
طريق
عرض القائمة
عرض الخريطة
إضافة حاجز
حاجز عورتا
الاسئلة المباشرة
الصفحة الاساسية
الاعدادات
Type here to search
88°F Sunny
ENG
08:49
6/27/2024

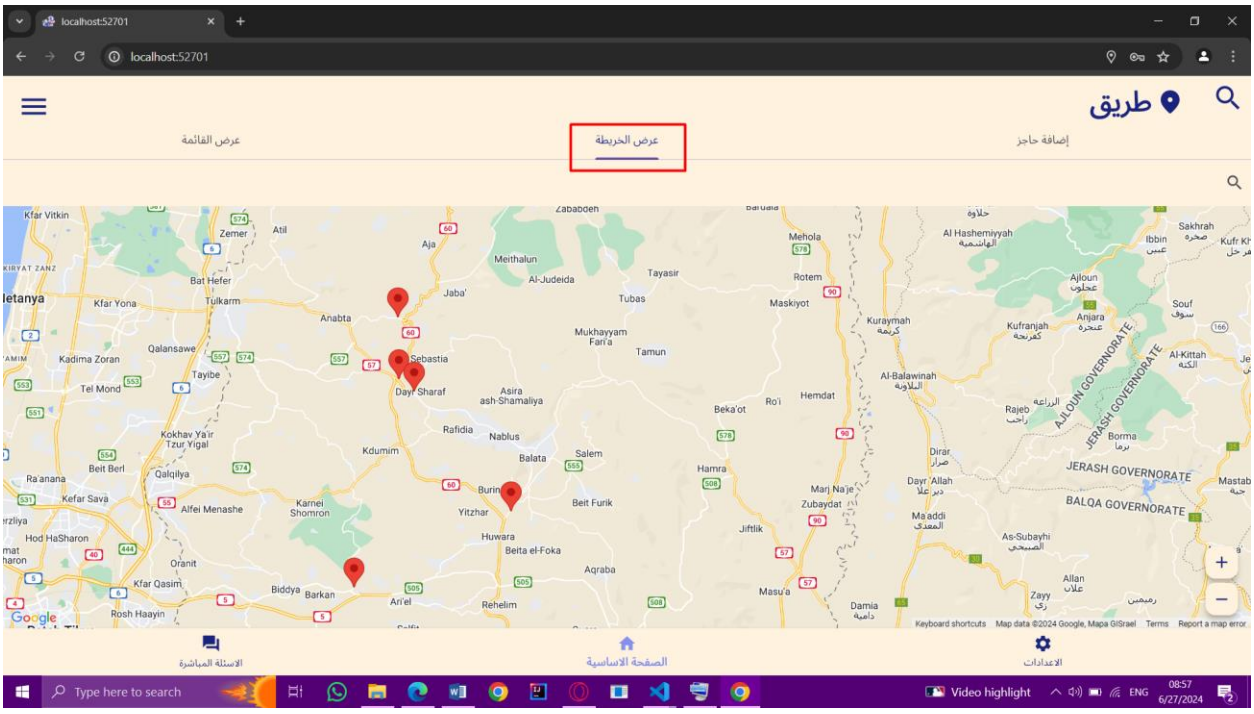

localhost:51142
طريق
تعديل معلومات الحاجز:
الاسم:
حاجز عورتا
الداخل:
ازمة
الوقت المتوقع للانتظار (داخل) :
30.24
الخارج:
سالك
الوقت المتوقع للانتظار (خارج) :
10.3
تم التحديث في
2024-06-26T17:46:42.000Z
تحديث المعلومات
Type here to search
88°F Sunny
ENG
08:49
6/27/2024

