

DEPARTMENT OF COMPUTER SCIENCE

UNIVERSITY OF RUHUNA



TOURDRIVE

An E-commerce platform for Tour Booking &
Vehicle Renting with a Better Traveling Experience

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An E-commerce platform for Tour Booking &
Vehicle Renting with a Better Traveling Experience

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TABLE OF CONTENTS

1	INTRODUCTION	5
1.1	BACKGROUND	5
1.2	PROBLEM DEFINITION	6
1.3	MAIN OBJECTIVES	7
1.4	SCOPE	8
1.4.1	SCOPE OF WEB APPLICATION	9
1.4.2	SCOPE OF THE MOBILE APPLICATION	9
2	REQUIRMENT ANALYSIS AND DESIGN	10
2.1	REQUIRMENT ANALYSIS	10
2.2	FUNCTIONAL REQUIREMENTS	14
2.3	NON-FUNCTIONAL REQUIREMENTS	15
2.4	DESIGN	16
2.4.1	ROLES OF THE SYSTEM	16
2.4.2	ENTITY RELATIONSHIP DIAGRAM	17
2.4.3	USE CASE DIAGRAM	18
2.4.4	ACTIVITY DIAGRAMS	19
2.4.5	DATA FLOW DIAGRAM	22
2.4.6	DESIGN SKETCHES	28
2.4.7	TECHNOLOGIES USED	32
3	IMPLEMENTATION	33
3.1	WEB APPLICATION	33
3.1.1	COMMON FUNCTIONALITIES	33
3.1.2	CUSTOMER FUNCTIONALITIES	37
3.1.3	CUSTOMER CARE OFFICER FUNCTIONALITIES	43
3.1.4	ADMIN FUNCTIONALITIES	44
3.2	MOBILE APPLICATION	51
3.3	BACKEND IMPLEMENTATION	57
4	TESTING AND EVALUATION	61
4.1	TESTING	61
4.1.1	WEB APPLICATION	61
4.1.2	MOBILE APPLICATION	62
4.1.3	BACKEND IMPLEMENTATION	63
4.2	TESTING PERFORMED	63
4.3	TEST CASES	64
4.4	EVALUATION	65
5	CONCLUSION & FUTURE WORK	67
5.1	CONCLUSION	67
5.2	FUTURE WORK	67
6	References	68

1 INTRODUCTION

1.1 BACKGROUND

Sri Lanka can be considered one of the most highly tourist-attracting countries. In this scenario, there does not exist a single platform in Sri Lanka for the tourists to facilitate the services such as booking tours including the places they should visit, and renting vehicles to fulfill transport needs during their stay in Sri Lanka.

We have noticed that the existing tour plan platforms such as tripadvisor.com, viator.com and trivago.com are international and they offer some tour packages and accommodation based on the countries around the world, but they have limited tour packages covering the places that can be visited in Sri Lanka, in addition, they do not allow the travelers to hire their own vehicles with or without a driver as they wish.

Platforms such as Kangaroo cabs and vehiclerentalsrilanka.com are local and they facilitate the customer by picking up from the airport and traveling to their desired locations but they do not offer special tour plans and renting vehicles by selecting the vehicle type, with or without a driver for both tourists and local travelers. Therefore, a local solution to cover both vehicle renting and booking tour packages can bring foreign exchange to the country.

It is obvious that the current vehicle booking applications do not contain a 24-hour emergency service in vehicle breakdowns or emergency situations. In addition, there can be communication problems between the client and the vehicle owner due to the language barrier when renting a vehicle from a local person. With the prevailing situation in the country regarding the availability of fuel, tourists have more credibility to use a digital solution as it provides reliability and can also reduce the inconveniences caused during their tour.

1.2 PROBLEM DEFINITION

In Sri Lanka, tourists have no single platform to book tours or rent vehicles to meet their transportation needs while they are on their tour. This can be a frustrating and inconvenient problem for tourists, as they may have to search multiple websites or sources to find the services they need, or they may have difficulty communicating with local service providers due to language barriers.

One potential solution to this problem could be to create a centralized platform or application that tourists can use to book tours and rent vehicles while they are in Sri Lanka. This platform could offer a variety of options to meet the needs of different types of tourists, and it could provide a convenient, easy-to-use interface for booking and managing travel arrangements even before landing in the country. Using the proposed solution not only the tourists but also the local travelers can search and book available tour packages and if they wish to travel by themselves without a guide they have the ability to rent a vehicle with or without a driver.

Additionally, this platform could include features such as a 24-hour emergency service for vehicle breakdowns or other emergency situations, and it could facilitate communication between tourists and service providers despite any language barriers as the platform can bridge the gap.

In our solution, tourists are free to arrange their tour and transportation facilities prior to landing in Sri Lanka. This will ease the payment and provide an effective visit.

1.3 MAIN OBJECTIVES

1. To provide a convenient and easy-to-use platform for tourists and local travelers to book tours and rent vehicles while they are in Sri Lanka.
2. If the client wishes to join a tour package predefined already they can register to that tour using the application and clients are able to request to add tour packages with the places they wish to join and the company can add a new tour package according to demand.
3. If the client needs to rent a vehicle by self driving or with a driver they can search and book any vehicle to travel to their desired locations.
4. To offer a variety of tour and vehicle rental options to meet the needs of different types of tourists.
5. Provide a convenient and attractive user interface in order to give the clients the best user experience.
6. On demand tour booking without waiting for any approval by the driver or vehicle owner.

7. To ensure reliable and timely service, including 24-hour emergency service for vehicle breakdowns or other emergency situations.
8. To facilitate communication between tourists and vehicle owners despite any language barriers.
9. To bring foreign exchange to Sri Lanka by offering a local solution for tourism-related services.
10. To provide a reliable, digital solution for tourists to use while they are in the country, particularly in light of the availability of fuel in Sri Lanka.

1.4 SCOPE

The scope of this project report revolves around the development of an all-inclusive application that caters to the tour booking and vehicle renting needs of both local and foreign tourists. With both web and mobile applications, this platform aims to provide a comprehensive solution for travelers.

The main functionalities of the application encompass tour booking and vehicle renting. It offers a wide range of standard tours, covering popular destinations and attractions. Additionally, a special feature allows customers to submit custom tour requests, tailoring their itineraries to suit their specific preferences and interests.

In terms of vehicle renting, customers have the flexibility to rent vehicles with or without a driver. The special feature of vehicle renting without a driver is also available, catering to those seeking self-driven experiences.

Using this application, customers will gain the convenience of a user-friendly platform that fulfills all their travel needs. They will have access to a diverse range of standard tours and the ability to request custom tours, providing a personalized travel experience. Furthermore, the option to rent vehicles with or without a driver, including the unique feature of self-driven vehicle rentals, grants travelers the freedom and flexibility to explore their destinations comfortably. Ultimately, the successful completion of this application ensures that customers can efficiently and comprehensively plan and enjoy their travel experiences.

1.4.1 SCOPE OF WEB APPLICATION

The web application in this scenario plays a vital role in facilitating tour booking and vehicle renting for local and foreign tourists. Alongside its user-friendly interface and seamless navigation, the web application offers a range of administrative functionalities to efficiently manage the system.

For the Administrator: The administrator and the customers. The administrator has privileged access and can oversee the entire operation, including managing tour packages, updating pricing and availability, and monitoring customer bookings. They can also handle customer inquiries and provide support when needed.

For the Customer: The customers can register, browse through various tours and vehicles, make bookings, and track their reservations. With the web application's administrative functionalities, the system ensures smooth operations, effective customer management, and streamlined communication between the administrator and customers, thereby enhancing the overall experience for all parties involved.

1.4.2 SCOPE OF THE MOBILE APPLICATION

The mobile application in this context offers a convenient and on-the-go solution for tour booking and vehicle renting. While it provides a subset of functionalities compared to the web application, it focuses on offering the most essential features. Customers can access all the necessary functionalities directly from their mobile devices, including browsing and booking tours, as well as renting vehicles. Notably, the mobile application introduces an important feature of emergency vehicle tracking, ensuring enhanced safety and security for customers. This functionality allows users to track their rented vehicles in case of emergencies or unexpected situations. With the mobile application's streamlined customer functionalities and the added benefit of emergency vehicle tracking, travelers can enjoy a seamless and safe experience during their journeys.

2 REQUIREMENT ANALYSIS AND DESIGN

2.1 REQUIREMENT ANALYSIS

During the requirement analysis for the proposed application, extensive research was conducted on existing tour booking and vehicle renting websites in Sri Lanka. It was discovered that the available websites lacked a comprehensive offering, as there was no single site that provided all the necessary facilities for tour booking, including secure payment methods and a wide range of selections encompassing the tourist attractions in Sri Lanka. This identified gap in the market emphasizes the need for a robust and user-friendly application that addresses these shortcomings and provides a seamless experience for travelers.

Furthermore, it was noted that there is currently no website in Sri Lanka that caters to vehicle renting with the option to choose vehicles with or without a driver. This limitation restricts the flexibility and choices available to customers who require self-driven experiences. By recognizing this gap, the proposed application aims to provide a unique feature that allows users to rent vehicles based on their preferences, whether they require a driver or not.

To gather the most essential set of requirements, an additional research component involved studying international websites that excel in tour booking and vehicle renting. By examining these websites, the project team could identify and incorporate the crucial features and functionalities that would ensure the proposed application meets the highest standards and provides an exceptional experience for users.

User Stories to gather requirements

User stories are written to gather requirements of the proposed solution.

Client (person who get the service, rent vehicle or book tour etc)

- **Tour Booking**

- **As a client I should be able to** view all available tours , **So I can** book a tour I like
- **As a client I should be able to** view full details of a selected tour, **So I can** book that tour.
- **As a client I should be able to** access an online payment portal,**So I can** pay for my tour booking .
- **As a client I should be able to** view available slots in a tour, **So I can** decide whether to book it or not.
- **As a client I should be able to** view reviews of a particular tour,**So I can** get the insights of other people who booked that tour.
- **As a client I should be able to** leave a comment on that tour after I completed that tour, **So I can** share my experience with others.
- **As a client I should be able to** view all my tour bookings, **So I can** manage my bookings.
- **As a client I should be able to** request for custom tours ,**So I can** visit my favourite places

- **Vehicle renting**

- **As a client I should be able to** view all the vehicles available for rent, **So I can** choose one to rent.
- **As a client I should be able to** filter available vehicles for rent by price, **So I can** select a vehicle suitable for my budget
- **As a client I should be able to** filter available vehicles for rent by location, **So I can** select a vehicle more conveniently
- **As a client I should be able to** filter available vehicles for rent by vehicle type, **So I can** select a vehicle suitable for my travel requirements
- **As a client I should be able to** register to the system using google, **So I can** manage my vehicle rentals

- **As a client I should be able to** login to the system using google, **So I can** manage my vehicle rentals
- **As a client I should be able to** register to the system using email, **So I can** manage my vehicle rentals
- **As a client I should be able to** log into the system using email, **So I can** manage my vehicle rentals
- **As a client I should be able to** view full details of a vehicle for rent, **So I can** rent that vehicle
- **As a client I should be able to** access an online payment gateway , **So I can** pay for the vehicle rental online.
- **As a client I should be able to** get an Email receipt for my payment , **So I can** verify that my payment was received.
- **As a client I should be able to** review a vehicle , **So I can** share my experience.
- **As a client I should be able to** reset my forgot password, **So I can** log in to the system
- **As a client I should be able to** update my current password, **So I can** secure my account
- **As a client I should be able to** chat with company, **So I can** customize my rental car

Company (provide services)

- **As the** system admin **I should be able to** add a vehicle to the system, **So clients can** rent that vehicle
- **As the** system admin **I should be able to** manually remove client profile **so I can** remove fake client profile from the system.
- **As the** system admin **I should be able to** remove vehicles from the system, **So I can** remove low ratings and vehicles from the system.
- **As the** system admin, **I should be able to** add the vehicle's full specs and photos to the system **so clients will be able to** see the full details of the vehicle.

- **As the** system admin, **I should be able to** log in the system with administrator privileges **so I can** access all the administrator features.
- **As the** system admin, **I should be able to** upload drivers and their full details to the system **so clients will be able to** choose drivers for their renting vehicles.
- **As the** system admin **I should be able to** remove drivers from the system **so I can** remove low rating drivers.
- **As the** system admin, **I should be able to** upload predefined tour packages and their full details to the system **so the client will be able to** see and register for the tour package.
- **As the** system admin **I should be able to** remove tour packages from the system, **So I can** remove low rating tour packages
- **As the** system admin **I should be able to** look-at clients' custom tour requests **so I can** arrange and update these tour packages.
- **As the** system admin **I should be able** to check and look at clients' reviews and ratings **so I can** take action about low-rating vehicles and drivers.
- **As the** system admin **I should be able to** see clients' request messages **so I can** reply to those messages.
-

In an emergency, as a system admin I should be able to track the vehicle so **I can** help the customer to solve his inconvenience.

2.2 FUNCTIONAL REQUIREMENTS

1. User Login & Registration

- 1. Google login
- 2. Facebook login
- 3. Email login

2. Mobile app for more convenient use

3. Track the location of vehicle *in case of emergency (breakdown)*

4. Company

- 1. Add drivers & tour guides to the system
- 2. Offer tour packages to clients [predefined]
 - 1. Allow to request custom tours
- 3. Add vehicles to the system
 - 1. Upload multiple images of the vehicle
 - 2. Add a fully spec description about the vehicle

5. Clients (people who rent vehicles)

- 1. Search for vehicles
 - 1. By price
 - 2. By location
 - 3. By vehicle type
- 2. Make a vehicle reservation (with or without driver)
- 3. Pay for the vehicle reservation via online payment portal
- 4. Add a rating & review of the vehicle after use
- 5. Book tour packages
- 6. Pay for booked tours online
- 7. Review tour packages
- 8. Request custom tour plans

6. Chat with vehicle owner for custom requests

2.3 NON-FUNCTIONAL REQUIREMENTS

1. Performance: The application should be responsive and provide quick loading times to ensure a seamless user experience. It should be able to handle a large number of concurrent users without any performance degradation.
2. Security: The application should incorporate robust security measures to protect user data, including encryption of sensitive information such as payment details. It should also have proper authentication and authorization mechanisms to ensure authorized access to the system.
3. Scalability: The application should be designed to handle increasing user demand and be scalable to accommodate future growth. It should be able to handle a growing number of tours, vehicles, and users without compromising performance.
4. Usability: The application should have an intuitive and user-friendly interface, allowing users to easily navigate and perform their desired actions. Clear and concise instructions should be provided throughout the application to guide users in making bookings and renting vehicles.
5. Reliability: The application should be highly reliable, ensuring minimal downtime and availability to users. It should have proper error handling and recovery mechanisms in place to handle unforeseen errors or system failures.
6. Compatibility: The application should be compatible with various web browsers and mobile devices, ensuring a consistent user experience across different platforms.
7. Accessibility: The application should comply with accessibility standards, making it accessible to users with disabilities. This includes providing alternative text for images, clear and readable fonts, and keyboard navigation options.
8. Integration: The application should be able to integrate with external systems and services, such as payment gateways and mapping APIs, to provide a seamless experience for users during the booking and renting processes.

2.4 DESIGN

2.4.1 ROLES OF THE SYSTEM

Admin

- Can view tour statistics
- Can add a new tour
- Can view all tours
- Can view all custom tours
- Can approve or reject a requested custom tour

Client

- Can view available tours
- Can view details of a selected tour
- Can book an available tour
- Can view his all booked tours
- Can request custom tours
- Can view requested custom tours to check the status
- Can view available vehicles
- Can view details of a selected vehicle
- Can rent a vehicle

Customer Care Officer

- Can view the notification of an emergency in vehicle renting without driver.
- Can start tracking the customer in case of an emergency.
- Can answer the questions of the chat bot that are unable to answer automatically.