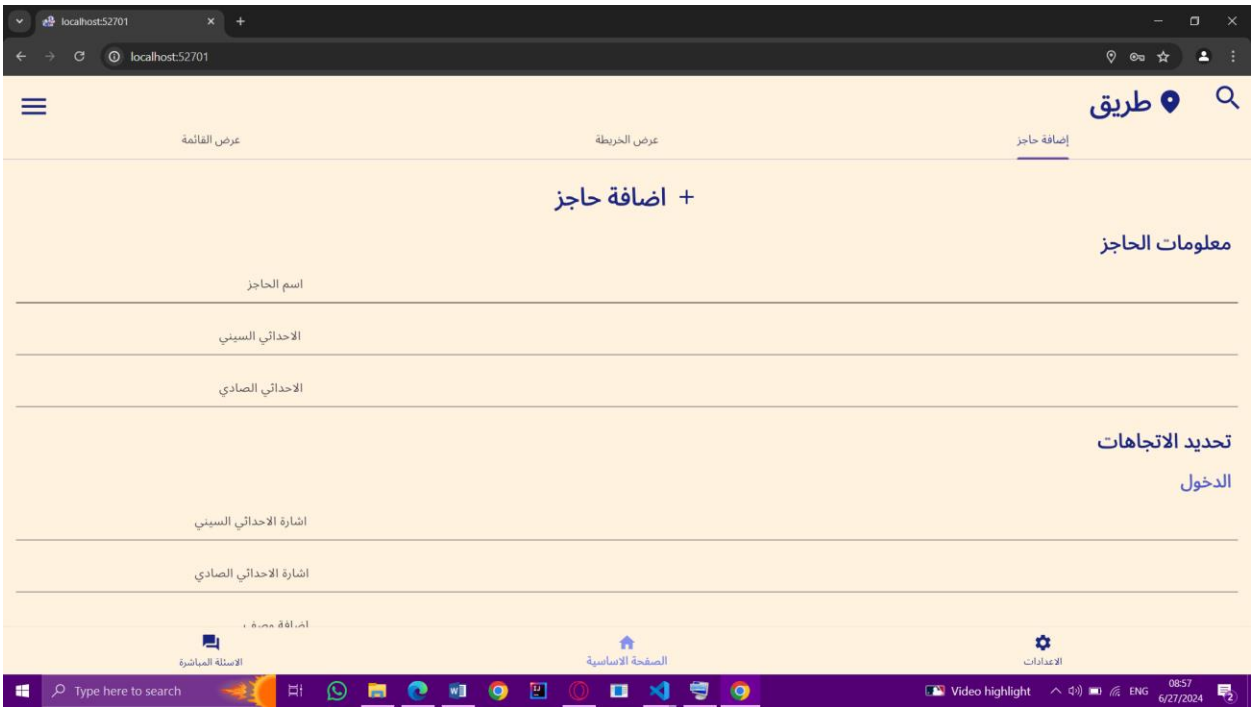

localhost:51142
طريق
تعديل معلومات الحاجز:
الاسم:
حاجز عورتا نابلس
الداخل:
ازمة
الوقت المتوقع للانتظار (داخل) :
30.24
الخارج:
سالك
الوقت المتوقع للانتظار (خارج) :
10.3
تم التحديث في
2024-06-26T17:46:42.000Z
تحديث المعلومات
Type here to search
88°F Sunny
08:50
6/27/2024


localhost:51142
طريق
عرض القائمة
عرض الخريطة
إضافة حاجز
حاجز عورتا نابلس
حاجز المربعة
حاجز حوارة
حاجز عناب طولكرم
حاجز الطنيب
حاجز دير شرف
Success
تم تحديث معلومات الحاجز بنجاح
حسناً
الاسئلة المباشرة
الصفحة الاساسية
الاعدادات
Type here to search
88°F Sunny
08:50
6/27/2024


localhost:52701
طريق
عرض القائمة
عرض الخريطة
إضافة حاجز
حاجز الطنيب
حاجز دير شرف
حاجز شافي شمرون
حاجز الكونتينر
حاجز الحمرا
حاجز عند اول بلاطة
استكمال معلومات الحاجز
الاسئلة المباشرة
الصفحة الاساسية
الاعدادات
Type here to search
Video highlight
ENG
08:56
6/27/2024


localhost:52701
استكمال معلومات الحاجز
+ استكمال معلومات الحاجز
تحديد الاتجاهات
الدخول
اشارة الاحداثي السيني
اشارة الاحداثي الصادي
اضافة وصف
الخروج
اشارة الاحداثي السيني
اشارة الاحداثي الصادي
اضافة وصف
اضافة
Type here to search
Video highlight
ENG
08:57
6/27/2024


localhost:52701
طريق
إضافة حاجز
عرض الخريطة
عرض القائمة
Kfar Vitkin
Zemer
Atil
Aja
Meithalun
Al-Judeida
Tayasir
Bat Hefer
Tulkarm
Jaba'
Tubas
Mehola
Rotem
Maskiyot
Al Hashemiyyah
Sakhrah
Ibbin
Kfar Yona
Anabta
Mukhayyam Far'a
Tamun
Kuraymah
Ajloun
Anjara
Kufranjah
Souf
Qalansawe
Kadima Zoran
Tayibe
Sebastia
Dayr Sharaf
Asira ash-Shamaliya
Al-Balawinah
Al-Kittah
Tel Mond
Rafidia
Nablus
Hemdat
Beka'ot
Ro'i
Rajeb
AJLOUN GOVERNORATE
JERASH GOVERNORATE
Kokhav Ya'ir Tzur Yigal
Kdumim
Balata
Salem
Hamra
Dirar
Borma
Beit Berl
Qalqilya
Ra'anana
Kefar Sava
Alfei Menashe
Karnei Shomron
Burin
Yitzhar
Beit Furik
Marj Na'je
Zubaydat
Dayr Allah
JERASH GOVERNORATE
BALQA GOVERNORATE
Hod HaSharon
Huwara
Beita el-Foka
Jiftlik
Ma'addi
As-Subayhi
Oranit
Kfar Qasim
Biddya
Barkan
Ari'el
Aqraba
Masu'a
Rehelim
Damia
Allan
Zayy
Rosh Haayin
Google
Keyboard shortcuts
Map data ©2024 Google, Mapa GISrael
Terms
Report a map error
الاسئلة المباشرة
الصفحة الاساسية
الاعدادات
Type here to search
Video highlight
ENG
08:57
6/27/2024