2.4.2 ENTITY RELATIONSHIP DIAGRAM

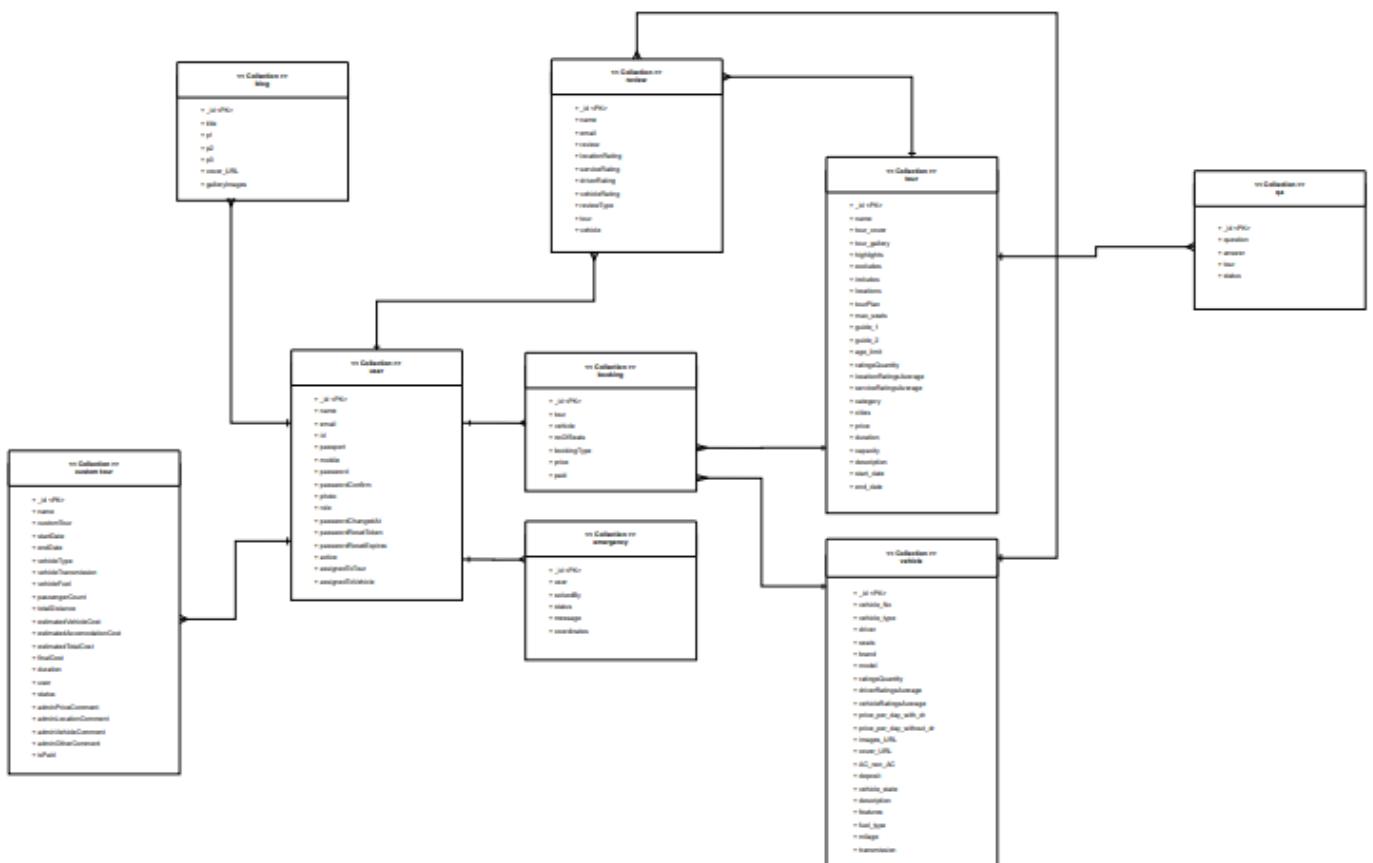


Figure 1

2.4.3 USE CASE DIAGRAM

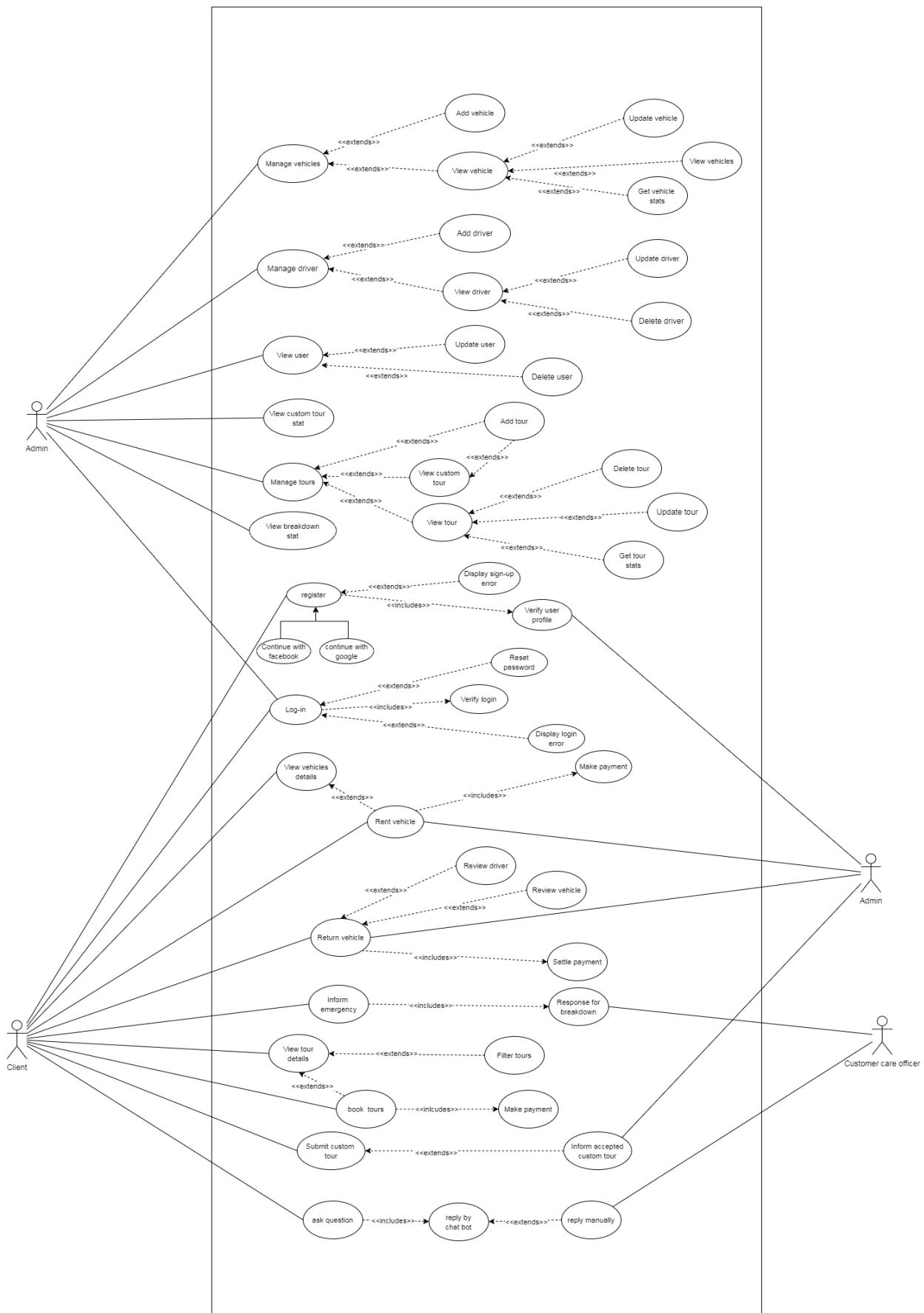


Figure 2

2.4.4 ACTIVITY DIAGRAMS

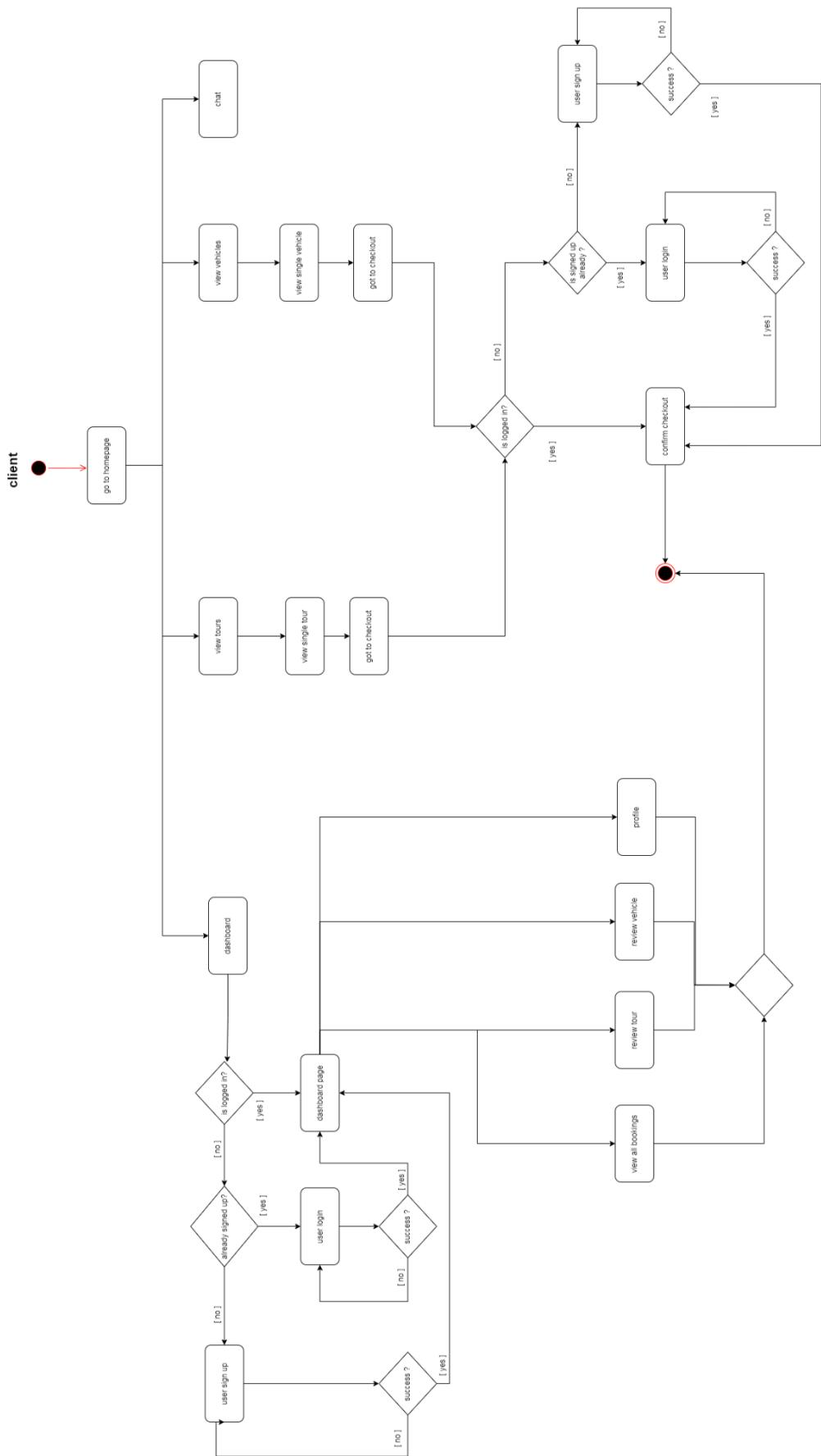


Figure 3

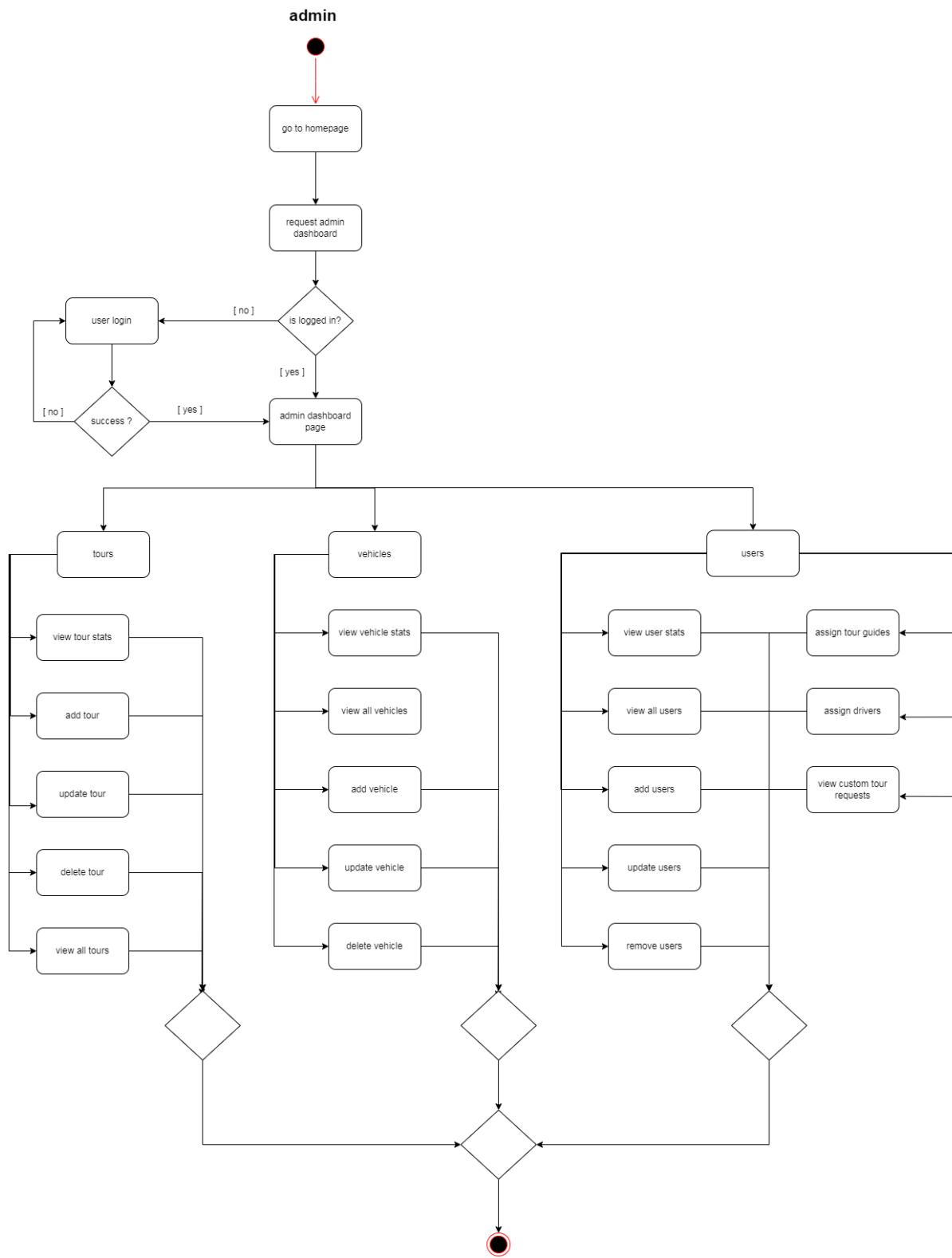


Figure 4

customer care officer