localhost:52701
طريق
إضافة حاجز
عرض الخريطة
عرض القائمة
+ اضافة حاجز
معلومات الحاجز
اسم الحاجز
الاحداثي السيني
الاحداثي الصادي
تحديد الاتجاهات
الدخول
اشارة الاحداثي السيني
اشارة الاحداثي الصادي
الاعدادات
الصفحة الاساسية
الاسئلة المباشرة
Type here to search
Video highlight
ENG
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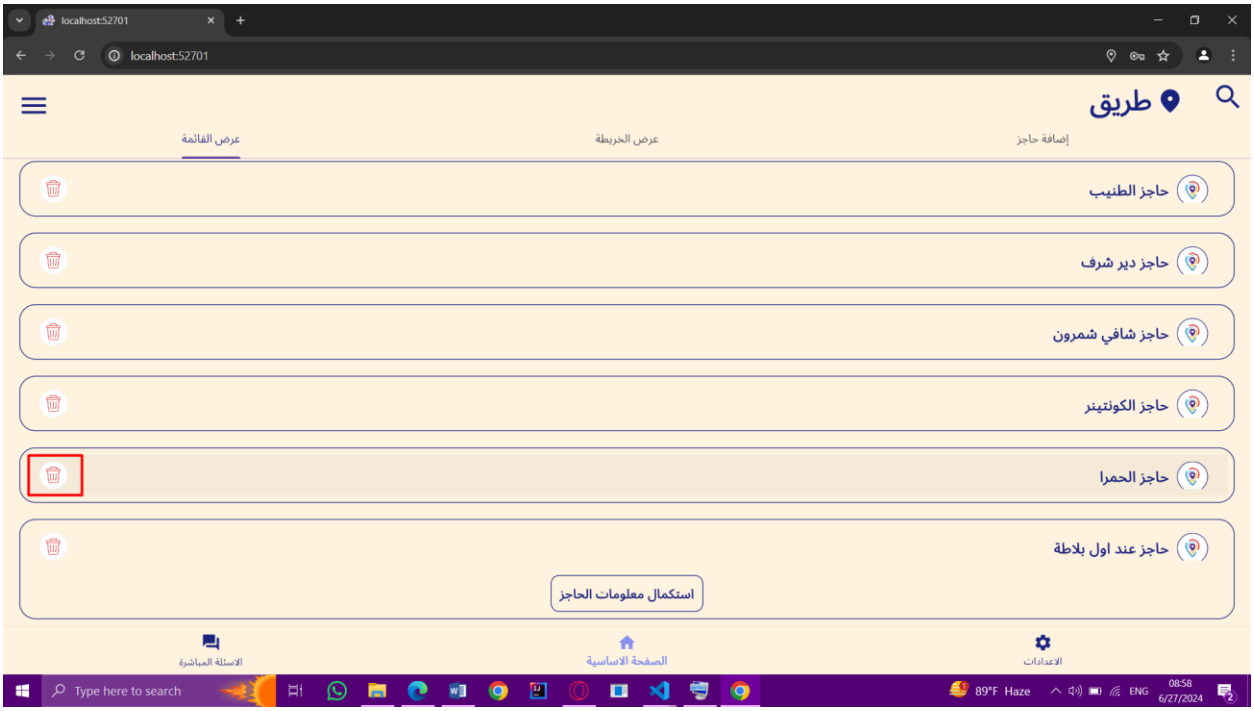
6/27/2024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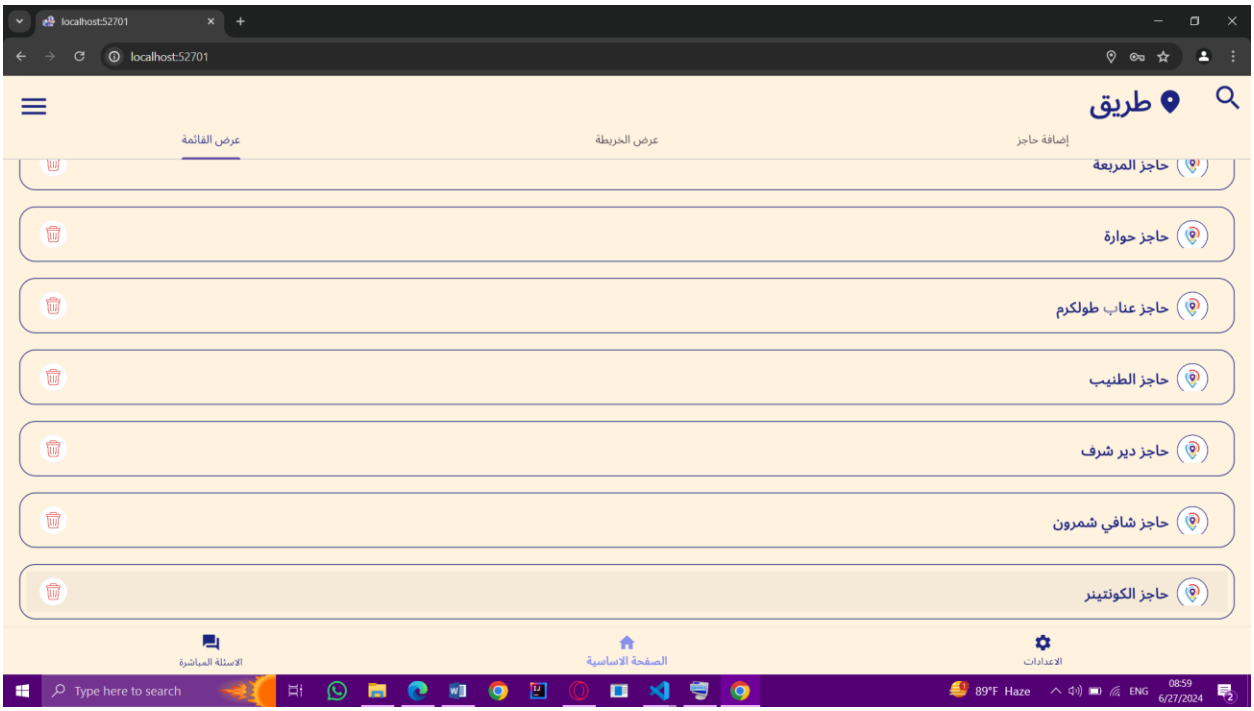
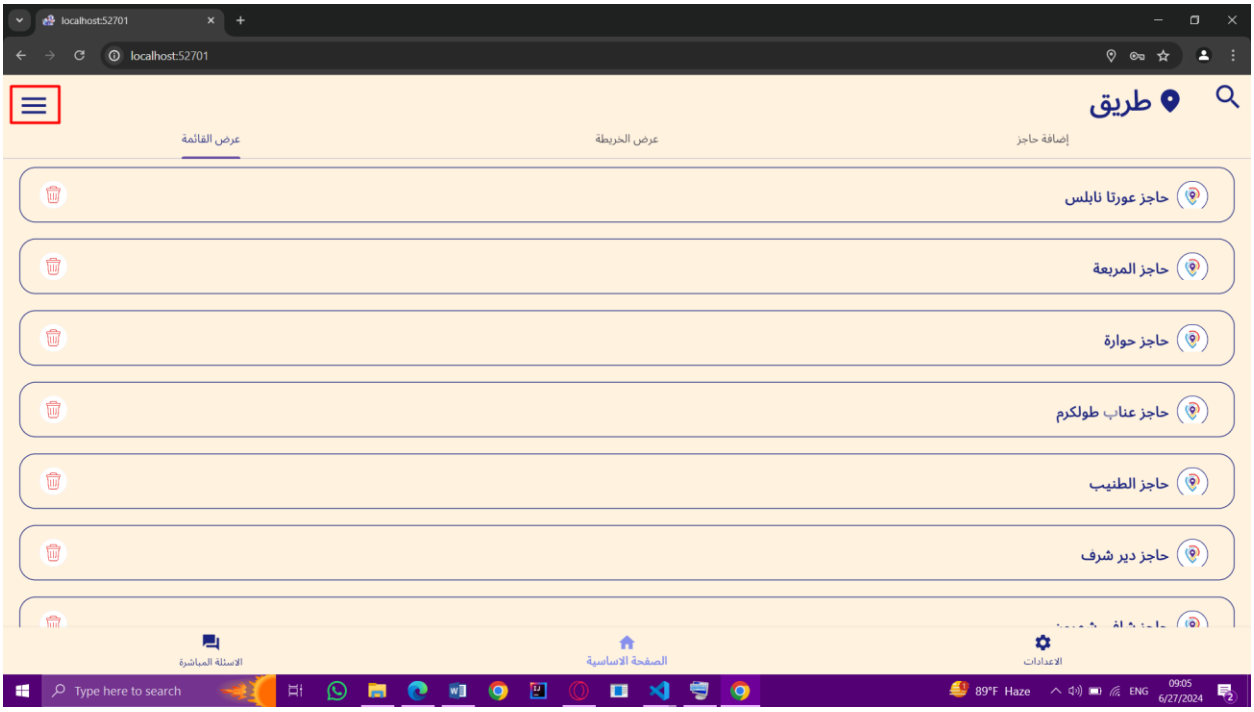
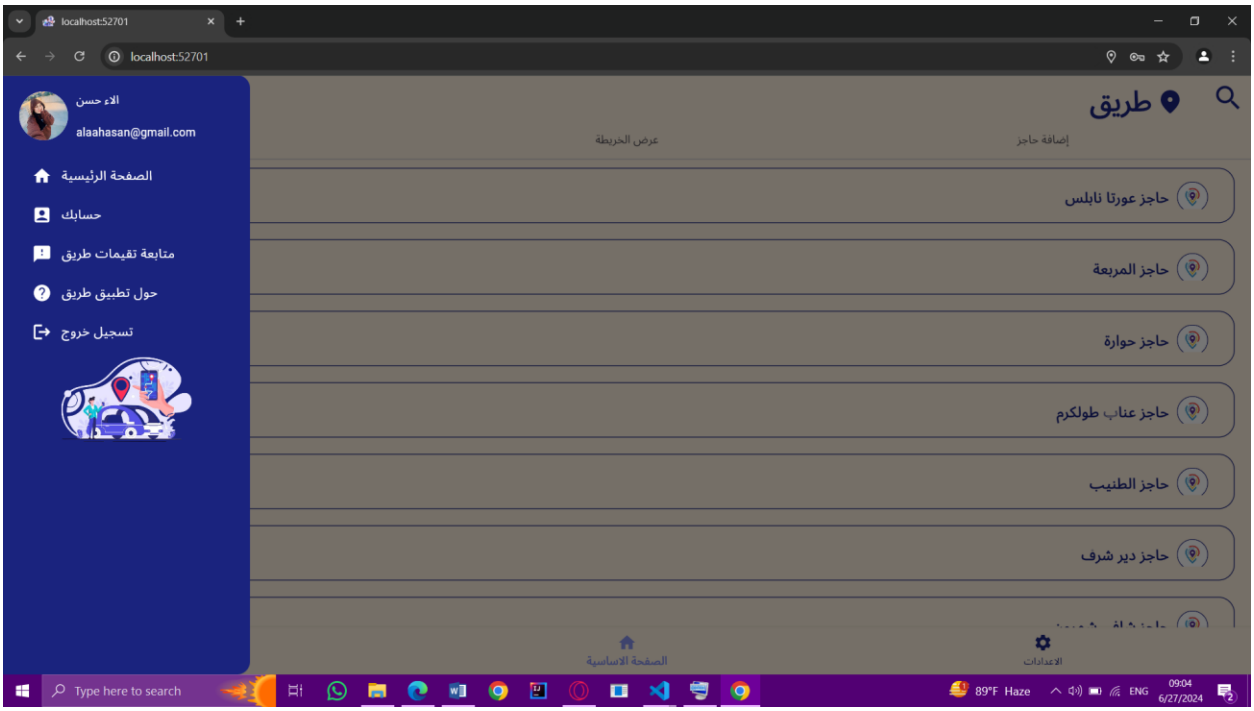
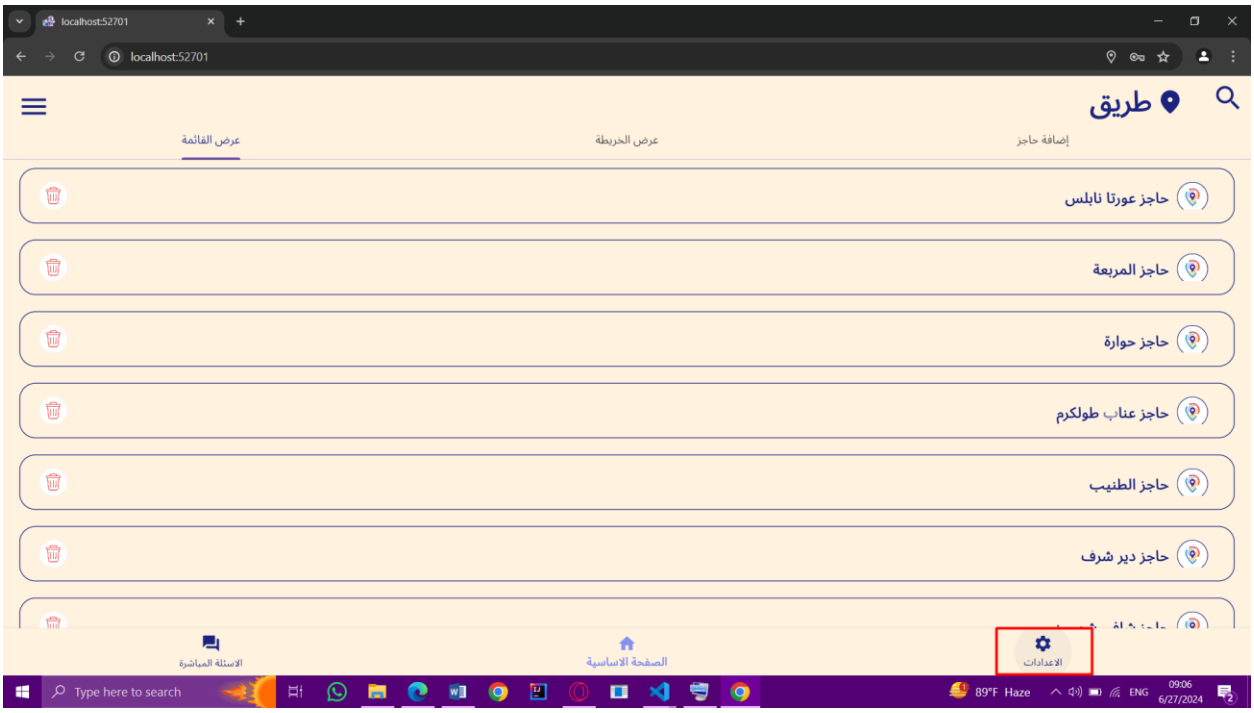