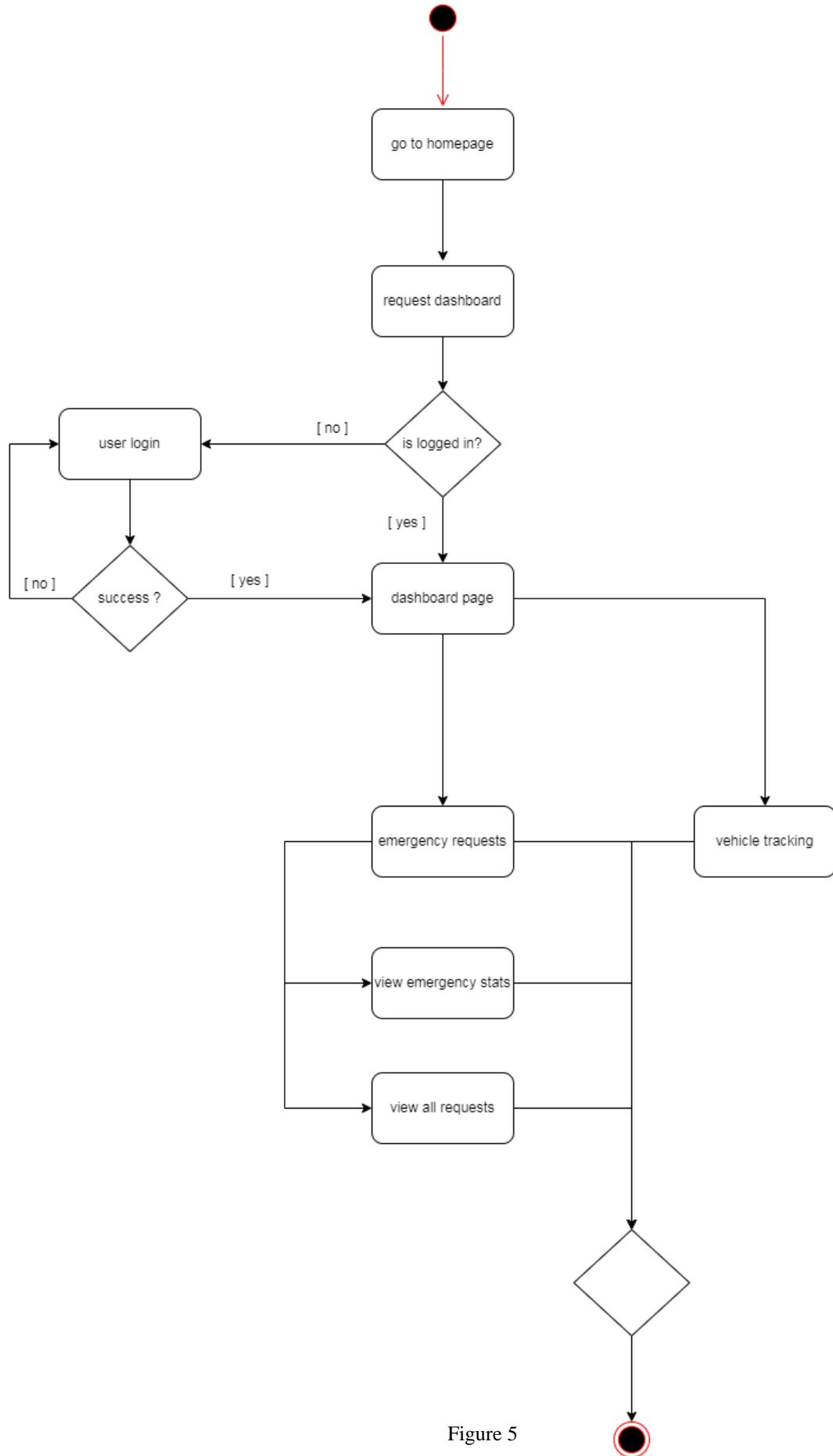


Figure 5

2.4.5 DATA FLOW DIAGRAM

Level 1 DFD

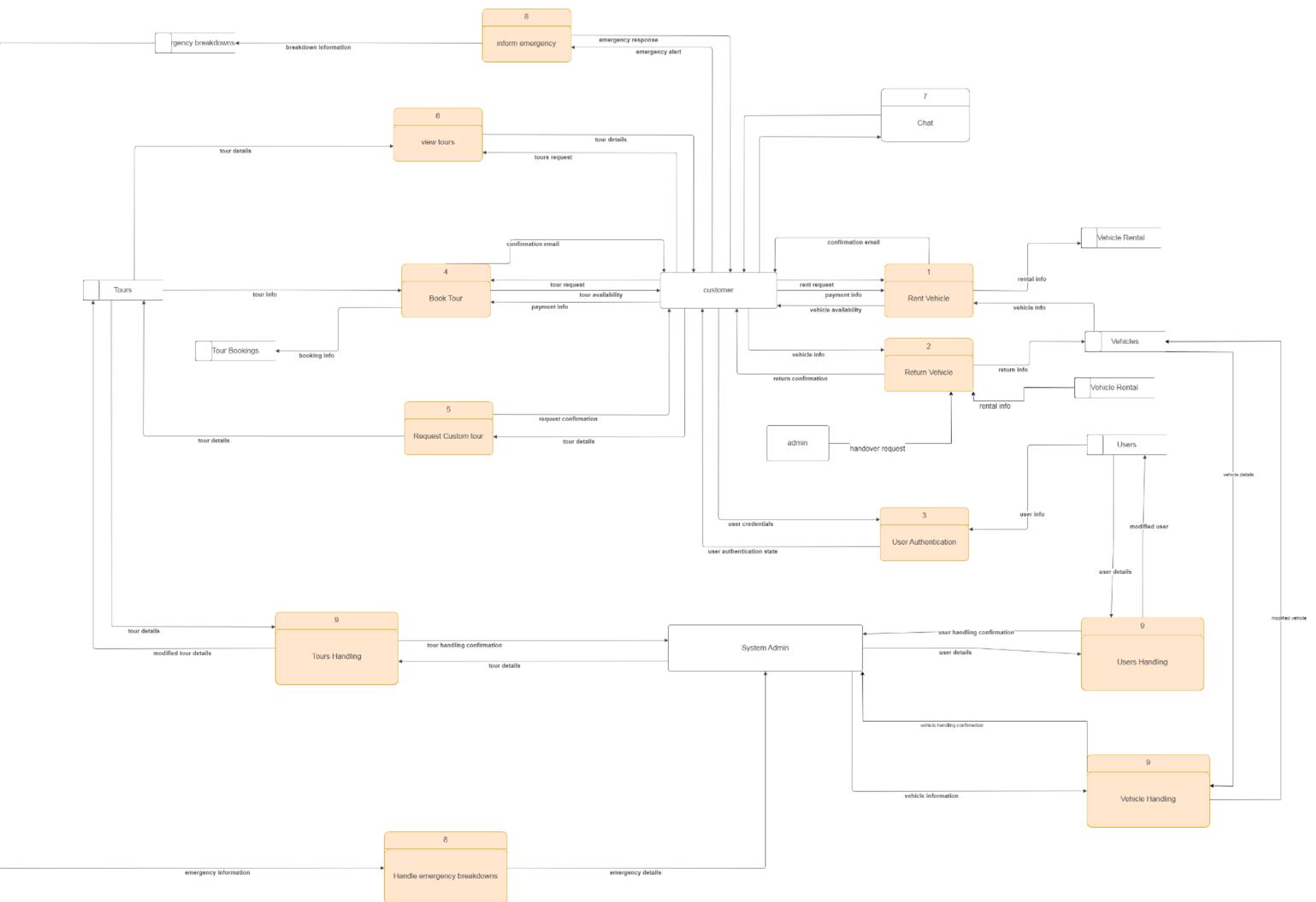
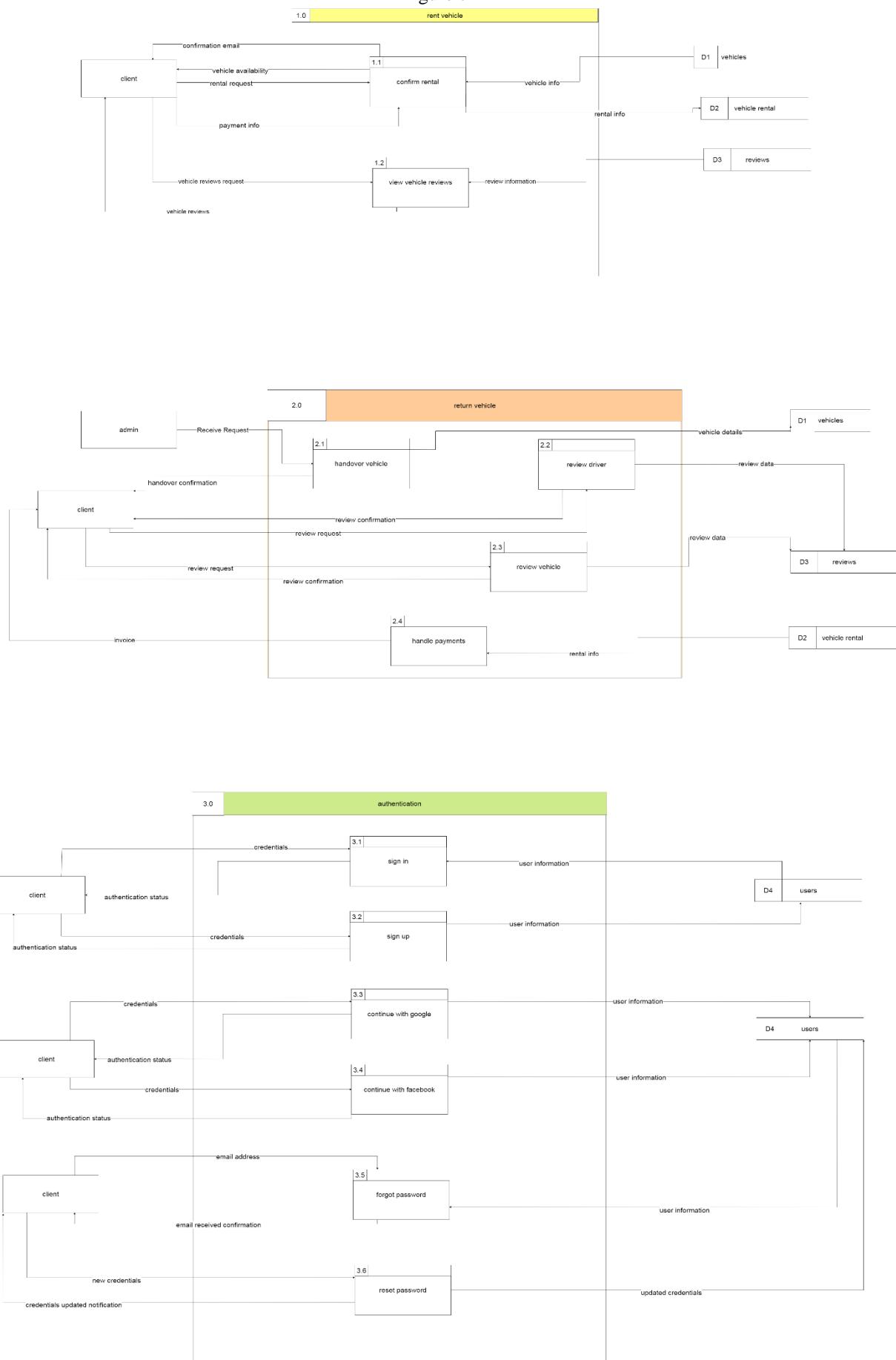
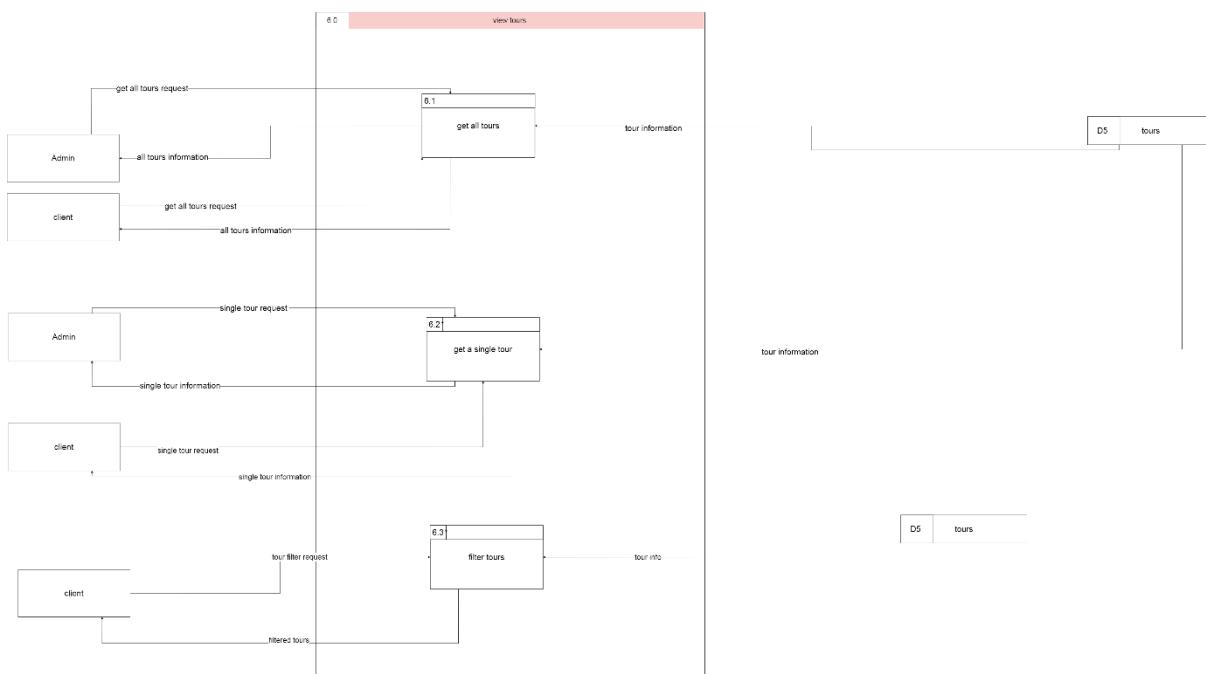
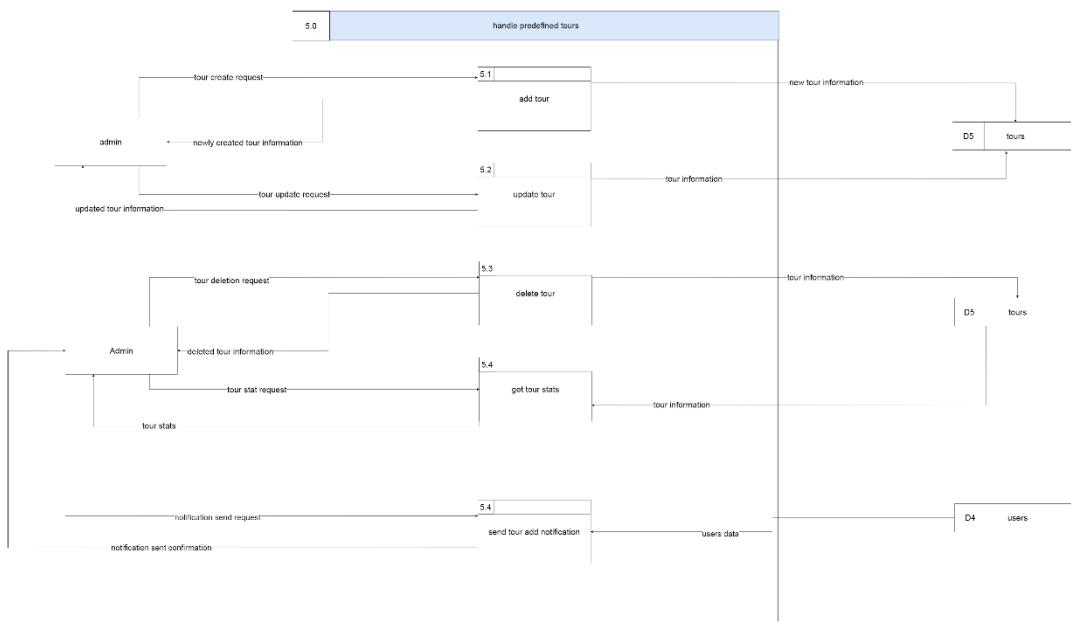
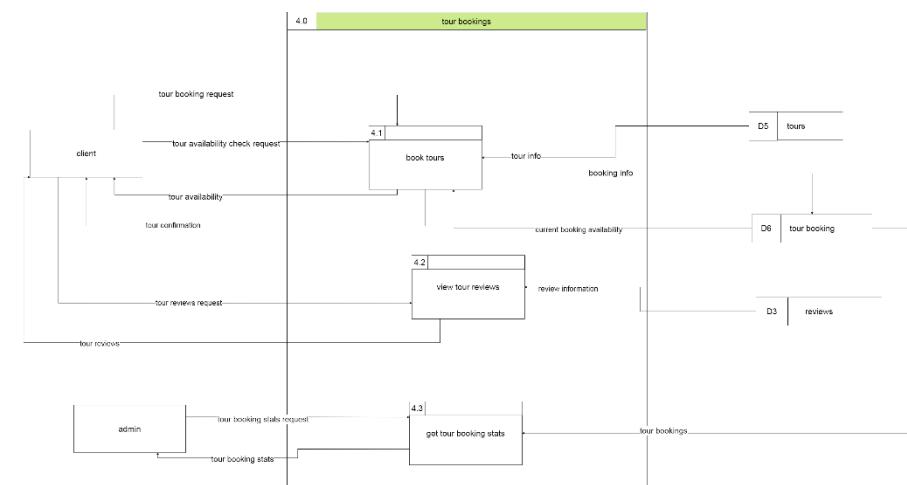


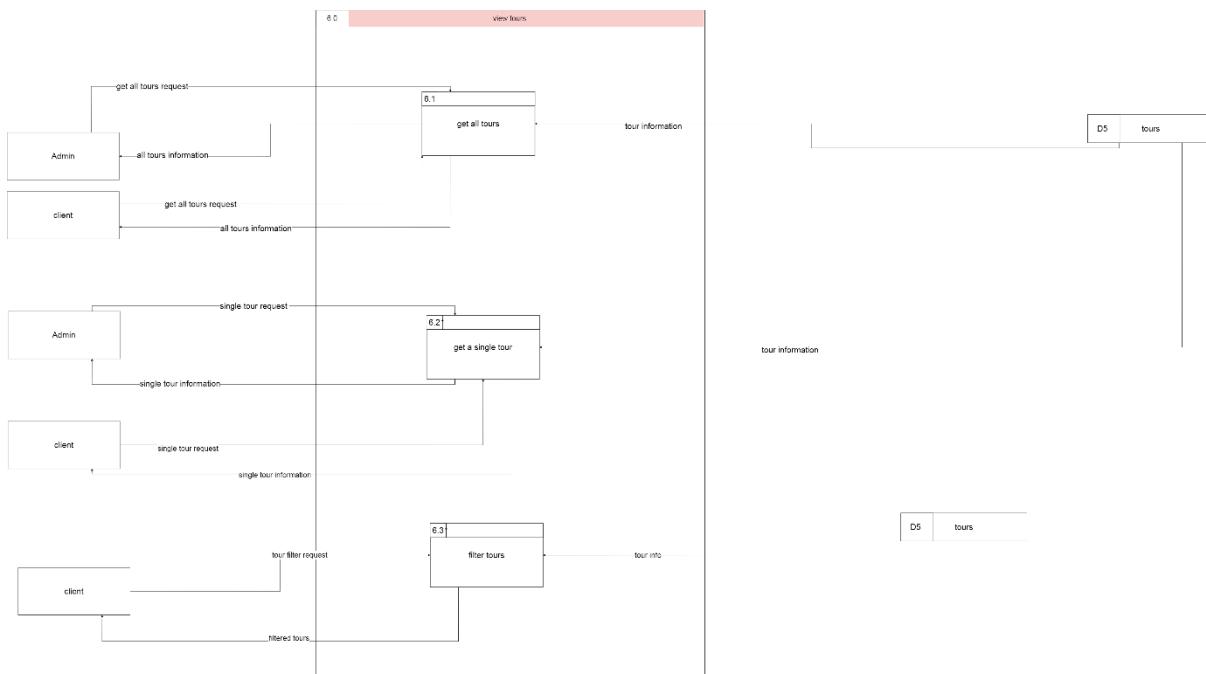
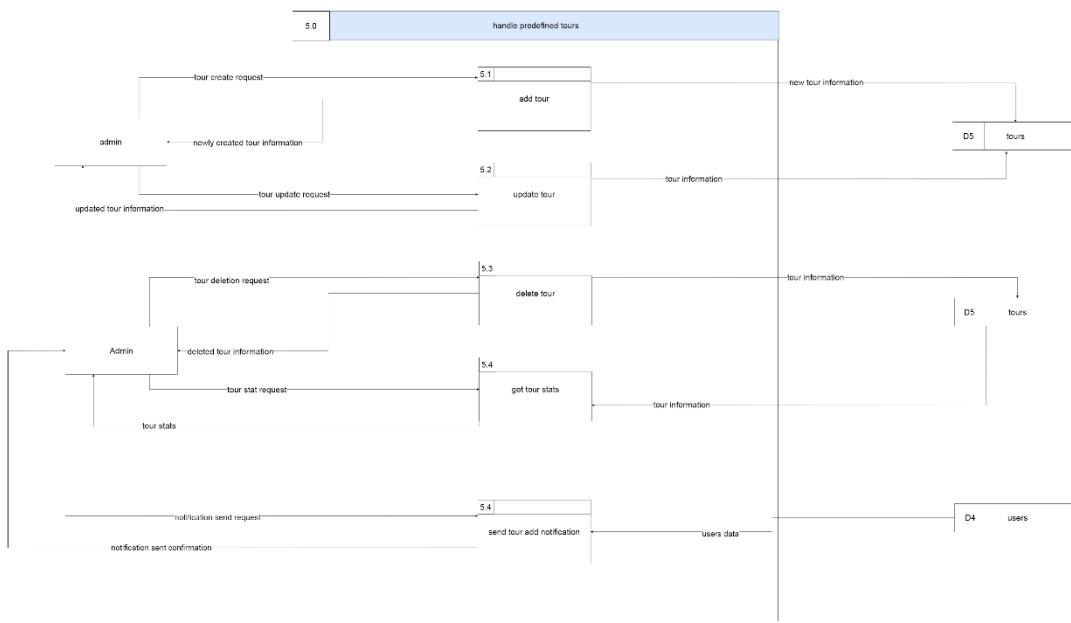
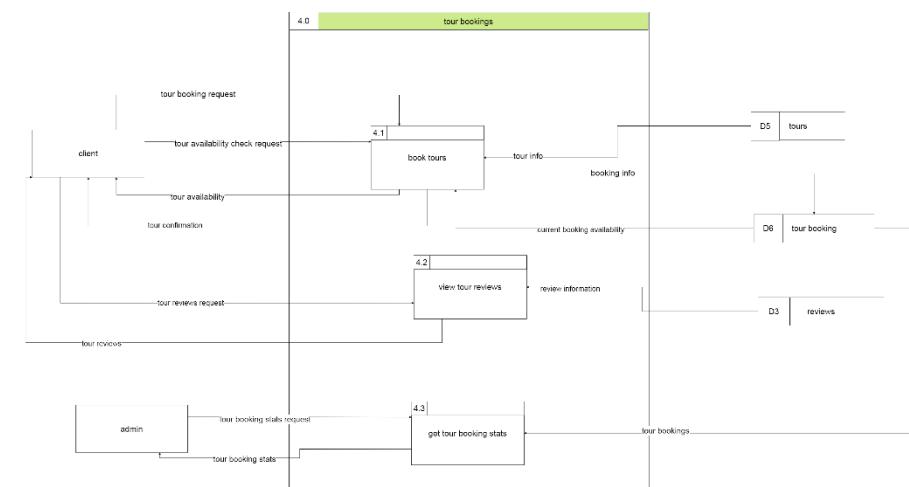
Figure 6

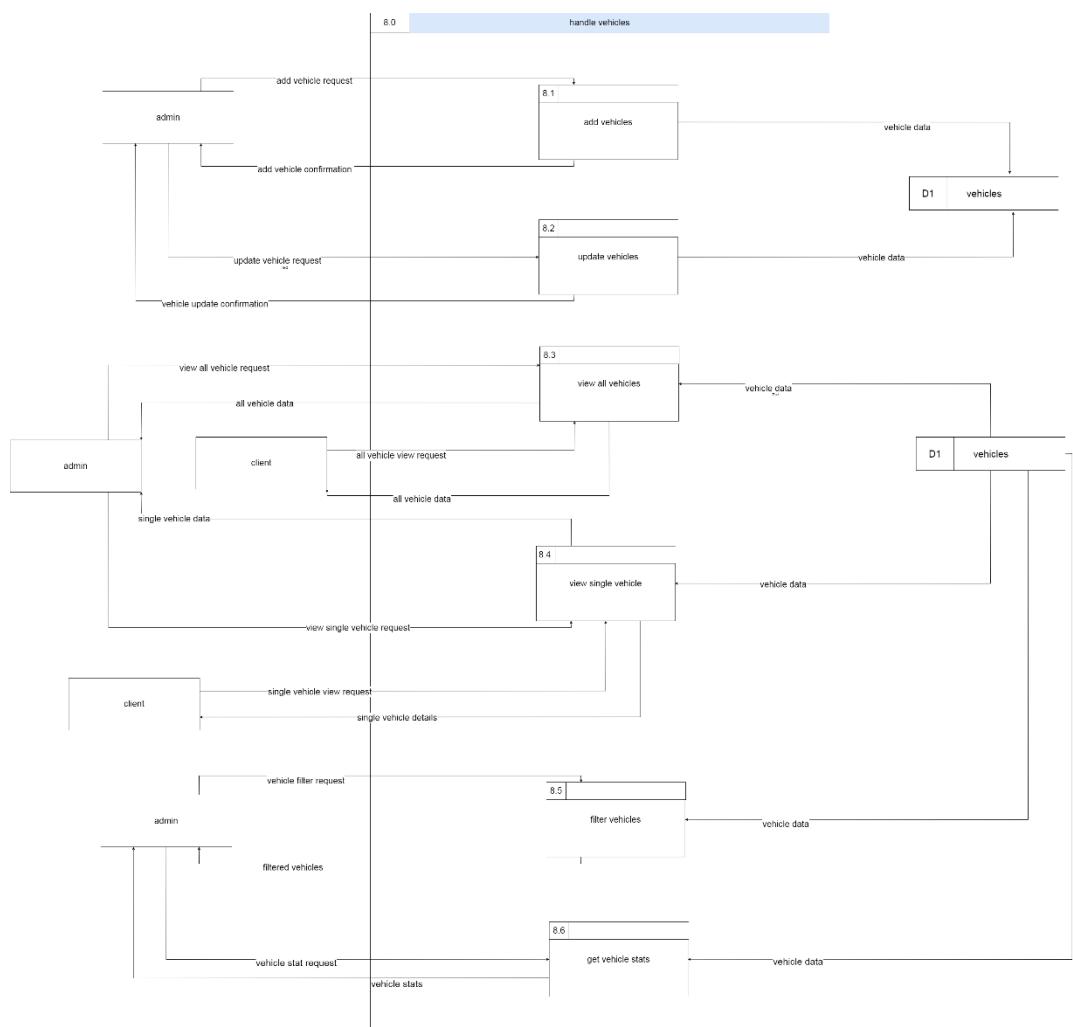
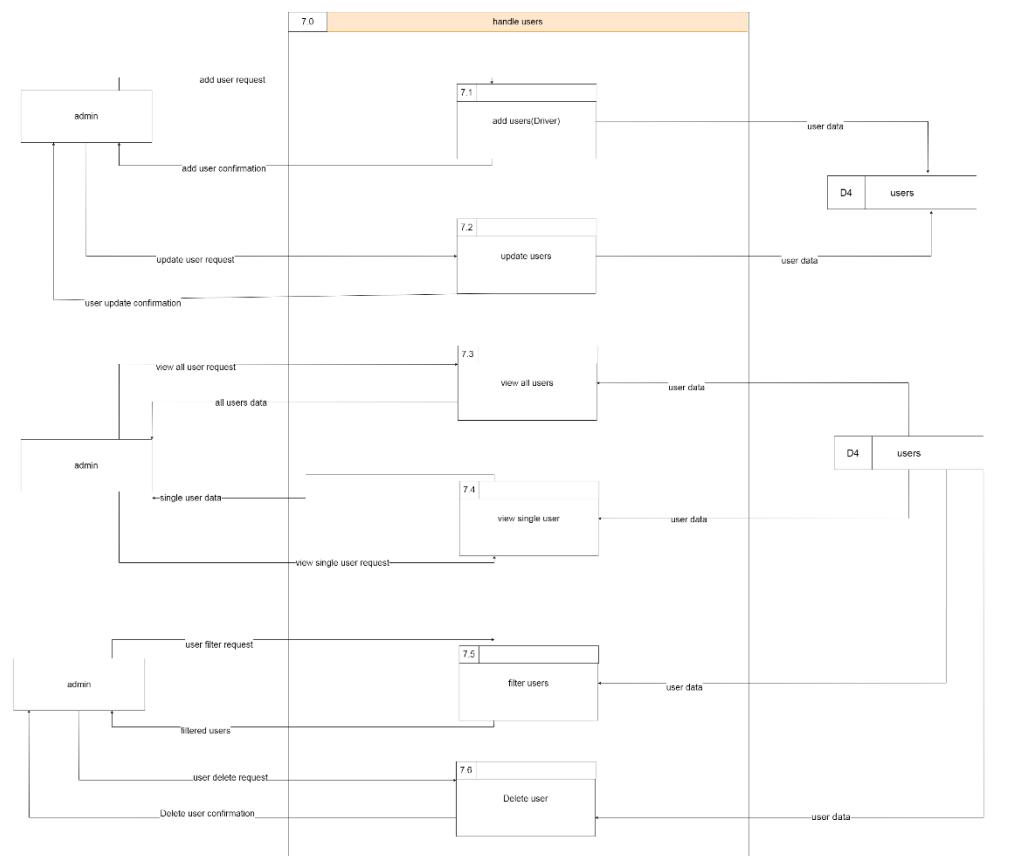
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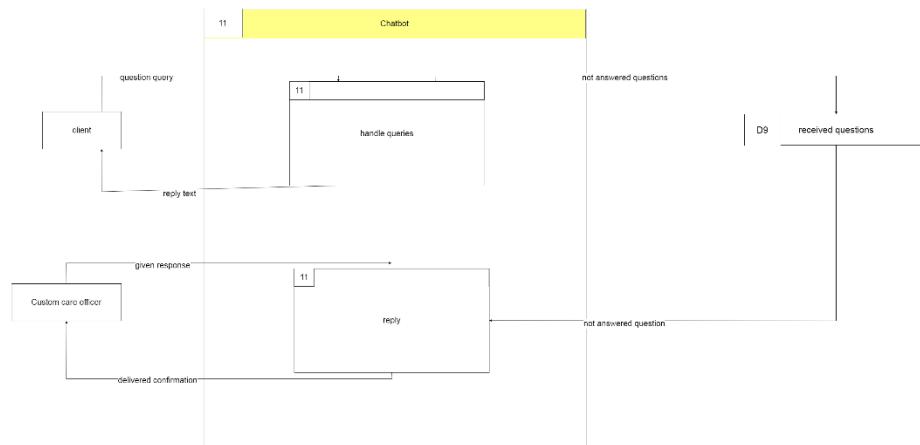
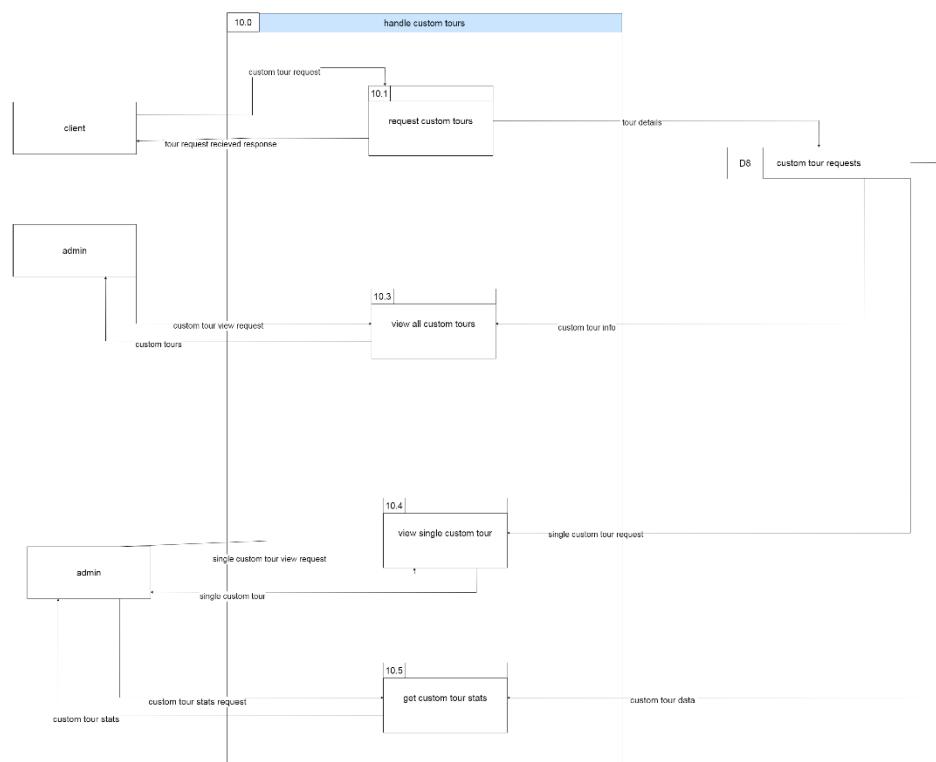
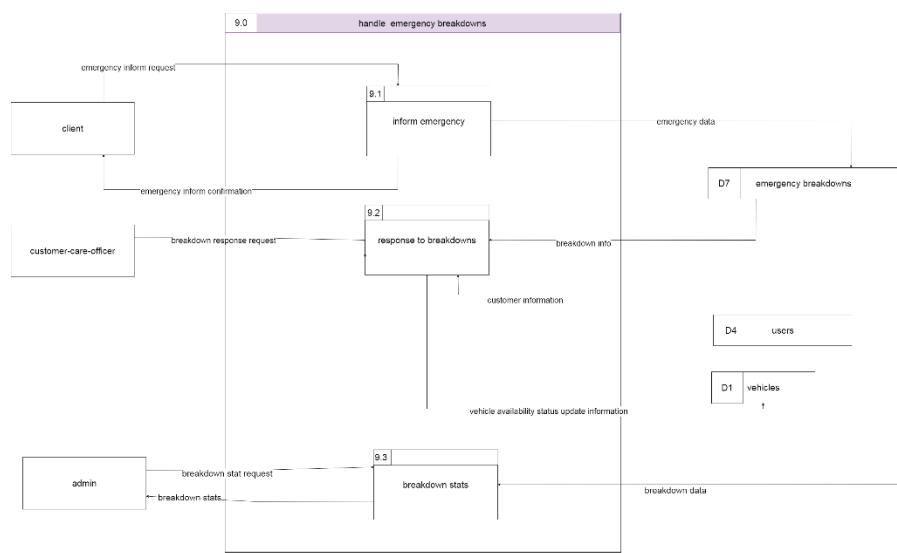
Figure 7