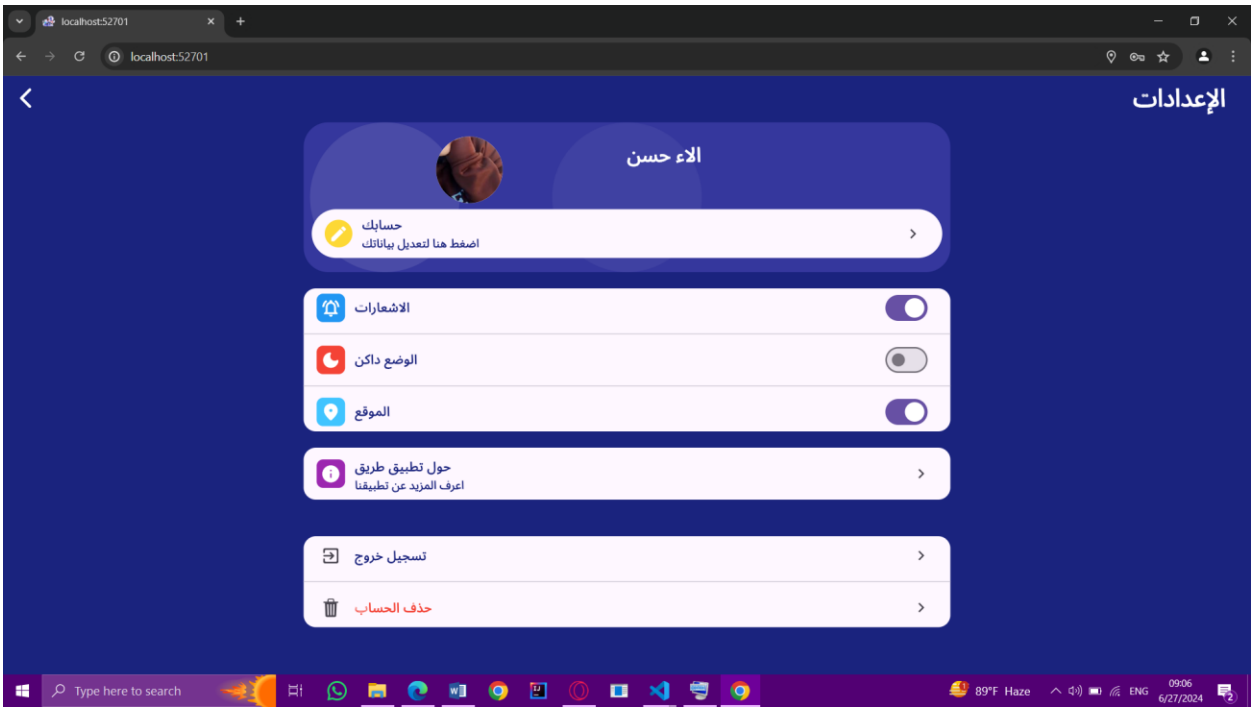
- Drawer (list on the left of home page)