2.4.6 DESIGN SKETCHES

Before implementing the web application, we opted to design the UI sketches using **Figma**. Figma was chosen for its collaborative features and ease of use in creating interactive and responsive designs. Sketching the UI beforehand allowed us to visualize the layout, gather feedback, and iterate on the design, ensuring a more efficient and user-friendly final implementation.

2.4.6.1. Web Application

2.4.6.1.1 Common Views

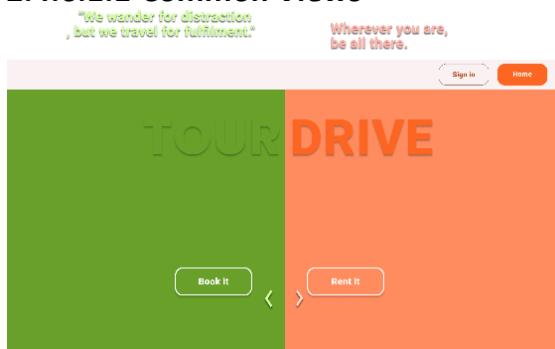


Figure 8 – Landing Page



Figure 9 – Landing Page Body

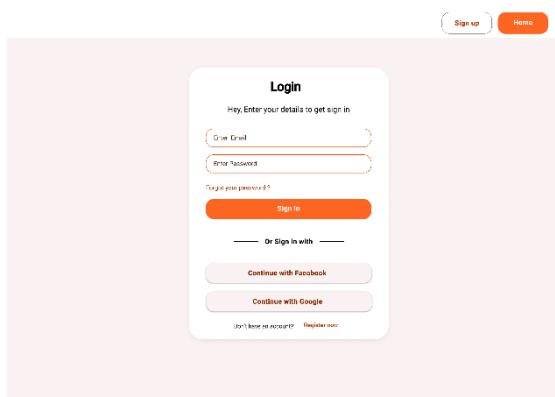


Figure 10 – Login

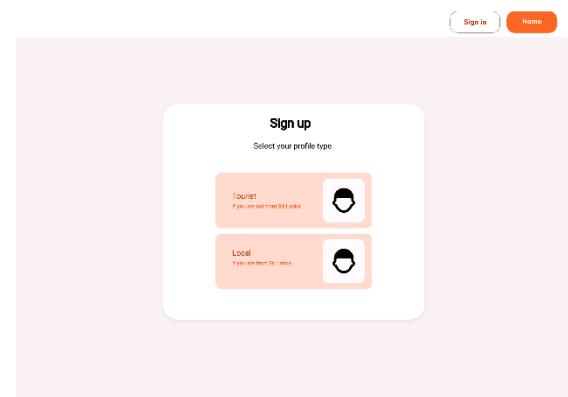


Figure 11 – Profile Type selector

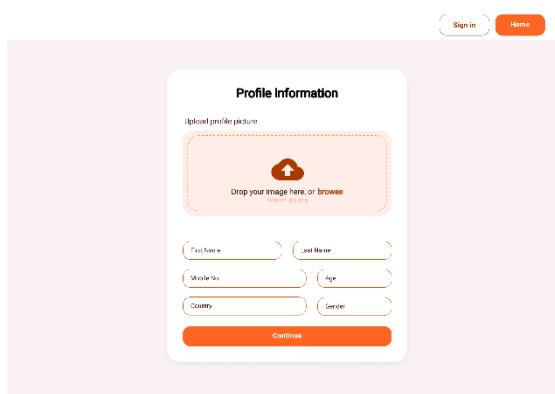


Figure 12 – Register

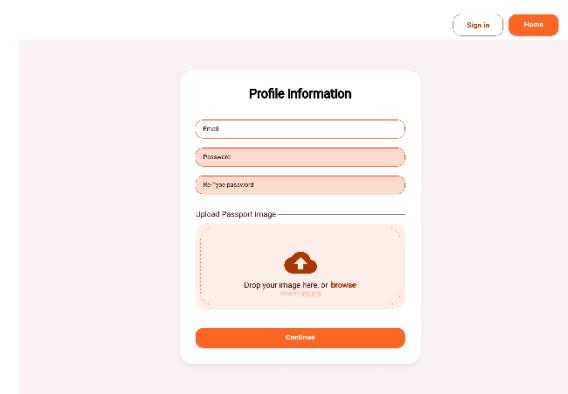


Figure 13 – Register security Info

The page has a header with 'Sign up' and 'Home' buttons. The main content area is titled 'Forgot Password' with a sub-instruction: 'Enter your TOURDRIVE username, or the email address that you used to register. We'll send you an email with your username and a link to reset your password.' It features a text input field labeled 'User/Email/Address or Username' and an orange 'Send' button. At the bottom, it says 'If you still need help, contact TOURDRIVE support'.

Figure 15 – Forgot Password

The page has a header with 'Sign in' and 'Home' buttons. The main content area is titled 'Password Reset' with a sub-instruction: 'Type new password password and confirm it.' It features two text input fields: 'New Password' and 'Re-type New Password', both highlighted in orange. An orange 'Continue' button is at the bottom.

Figure 14 – Reset

2.4.6.1.2 Admin Functionalities

The page has a header with 'Welcome, Mr. John Doe'. The main content area is titled 'TourDrive' with a sub-instruction: 'Home / Tour statistics'. It shows a summary: 'display tour stats here'. On the left, there's a sidebar with 'Tours' and links: 'Tour Statistics', 'Add Tour', 'Update Tour', and 'View All Bookings'. A blue bar highlights the 'Tours' section.

Figure 15 – Admin Home

The page has a header with 'Welcome, Mr. John Doe'. The main content area is titled 'TourDrive' with a sub-instruction: 'Home / Add tour'. It shows a form for adding a tour: 'Name', 'Info', 'Category', 'Locations', 'Start Date', 'Cover Photo', 'Gallery Images', 'Max Guests', 'Age Limit', and 'Description'. There are 'Create' and 'Cancel' buttons at the bottom.

Figure 16 – Admin Add Tours

The page has a header with 'Welcome, Mr. John Doe'. The main content area is titled 'TourDrive' with a sub-instruction: 'Home / Update tour'. It shows a form for updating a tour: 'Name', 'Action', 'Info', 'Category', 'Locations', 'Start Date', 'Cover Photo', 'Gallery Images', 'Max Guests', 'Age Limit', and 'Description'. A red 'Remove this from listing' button is visible. There are 'Create' and 'Cancel' buttons at the bottom.

Figure 17 – Admin Update Tours

The page has a header with 'Welcome, Mr. John Doe'. The main content area is titled 'TourDrive' with a sub-instruction: 'Home / Bookings'. It shows a table with bookings. A sub-instruction 'table with bookings' is shown to the right. On the left, there's a sidebar with 'Tours' and links: 'Tour Statistics', 'Add Tour', 'Update Tour', and 'View All Bookings'.

Figure 18 – Admin Home/ Bookings

The page has a header with 'Welcome, Mr. John Doe'. The main content area is titled 'TourDrive' with a sub-instruction: 'Home / User statistics'. It shows a summary: 'display user stats here'. On the left, there's a sidebar with 'Users' and links: 'User Statistics', 'Add User', 'Update User', and 'View Users'. A blue bar highlights the 'Users' section.

Figure 19 – Admin User Stats

The page has a header with 'Welcome, Mr. John Doe'. The main content area is titled 'TourDrive' with a sub-instruction: 'Home / Add User'. It shows a form for adding a user: 'Name', 'Info', 'Category', 'Locations', 'Start Date', 'Cover Photo', 'Gallery Images', 'Max Guests', 'Age Limit', and 'Description'. There are 'Create' and 'Cancel' buttons at the bottom.

Figure 20 – Admin Add User

Welcome, Mr. John Doe

Home / Add User

Name

Price

Locations

Cover Photo

Max Seats

Duration

Category

Start Date

Gallery Images

Age Limit

Clear **Save**

Figure 21 – Update User

Welcome, Mr. John Doe

Home / Add User

Name	Date	Status
John	2023-10-01	Available

Figure 22 – View All Tours

2.4.6.2 Mobile Application



Figure 23 – Loading page

Login

Hey, Enter your details to get sign in

Enter Email

Enter Password

Forgot your password?

Sign in

Or Sign in with

G F

Don't have an account? [Register now](#)

GET STARTED

Figure 24 – Login

Forget Password

Enter Email Address

Send

If you still need help, contact **TOURDRIVE support**

Figure 25 – Forget Password

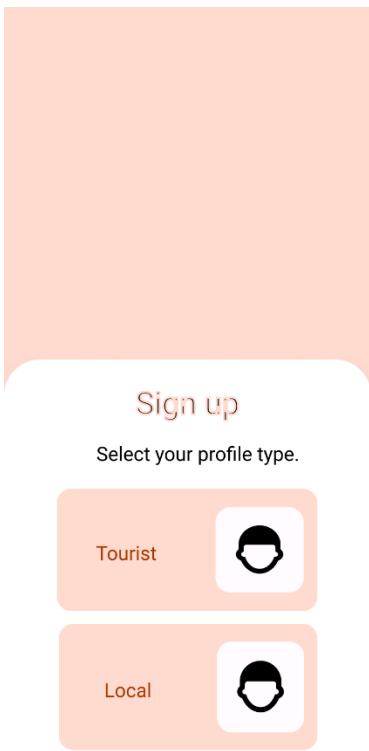


Figure 26 – Signup type

This screen is titled "Profile Information". It contains five input fields: "Enter Email", "First Name", "Last Name", "Password", and "Retype Password". At the bottom is an orange "Continue" button.

Figure 27 – Signup Profile



Figure 28 – Landing page

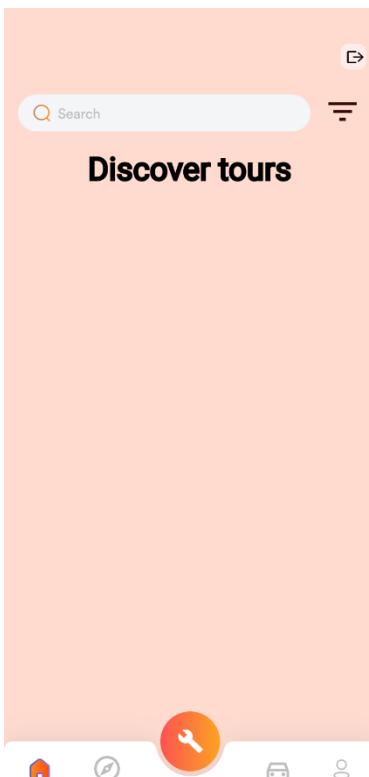


Figure 29 – Tour Home Page



Figure 30 – Single Tour Page

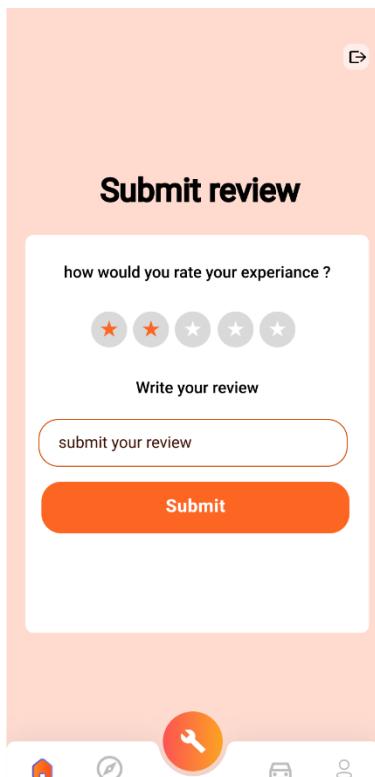
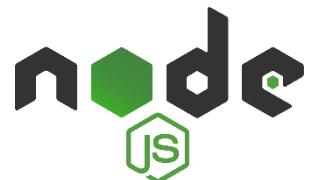
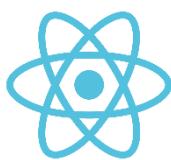


Figure 31 – Review Page

2.4.7 TECHNOLOGIES USED

- React: Suitable for web and mobile development due to its component-based architecture, virtual DOM rendering, and extensive ecosystem of libraries and tools.
- Node.js: Ideal for web and mobile development as it enables server-side JavaScript execution, providing a scalable and efficient runtime environment.
- Express.js: Well-suited for web development as a lightweight and flexible framework that simplifies the creation of APIs and server-side applications.
- Flutter: Perfect for cross-platform mobile app development with a single codebase, allowing developers to create visually appealing and performant applications for both iOS and Android.
- MongoDB: Well-suited for web and mobile development with its flexible document model, scalability, and ability to handle large volumes of data in real-time applications.
- Postman: Essential for web and mobile development as a comprehensive API development and testing platform, facilitating the design, debugging, and documentation of APIs.
- GitHub: Indispensable for web and mobile development as a version control platform that enables seamless collaboration, code sharing, and project management among developers.
- Firebase: Firebase is suitable for mobile development due to its real-time database, authentication services, cloud storage, and push notifications, providing a comprehensive backend solution that seamlessly integrates with mobile apps.



3 IMPLEMENTATION

3.1 WEB APPLICATION

3.1.1 COMMON FUNCTIONALITIES

- **Sign Up**

- Users can signup to the system using email and password or using their Google account , from this page

The screenshot shows a 'Sign Up' form. At the top, it says 'Select your profile type.' Below are three input fields: 'Enter Email', 'Enter New Password', and 'Re Enter Password'. A large orange 'SignUp' button is centered below these fields. Below the button, it says '-----or Sign Up with-----'. An orange 'Continue with Google' button is shown. In the bottom left corner of the page, there is a small orange circular icon with a white speech bubble symbol.

Figure 32 – Sign Up

- **Login**

- Users can login to the system by using email and password or using their Google account, from this page.

The screenshot shows a 'Login' form. At the top, it says 'Hey, Enter your details to get sign in'. Below are two input fields: 'Enter Email' and 'Enter Password'. Underneath the password field is a link 'Forgot your password? Click here to reset.'. A large orange 'Login' button is centered below the password field. Below the button, it says '----- or Sign in with -----'. An orange 'Continue with Google' button is shown. In the bottom left corner of the page, there is a small orange circular icon with a white speech bubble symbol.

Figure 33 – Login

• Tour Filtering

- On this page customers can view all predefined tours and properties of the tour such as tour name, price, visiting locations, category and reviews. Also users can filter search results by tour categories and price range. Furthermore they can view all the information about tour by clicking the explore button.

The screenshot shows a web browser window with the URL `localhost:3000/tours`. The main content area displays three tour packages:

- Cultural Triangle Tour**: Located in Sigiriya, Anuradhapura. 5 reviews. 7 Days. \$799. Includes an 'Explore' button.
- Beach Getaway Tour**: Located in galle, matara, mirissa. 3 reviews. 5 Days. \$699. Includes an 'Explore' button.
- Beach and Wildlife Tour**: Located in udawalawa. 2 reviews. 8 Days. \$1299. Includes an 'Explore' button.

To the right of the tour cards, there are two filter sections:

- Filter Tours**: Categories: city, hiking, adventure, historical, cultural.
- Filter Price**: A slider ranging from \$400 to \$1900.

A yellow sidebar on the right encourages users to "Sign Up from here to make your own tours." with a "Sign Up" button.

Figure 34 – Tour Filtering

• Browse Tours

- On this page customers can view all details of the clicked tour, such as duration, maximum number of participants, minimum age and pickup location, tour highlights, include and excludes of the tour, price, tour plan and reviews of that particular tour.

The screenshot shows a detailed view of the **Cultural Triangle Tour - 7 Days**. The tour is located in Sigiriya, Anuradhapura, with a 4-star rating from 5 reviews. Three tour photos are displayed: a large Buddha statue, a rocky mountain peak, and a scenic landscape with a lake.

Tour details:

- Duration: 7 Days
- Max People: 15
- Min Age: 12
- Pickup Airport: (not specified)
- From: (not specified)

Figure 35 – Single tour view I

Overview

Experience the cultural and historical wonders of Sri Lanka's Cultural Triangle on this 5-day tour. Explore ancient cities, marvel at impressive rock fortresses, and witness traditional dance performances. Discover the fascinating history and religious significance of the Temple of the Tooth Relic in Kandy. Stay in comfortable hotels and travel in style with a private air-conditioned vehicle and driver/guide. This tour is perfect for those who want to learn about Sri Lanka's rich culture and history.

Tour Highlights

- Sigiriya Rock Fortress and frescoes
- Polonnaruwa ancient city ruins
- Dambulla Cave Temple and Buddha statues
- Anuradhapura ancient city and stupas
- Kandy and Temple of the Tooth Relic

Included/Excluded

- | | |
|---|--|
| <input checked="" type="checkbox"/> Accommodation in 4-star hotels | <input type="checkbox"/> Airfare to and from Sri Lanka |
| <input checked="" type="checkbox"/> Private air-conditioned transport with a driver/guide | <input type="checkbox"/> Lunch and drinks other than water |
| <input checked="" type="checkbox"/> Entrance tickets to all mentioned sites | <input type="checkbox"/> Tips and gratuities |
| <input checked="" type="checkbox"/> Breakfast and dinner | <input type="checkbox"/> Travel insurance |
| <input checked="" type="checkbox"/> Bottled water during the tour | <input type="checkbox"/> Visa fees (if applicable) |

\$799

Check In

06/01/2023

Check Out

06/06/2023

Already booked

0

Available Seats

15

How many seats do you need?

1

Login to book this tour 

Figure 36 – Single tour view II

• Vehicle Filtering

- On this page customers can view all vehicles available for renting and they can filter out search results by vehicle type, fuel type and transmission type and price. Furthermore they can view all the details of the vehicle by clicking view button.



Honda City

★★★★★ 1 review(s)

Power windows Central locking Touchscreen infotainment system Rearview camera ABS with EBD

5 seats \$ 9 [View](#)



Toyota Prius

★★★★★ 0 review(s)

Keyless entry and ignition Lane departure warning Adaptive cruise control Blind spot monitoring Premium sound system

5 seats \$ 11 [View](#)



Suzuki Wagon-R

★★★★★ 1 review(s)

4 seats \$ 5 [View](#)

Filter Vehicles

Vehicle Types

car
 van
 suv
 bike

Fuel Type

Petrol
 Diesel

Transmission

Auto
 Manual

Filter Price

\$ 5 \$ 20 [^](#)

Figure 37 – Vehicle filtering

- **Browse Vehicles**

- On this page customers can view all details of the clicked vehicle such as images of the vehicle, current milage, transmission type, number of seats ,fuel type, features of the vehicle and renting prices with and without driver.

Honda City

★★★★★(1 reviews)

Milage 3500 Transmission auto Seats 5 Adults Fuel petrol

Description

The Honda City is a stylish and comfortable sedan that is perfect for those who value both form and function. With a sleek design that is sure to turn heads, this sedan also delivers on performance, with great fuel efficiency that makes it perfect for long drives. The City comes equipped with a range of features that make it a joy to drive, including power windows, central locking, a touchscreen infotainment system, a rearview camera, and ABS with EBD. Whether you're commuting to work or going on a road trip, the Honda City is sure to impress.

Features

- Power windows
- Central locking
- Touchscreen infotainment system
- Rearview camera
- ABS with EBD

Per day
\$9

From

To

Driving Option

[Log in to rent a vehicle](#)

Figure 38 – View single vehicle

- **Blog viewing**

- On this page customers can view all blog posts posted by TourDrive. They can browse through the posts and read them by clicking the button "Read more ..."

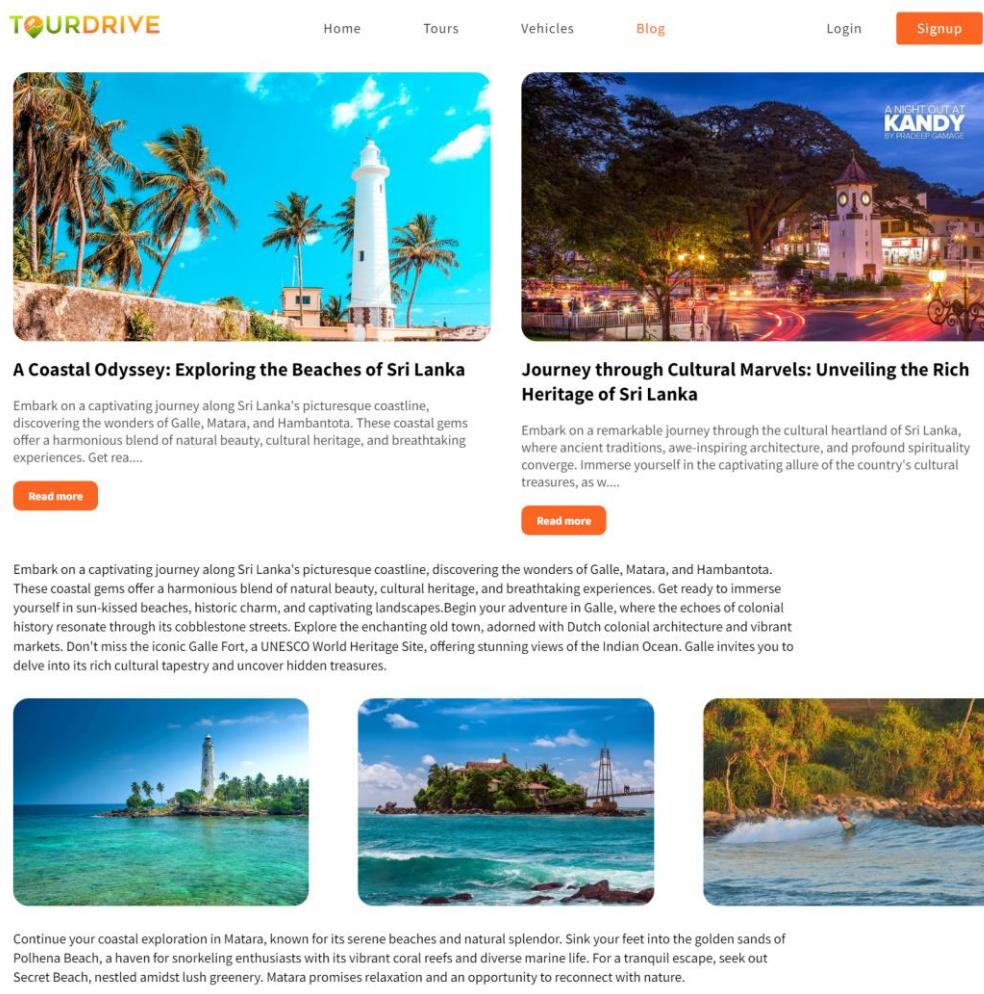


Figure 39 – Blog

3.1.2 CUSTOMER FUNCTIONALITIES

- **Tour Booking**

- On this page customers can click on the "Login to book this tour" button and proceed to the login page and after successfully logged in to the system , and proceed with tour booking by specifying how many seats are required .

Experience the cultural and historical wonders of Sri Lanka's Cultural Triangle on this 5-day tour. Explore ancient cities, marvel at impressive rock fortresses, and witness traditional dance performances. Discover the fascinating history and religious significance of the Temple of the Tooth Relic in Kandy. Stay in comfortable hotels and travel in style with a private air-conditioned vehicle and driver/guide. This tour is perfect for those who want to learn about Sri Lanka's rich culture and history.

Tour Highlights

- Sigiriya Rock Fortress and frescoes
- Polonnaruwa ancient city ruins
- Dambulla Cave Temple and Buddha statues
- Anuradhapura ancient city and stupas
- Kandy and Temple of the Tooth Relic

Included/Excluded



Accommodation in 4-star hotels

Airfare to and from Sri Lanka

Experience the cultural and historical wonders of Sri Lanka's Cultural Triangle on this 5-day tour. Explore ancient cities, marvel at impressive rock fortresses, and witness traditional dance performances. Discover the fascinating history and religious significance of the Temple of the Tooth Relic in Kandy. Stay in comfortable hotels and travel in style with a private air-conditioned vehicle and driver/guide. This tour is perfect for those who want to learn about Sri Lanka's rich culture and history.

Tour Highlights

- Sigiriya Rock Fortress and frescoes
- Polonnaruwa ancient city ruins
- Dambulla Cave Temple and Buddha statues
- Anuradhapura ancient city and stupas
- Kandy and Temple of the Tooth Relic

Included/Excluded



Accommodation in 4-star hotels

Airfare to and from Sri Lanka

Check In

06/01/2023

Check Out

06/06/2023

Already booked

0

Available Seats

15

How many seats do you need?

1

[Login to book this tour](#)

Check In

06/01/2023

Check Out

06/06/2023

Already booked

0

Available Seats

15

How many seats do you need?

1

[Book Now](#)

Figure 40 – Booking tour

• Vehicle Renting

- On this page customers can click on the “Login to rent a vehicle” button and proceed to the login page and after successfully logged in to the system , and proceed with vehicle renting process by mentioning date duration and the driver option.

Description

The Honda City is a stylish and comfortable sedan that is perfect for those who value both form and function. With a sleek design that is sure to turn heads, this sedan also delivers on performance, with great fuel efficiency that makes it perfect for long drives. The City comes equipped with a range of features that make it a joy to drive, including power windows, central locking, a touchscreen infotainment system, a rearview camera, and ABS with EBD. Whether you're commuting to work or going on a road trip, the Honda City is sure to impress.

Features

- Power windows
- Central locking
- Touchscreen infotainment system
- Rearview camera
- ABS with EBD

Per day

\$9

From

mm/dd/yyyy

To

mm/dd/yyyy

Driving Option

Without driver

[Log In to rent a vehicle](#)

Figure 41 – Vehicle renting part I

The screenshot shows a mobile application interface for vehicle rental. On the left, there's a detailed description of a Honda City sedan, highlighting its stylish design, comfort, and various features like power windows, central locking, a touchscreen infotainment system, a rearview camera, and ABS with EBD. Below the description is a list of features with orange bullet points. On the right, there's a rental form with fields for 'From' (date input), 'To' (date input), and 'Driving Option' (dropdown menu set to 'Without driver'). A large orange button at the bottom right says 'Rent Now' with a small icon.

Figure 42 – Vehicle renting part II

- **View all booked tours**

- On this page customers can view all the tours they have booked until present. Here it shows tour name, price, type and the start date of the tour. Furthermore they can click on the "View Tour" link to view what tour they've booked.

The screenshot shows a user profile page for 'John Doe'. The top bar includes a profile picture, a welcome message, and a 'Logout' button. The main content area is titled 'TOURDRIVE' and shows a 'Tour Bookings' section. This section has a table with columns: #, Tour Name, Type, Start Date, Fee, and View. Three bookings are listed:

#	Tour Name	Type	Start Date	Fee	View
1	646e9fecb11685273823500	custom-tour	2023-05-29	\$1500	View tour
2	Urban Discovery	tour	2023-06-02	\$1399	View tour
3	Nature's Pathways	tour	2023-06-03	\$899	View tour

Figure 43 – View All booked Tours

- **View all booked vehicles**

- On this page customers can view all the vehicles they have rented until present. Here It shows vehicle number, type, model, make, fee and rental period of the vehicle.

#	Vehicle No	Type	Model,Make	Fee	Rental Period
1	PD2347	car	TOYOTA,PREMIO	\$25	2023-05-30 - 2023-06-02

Figure 44 – View All booked vehicles

- **View user's all custom tours**

- On this page customers can view all the custom tours they've requested and in the state of pending, approved or rejected. They can proceed to the payment of approved tours by clicking "Payment" button.

#	Tour	Status	Start Date	End Date	Price	Actions
2	0.15709632081258618	● pending	2023-05-27	2023-05-28	\$ 1270	<button>View</button>
3	646e9fecb11685166657320	● pending	2023-05-31	2023-06-10	\$ 1590	<button>View</button>
4	646e9fecb11685250873557	● approved	2023-05-26	2023-05-31	\$ 10	<button>Payment</button> <button>View</button>

Figure 45 – User's custom Tours

Also they can view summary of the custom tour by clicking "View" button.

Welcome, John Doe

TOURDRIVE

Custom tour summary pending

Tour Request ID	Start Date	Duration
0.15709632081258618	2023-05-27	1 Days
End Date	Passenger count	Vehicle type
2023-05-28	2	car
Vehicle transmission	Vehicle fuel	
auto	petrol	
Total distance	Vehicle cost	
122KM	\$ 1220	
Accommodation cost	Estimated total price	
\$ 50	\$ 1270	

click here to view terms and conditions

Day	City	Location One	Location Two	Location Three	Location Four	Accommodation
1	Colombo	Gangaramaya Temple	Viharamahadevi Park	National Museum of Colombo	Galle Face Green	guestHouse
2	Kandy	Temple of the Tooth Relic	Kandy Lake	Royal Botanical Gardens	Bahirawakanda Vihara Buddha Statue	villa

Figure 46 – Summary of custom tour

• Request for a custom tour

- Customers can request for a custom tour from this page. They need to fill tour start date, end date , vehicle type, passenger count, vehicle transmission and fuel type and proceed to select cities. From city list they can add cities and then click “Proceed”. Then they can select travelling locations from generated cards and select accommodations as well. Then they can view an estimation for their tour by clicking “view estimation”. After view the estimation they can submit tour for the evaluation.

Welcome, John Doe

TOURDRIVE

Request Custom Tour

Tour Request ID	646e9fecb11685502809789
Tour Start date	mm/dd/yyyy
Tour End date	mm/dd/yyyy
Passenger count	1
Vehicle type	Select vehicle type
Vehicle Transmission	Auto
Vehicle Fuel type	Petrol

Figure 47 – custom tour request form part I

Figure 48 – Custom tour request form part II

Figure 49 – custom tour request form part III

Figure 50 – custom tour request form part IV

3.1.3 CUSTOMER CARE OFFICER FUNCTIONALITIES

- **View all emergency requests and handle it.**
 - On this page, the customer care officer can view and review all emergency requests from users. (figure 51) By clicking an action button, they can access detailed information, including the requester's location (figure 52). Resolved requests can be marked as completed by the admin, ensuring efficient tracking and timely assistance. The visibility of the requester's location aids in providing appropriate support.