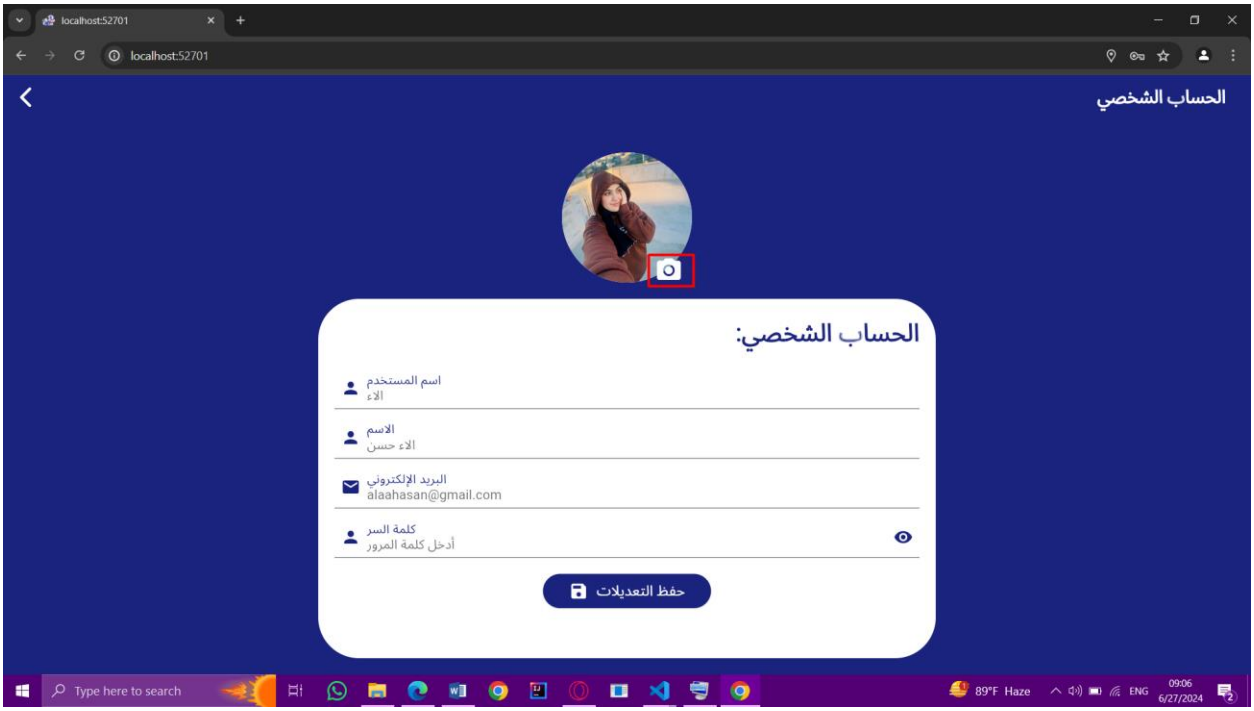


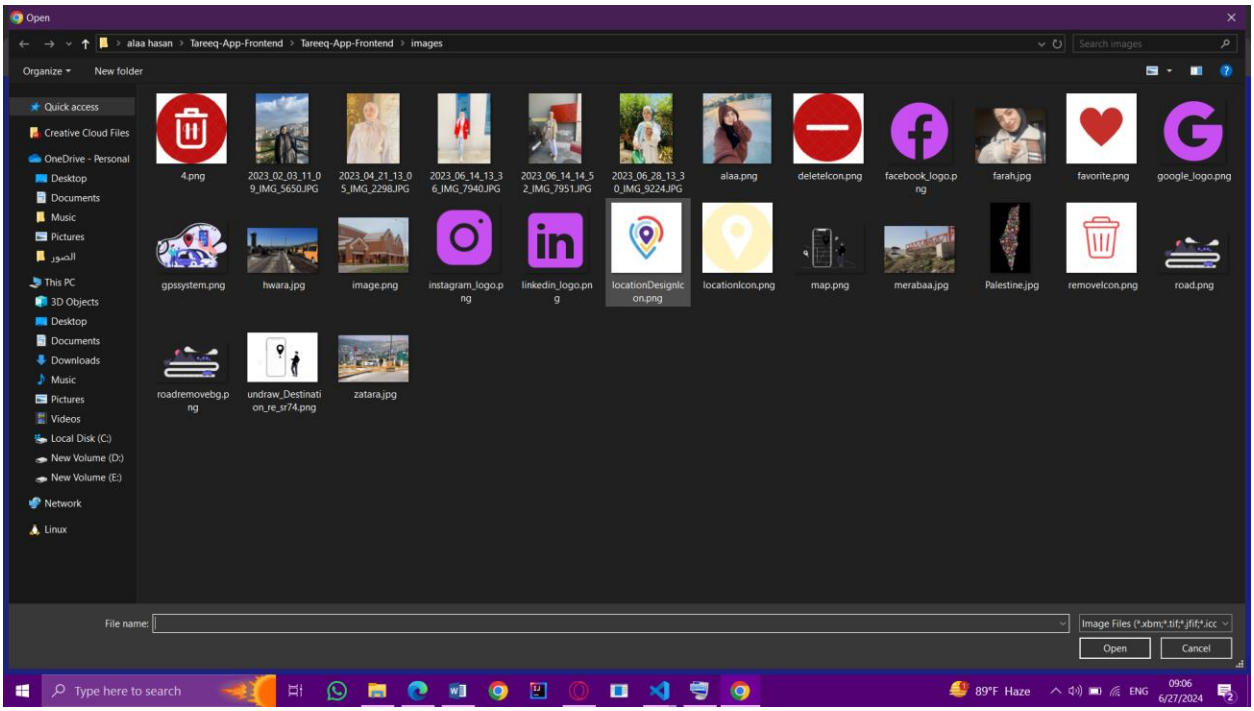
- Settings Page





- Profile Page: the user can update the image.

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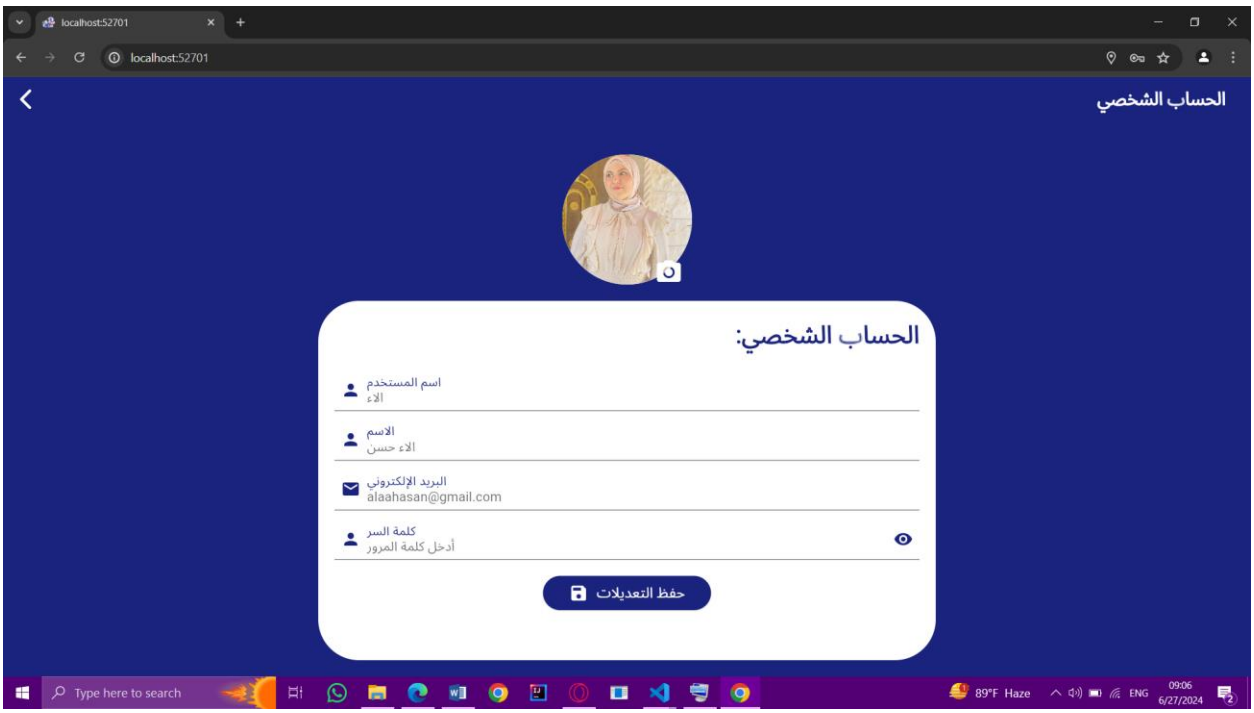
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اسم المستخدم