The screenshot shows the TOURDRIVE interface. At the top left is a user profile icon with the text "Welcome, ross geller". At the top right is a "Logout" button. The main title "TOURDRIVE" is at the top center. Below it is the heading "View all Emergency requests". A table lists one emergency request:

#	user	status	message	date, time	Actions
1	Hashan	pending	type: Mechanical Breakdown message: help me	2023-05-30T07:02:44.568Z	

Figure 51 – All emergency request

The screenshot shows the TOURDRIVE interface. At the top left is a user profile icon with the text "Welcome, ross geller". At the top right is a "Logout" button. The main title "TOURDRIVE" is at the top center. Below it is the heading "View Emergency Request". The page displays a map with a location pin and a message box containing the requester's details. At the bottom are input fields for "User's name" (Hashan) and "Mobile Number" (769198550), and a large text area for the "Message" (type: Mechanical Breakdown message: help me). A red "Mark as Completed" button is at the bottom right.

Figure 52 – Single emergency request view

- **View all customer Q & A requests and answer them**
 - On this page, the customer care officer can view and answer all the questions users have been asked about a particular tour.

Screenshot 1: View all Q&A requests

Welcome, ross geller

Logout

TOURDRIVE

View all Q&A requests

#	tour	question	date, time	Actions
1	Beach Getaway Tour	Are there any diving activities?	2023-06-01T03:17:59.113Z	

All emergency requests
Customer Q&A

Screenshot 2: Answer question

Welcome, ross geller

Logout

TOURDRIVE

Answer question

Question: Are there any diving activities?

Answer: Yes, there are.

Submit

All emergency requests
Customer Q&A

3.1.4 ADMIN FUNCTIONALITIES

- **Add a tour**
 - On this page, the administrator has the ability to add tours that they want to display on the website. The purpose of this feature is to allow the administrator to showcase different tours or travel packages to potential customers or website visitors.

The screenshot shows the 'Add Tour' page. At the top right is a 'Logout' button. On the left, there's a sidebar with a user icon and the text 'Welcome, admin@mail.com'. Below this is a navigation bar with icons for search, add, edit, and delete. A red box highlights the 'Tours' section in the sidebar, which contains links: 'Tour Statistics', 'Add Tours' (selected), 'View All Tours', and 'View All Custom Tours'. A speech bubble icon is at the bottom left.

Tour Name	Enter tour name here	Tour Price	Enter tour price here
Tour Cover	<input type="file"/> Choose File No file chosen	Tour Images	<input type="file"/> Choose Files No file chosen
Age Limit	Enter tour maximum age limit here	Capacity	Enter maximum no of seats for this tour
Tour Visiting cities	Enter cities visit during the tour here. ex city1, city2, city3		
End Date	mm/dd/yyyy	Start Date	mm/dd/yyyy
Tour Category	select tour category	Duration	Enter tour duration here
Tour Includes Enter Tour Includes here. EX: Include 1, Include 2,			

Figure 53 – Add tour form

• View all tour and Update tour

- On this page, the administrator has the ability to view all the tours that have been added to the website. This functionality allows the administrator to easily monitor and manage the tours that are currently available for users to browse and book.

The screenshot shows the 'View all Tours' page. At the top right is a 'Logout' button. On the left, there's a sidebar with a user icon and the text 'Welcome, admin@mail.com'. Below this is a navigation bar with icons for search, add, edit, and delete. A red box highlights the 'Tours' section in the sidebar, which contains links: 'Tour Statistics', 'Add Tours' (selected), 'View All Tours', and 'View All Custom Tours'. A speech bubble icon is at the bottom left.

#	Tour	Price	Start date	End date	Actions
1	Cultural Triangle Tour	799	03-06-2023	08-06-2023	
2	Beach Getaway Tour	699	03-06-2023	08-06-2023	
3	Beach and Wildlife Tour	1299	03-06-2023	08-06-2023	
4	Nature's Pathways	899	03-06-2023	08-06-2023	
5	Thrilling Trails	749	03-06-2023	08-06-2023	

Figure 54 – View All Tours added

By clicking edit icon administrator can edit and update the tour information. Also, by clicking on the trash can icon, the administrator can delete the corresponding tour from the website.

Figure 55 – Tour update form

• Review Custom tour

- On this page, the administrator has access to view all the custom tour requests submitted by users. By clicking on the "book" icon, the administrator can see all the information associated with each custom tour request, allowing him to review the details provided by the user. Admin also have the ability to add any additional information or notes to the request and make a decision to accept or reject the custom tour. Furthermore, the administrator has the option to delete custom tour requests if necessary

#	Tour Name	Status	Start date	Duration	Actions
1	my-tour-1	● rejected	2023-05-20	7	()()
2	my-tour-2	● approved	2023-05-23	7	()()
3	my-tour-3	● approved	2023-05-25	12	()()
4	hi-custom-tour	● pending	2023-05-27	7	()()
5	my-tour-4	● pending	2023-05-24	13	()()

 A sidebar on the left shows a navigation menu with 'Tours' selected, and a bottom right corner has a speech bubble icon.

Figure 56 – View All Custom Tours

The screenshot shows the TOURDRIVE application interface. On the left, a sidebar menu titled 'Tours' includes links for 'Tour Statistics', 'Add Tours', 'View All Tours', and 'View All Custom Tours'. The main content area is titled 'Requested tour summary' with a status of 'pending'. It displays tour details such as name ('my-tour-4'), start date ('2023-05-24'), end date ('2023-06-06'), duration ('13 Days'), vehicle transmission ('auto'), total distance ('207KM'), accommodation cost ('\$ 140'), passenger count ('5'), vehicle type ('van'), vehicle fuel ('petrol'), vehicle cost ('\$ 3105'), and estimated total price ('\$ 3245'). Below this is a table showing travel locations across four days:

Day	City	Location One	Location Two	Location Three	Location Four	Accommodation
1	Hambantota	Yala National Park	Bundala National Park	Kalametiya Bird Sanctuary	Mulkirigala Rock Temple	guestHouse
2	Ampara	Gal Oya National Park	Magul Maha Viharaya	Kudumbigala Monastery	Maha Oya River Safari	star_1

Below the table is a section titled 'Validate tour' with four input fields: 'Enter final total cost (\$)' containing 'not available', 'Enter any price changes here' containing 'not available', 'Enter any location changes here' containing 'not available', and 'Enter any vehicle changes here' containing 'not available'. At the bottom are 'Accept' and 'Reject' buttons.

Figure 57 – View single Custom tour

• Add a vehicle.

- Here, on this page, the administrator has the ability to add vehicles to the website. This feature allows the administrator to showcase different vehicles available for rental

The screenshot shows the 'Add Tour' form for adding a vehicle. The form includes fields for 'Tour Name' (with placeholder 'Enter tour name here'), 'Tour Price' (with placeholder 'Enter tour price here'), 'Tour Cover' (with a file selection button 'Choose File' and message 'No file chosen'), 'Tour Images' (with a file selection button 'Choose File' and message 'No file chosen'), 'Capacity' (with placeholder 'Enter maximum no of seats for this tour'), 'Age Limit' (with placeholder 'Enter tour maximum age limit here'), 'Start Date' (with placeholder 'mm/dd/yyyy' and a calendar icon), 'Duration' (with placeholder 'Enter tour duration here'), 'Tour Visiting cities' (with placeholder 'Enter cities visit during the tour here. ex city1, city2, city3'), 'End Date' (with placeholder 'mm/dd/yyyy' and a calendar icon), 'Tour Category' (a dropdown menu with placeholder 'select tour category'), and 'Tour Includes' (a text area with placeholder 'Enter Tour Includes here. EX: include 1, include 2,').

Figure 58 – Add vehicle form

• View all vehicle and Update vehicle

- This page provides the administrator with an overview of all the vehicles added to the website. By clicking on the "edit" icon, the administrator can modify and update the information associated with a specific vehicle, ensuring accuracy and relevance. They also have the option to delete a vehicle if needed, giving them control over the management of the website's vehicle listings.

The screenshot shows the 'View all Vehicles' page. At the top, there is a navigation bar with icons for search, add, edit, and delete. Below the navigation bar, the page title 'TOURDRIVE' is displayed. On the left, a sidebar menu under 'Vehicles' includes 'Vehicle Statistics', 'Add Vehicles', and 'View All Vehicles'. The main content area is titled 'View all Vehicles' and contains a table with the following data:

ID	Vehicle No	Type	model-make	Fuel	Status	Actions
1	KA 02 BC 5678	suv	Fortuner, Toyota	diesel	available	
2	ABB 1234	car	City, Honda	petrol	available	
3	BCC-7878	car	Swift, Suzuki	petrol	available	
4	ABC-1001	car	Prius, Toyota	petrol	available	
5	ABC-1012	car	Alto, Suzuki	petrol	rented	

Figure 59 – View All Vehicles

The screenshot shows the 'Update Vehicle Status' form. At the top, there is a navigation bar with icons for search, add, edit, and delete. Below the navigation bar, the page title 'TOURDRIVE' is displayed. On the left, a sidebar menu under 'Tours' includes 'Tour Statistics', 'Add Tours', 'View All Tours', and 'View All Custom Tours'. The main content area is titled 'Update Vehicle Status' and contains a 'Select status' dropdown menu with 'available' selected. Below it is an 'Update state' button. The next section is titled 'Update Driver' and contains a 'Select Driver' dropdown menu with 'not available' selected. Below it are 'Update driver' and 'Remove driver' buttons. The final section is titled 'Update Vehicle' and contains fields for 'Vehicle No' (KA 02 BC 5678) and 'Vehicle Transmission' (manuel).

Figure 60 – Single vehicle update form

- **Add a user**

- This page grants the administrator access to add users to the system and assign them one of the four main user roles: admin, tour guide, driver, or customer care officer. The administrator can determine the appropriate role for each user based on their responsibilities and access levels within the system. By adding users and assigning roles, the administrator effectively manages the user accounts and ensures that each user has the necessary permissions

The screenshot shows the 'Add User' interface. At the top right is a 'Logout' button. Below it is a title 'TOURDRIVE'. The main area is titled 'Add User'. It contains several input fields: 'First Name' (placeholder 'Enter user's first name here'), 'Last Name' (placeholder 'Enter user's last name here'), 'Email' (placeholder 'Enter email here' with a small mail icon), 'Select user role' (a dropdown menu labeled 'Select user role'), 'ID' (placeholder 'Enter national ID here'), and 'Mobile' (placeholder 'Enter mobile number here'). At the bottom are two buttons: an orange 'Add User' button and a black 'Clear' button.

Figure 61 – Add user form

- **View all user and Update user account**

- This page provides the administrator with an overview of all user profiles on the website. By clicking the "edit" icon, the administrator can update and modify user account information as needed. Additionally, the administrator has the ability to delete user accounts

The screenshot shows the 'View all Users' interface. At the top right is a 'Logout' button. Below it is a title 'TOURDRIVE'. The main area is titled 'View all Users'. It displays a table of user data:

#	Name	Email	Status	User type	Actions
1	-	admin@mail.com	active	admin	
2	jane joe	jd@mail.com	deactive	tour_guide	
3	-	test12@mail.com	active	user	
4	john doe	johnd@mail.com	active	driver	
5	json stathom	js@mail.com	active	driver	

Figure 62 – View All Users

Welcome, admin@mail.com

TOURDRIVE

Update User

First Name: jane

Last Name: joe

Email: jd@mail.com

Select user role: tour_guide

ID: 1234

Mobile: 782509052

Update user Clear

Figure 63 – Update user form

• Vehicle Statistics

- On this page, the administrator can access statistics and information related to renting vehicles. The statistics provide insights into the comparison of vehicle rentals based on vehicle types and the corresponding income generated from those rentals.



Figure 64 – Vehicle statistics

• Tour Statistics

- On this page, the administrator can access statistics and information related to tour booking. The statistics provide insights into the comparison of tour booking based on tour category and the corresponding income generated from those rentals.

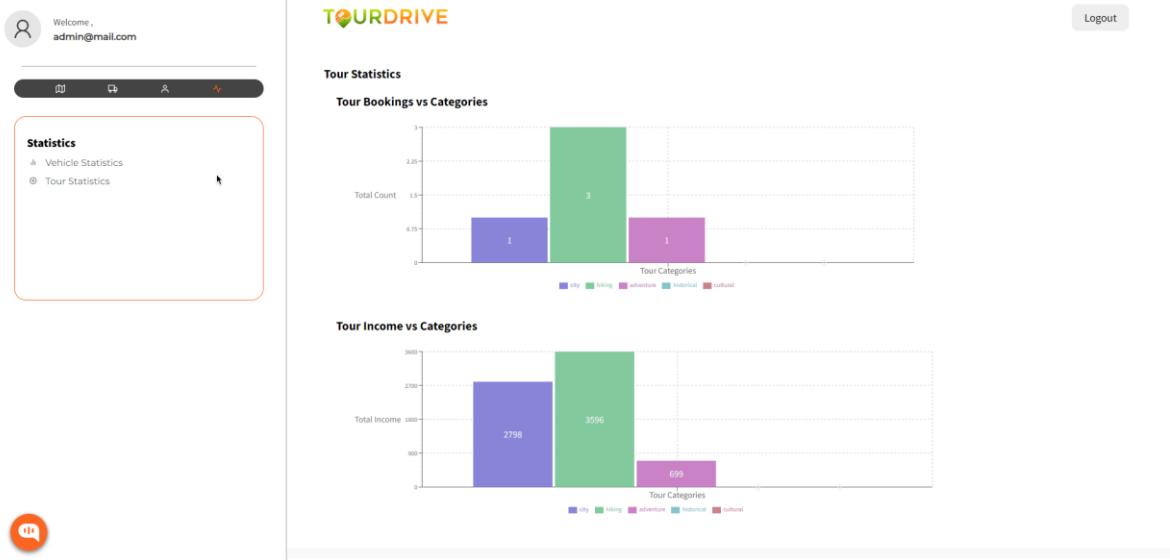


Figure 65 – Tours statistics

3.2 MOBILE APPLICATION

The mobile application offers the following functionalities for users:

1. Tour Booking: Customers can use the mobile app to search for tours, book their preferred options, and even request customized tours, providing them with a seamless experience for planning their travel itineraries.
2. Vehicle Renting: In the vehicle renting aspect, the mobile app enables users to search for available vehicles based on type, make payments to rent a vehicle, and utilize location tracking to notify emergencies and seek assistance promptly, ensuring their safety and security.
3. Customer-Focused Features: The mobile app is designed to prioritize essential customer needs, providing a user-friendly interface and easy access to tour booking and vehicle renting functionalities. While administrative features are excluded, the app aims to deliver a streamlined experience specifically tailored to customer requirements.