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البريد الإلكتروني
alaahasan@gmail.com
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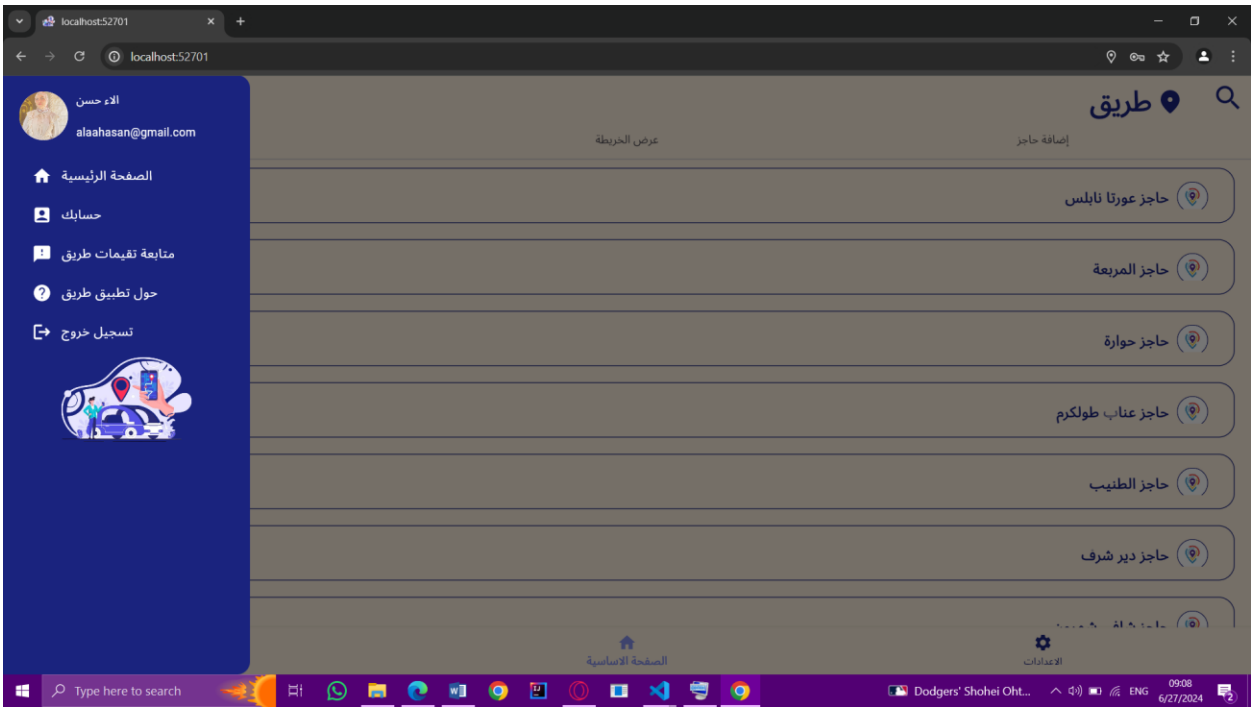
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Chapter 4: Result And Discussion

Thanks to God, we have succeeded in developing our “Tareeq” application, which is a platform to facilitate movement between cities in Palestine through continuous updates on the status of checkpoints in the West Bank.

Users can use the “Tareeq” application either through the mobile application or the web, which gives users the ability to benefit from effective and easy-to-use features, with a focus on making the design user-friendly, simple and clear to ensure ease of use.

By using “Tareeq”, there is no need to worry about a lot of information and news about the status of a particular checkpoint, which may be inaccurate, and there is no longer any need to search for a long time for a specific information among many messages and news to know the status of a specific checkpoint. The application makes it easy to plan travel, access specific information, and benefit from the recommendations of others. In addition, the presence of an administrator in the Tareeq application helps in constant follow-up and continuous auditing.

4.1. CONSTRAINTS

During the journey of developing the Tareeq application, we faced several challenges, through which we learned many new information, ways of solving and thinking.

1. Map Features and GPS Accuracy:

   Since the map is the main feature of a route app, we faced several challenges in handling simulation and tracking. Testing these features was not easy, both because the emulator was not very accurate, and also because of limitations in the GPS accuracy in the emulator. To overcome this, we place checkpoints in locations that can be easily moved for testing purposes. But we also faced the problem of restrictions imposed on Palestinians, which confuse the GPS and give out locations in other countries. Since it is not easy to constantly test the feature of simulating a specific track using an actual mobile phone, because during the development phase you change and modify a lot, the greatest reliance was on the emulator. To solve the accuracy issue in the emulator, we researched and determined that a threshold value should be implemented to account for GPS inaccuracy when determining whether a user has reached a checkpoint or not.

2. Direction of the checkpoint:

   Since the checkpoint can be crossed via two opposite paths, it was difficult to determine the user’s current direction when crossing the checkpoint. Is he entering the city or an exit from the city? We need to know this in order to know the waiting time that was measured for any path.

   Because each checkpoint has a special status and there is no general status for all checkpoints to solve, the problem was solved by using the Lock-up Table as mentioned previously in the report.

3. Google Cloud Integration:

   It was not easy to store images in Google Cloud and connect them with the main database, as it required careful processing and troubleshooting.

4. We had difficulty getting the exact location of the checkpoint locations on the map.

Despite the challenges, we succeeded in developing the “Tareeq” application with all its special features to make it easier for users.

Chapter 5: Conclusion And Recommendation

5.1. SUMMARY

The “Tareeq” application was developed and designed to facilitate movement between cities in the West Bank, by providing users with comprehensive information about the checkpoint they may pass on their way, enabling them to better plan their trips.

The development process included resolving various limitations, including code errors, designing a suitable database, saving information in the best way without overloading the database, dealing with map and GPS features, and managing and determining directions to checkpoints.

“Tareeq” provides a solution to a problem imposed on us, using a mobile or web application.

5.2. RECOMMENDATION

- Make a comprehensive plan before starting the project and determine the architecture with which you will build the project to suit the application, and plan significantly how the database will be built.
- Choose the technologies you want to use in the project based on what is appropriate for the project sent.
- Make sure to test each part separately first, and combine the parts in an integrated manner.

5.3. WHAT WE HAVE LEARNED

- We learned to use the flutter and the node-js to build a complete application.
- The correct use of MySQL Database and the use of Google Cloud to solve problems with pressure on databases.
- We learned how to do notification by using firebase.
- We know how to deal with map features (tracking and analysis) and learn strategies for handling GPS inaccuracies and testing location-based features.
- We learned how to solve some problems using Lookup Table when there is no general condition.

5.4. FUTURE WORK

- Developing a “Tareeq” to be able to give users suggestions about the best path according to the condition of the checkpoint by using artificial intelligence in feature "Inquire about route.
- The application becomes comprehensive for all West Bank checkpoints.

Chapter 5: References

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