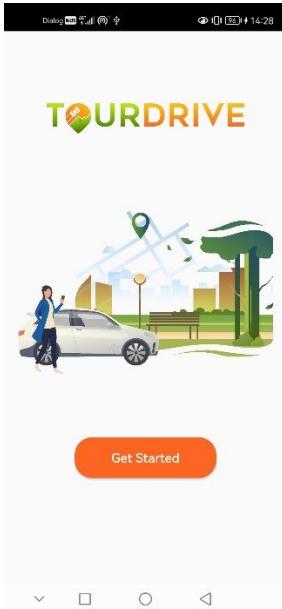


Figure 66 – starting page

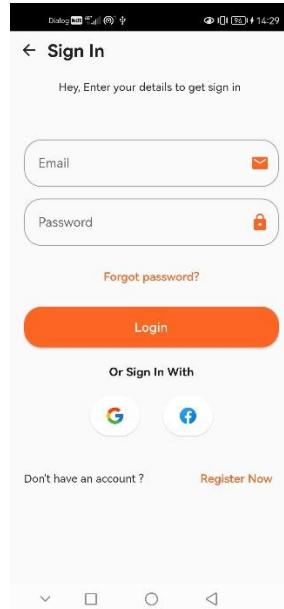


Figure 67 – Login page

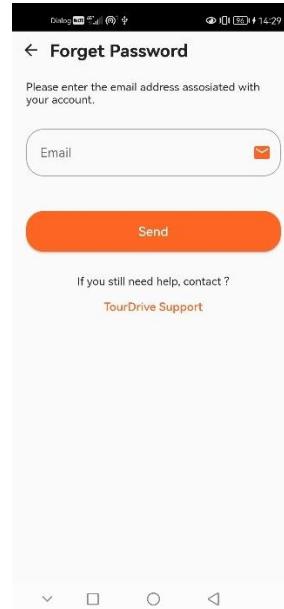


Figure 68 – forget password

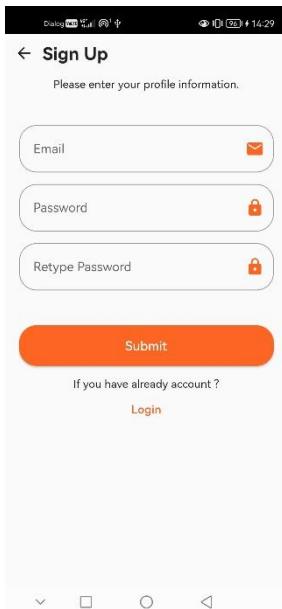


Figure 69 – Sign Up page



Figure 70 – Home page

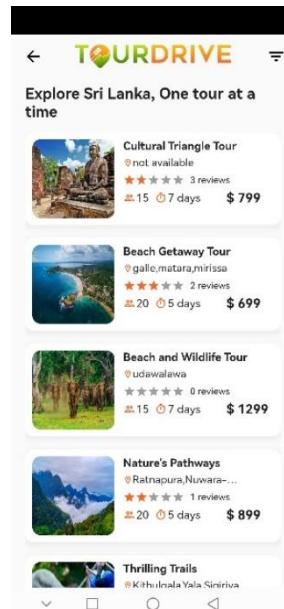


Figure 71 – Tours listing

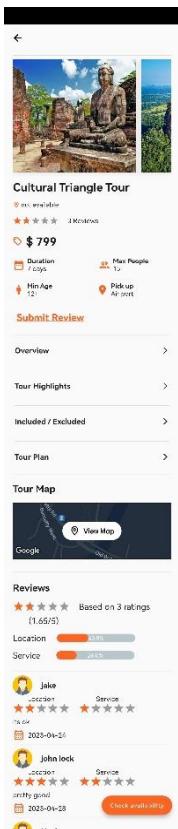


Figure 72 – Single tour

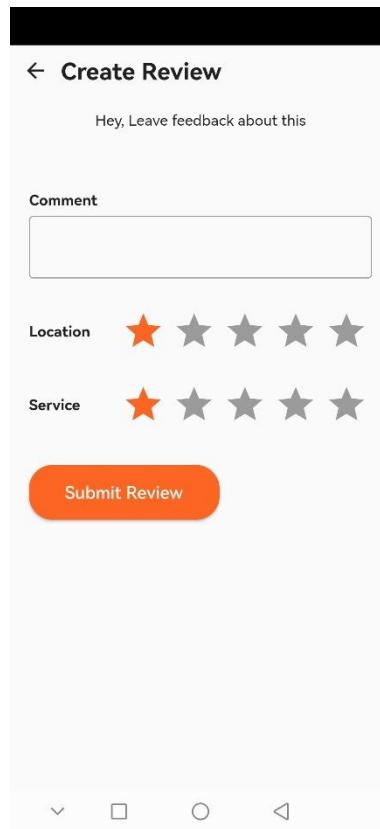


Figure 73 – Review adding

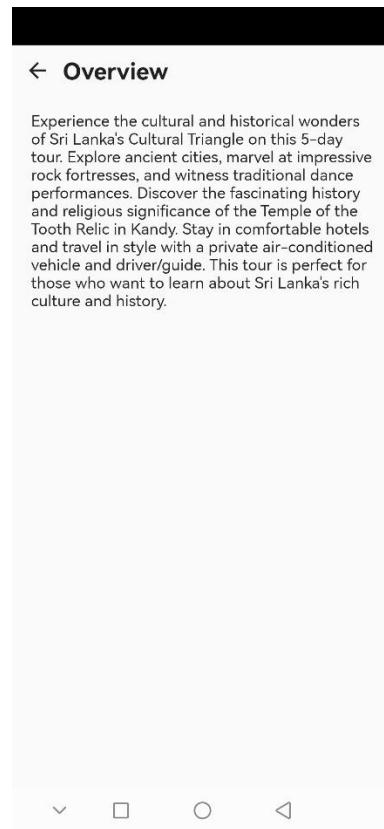


Figure 74 – Tour overview

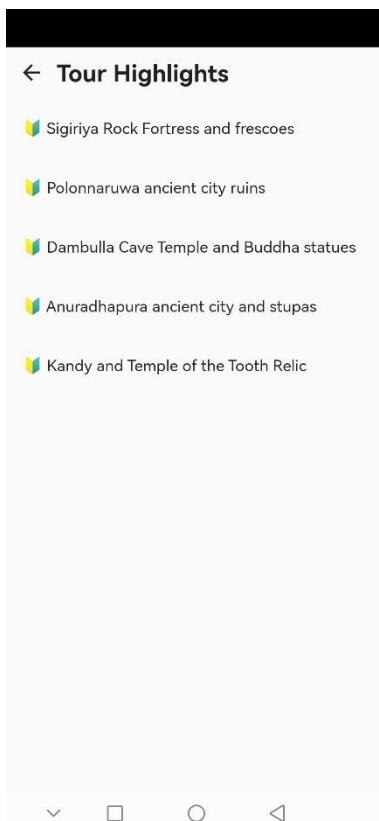


Figure 75 – Tour highlights

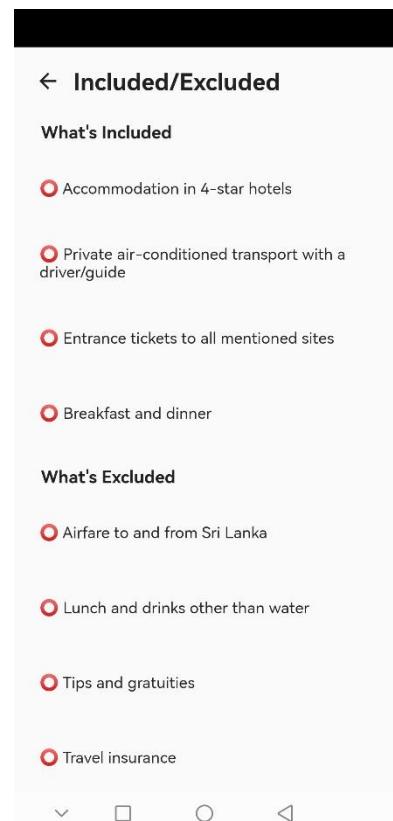


Figure 76 – Tour info



Figure 77 – Tour plan

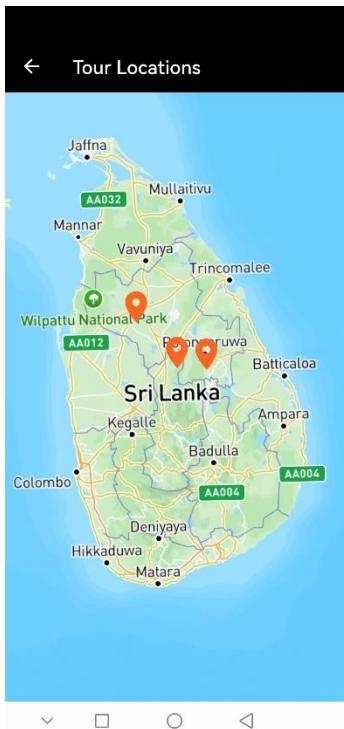


Figure 78 – Tour location

Figure 79 – booking window

Figure 80 – Vehicle listing

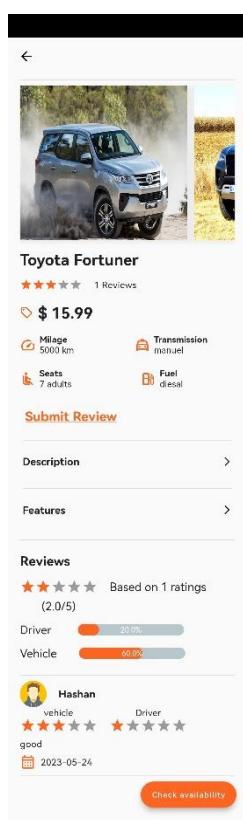


Figure 81 – Vehicle view

Figure 82 – review adding form

The Toyota Fortuner is a rugged and powerful SUV that is built for adventure. With great off-road capabilities, this SUV is perfect for those who love to explore. The Fortuner is equipped with a range of features that make it both comfortable and convenient to drive, including a 4WD system, hill descent control, automatic climate control, a 7-inch touchscreen infotainment system, and push-button start. Whether you're navigating city streets or blazing your own trail in the great outdoors, the Toyota Fortuner is the perfect companion.

Figure 83 – Vehicle description

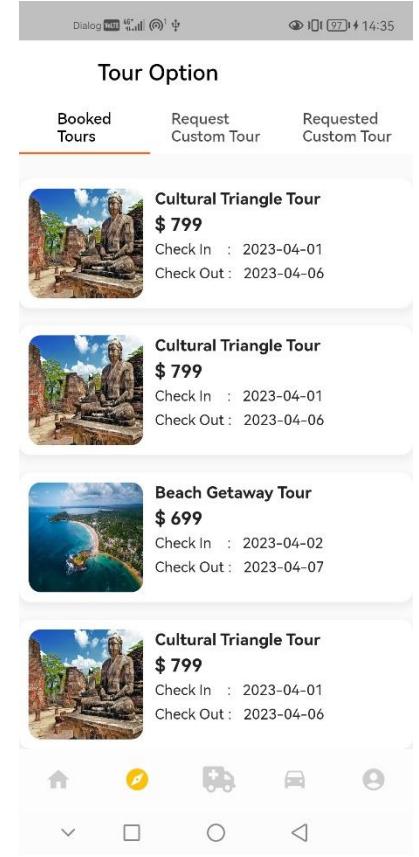
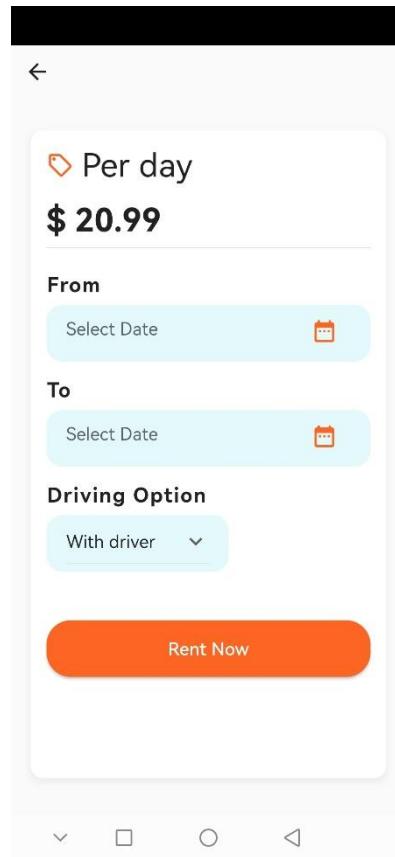


Figure 84 – Vehicle information

Figure 85 – Booking window

Figure 86 – Booked tour

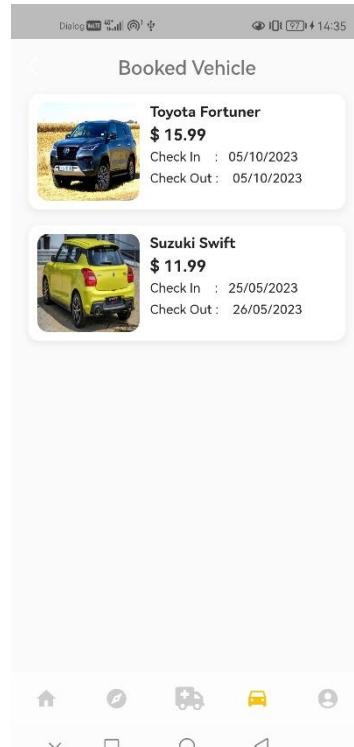
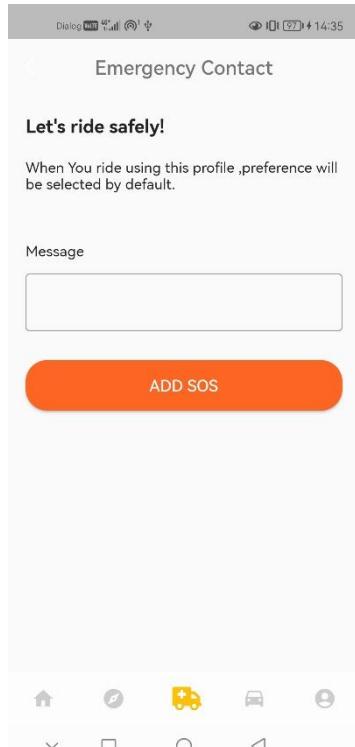
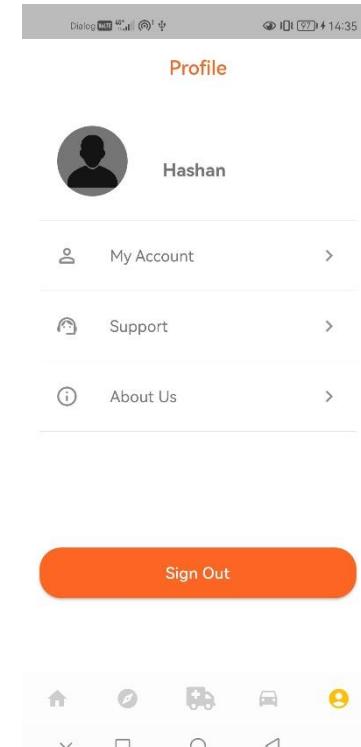


Figure 87 – emergency request

Figure 88 – booked vehicle

Figure 89 – profile



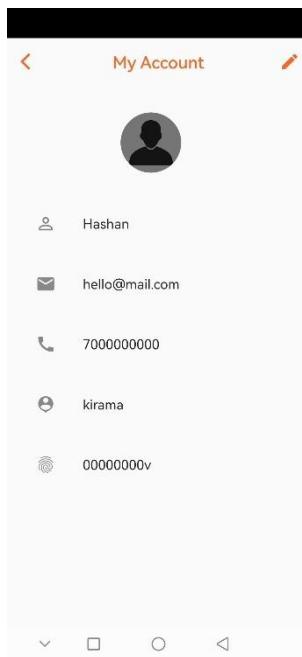


Figure 90 – profile

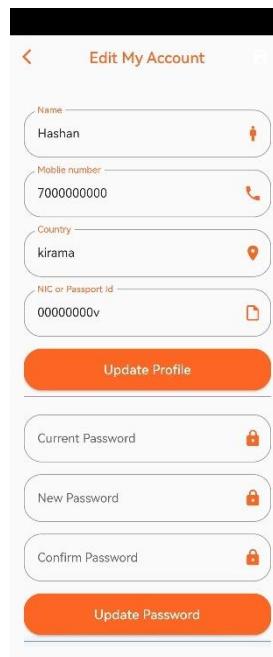


Figure 91 – profile update

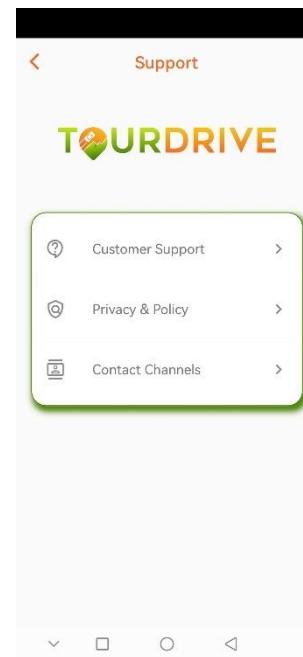


Figure 92 – customer support

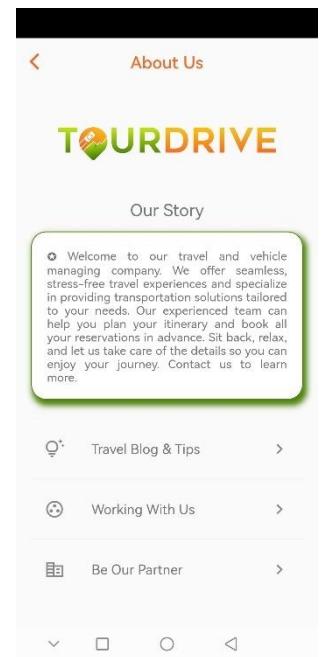


Figure 93 – About Us

3.3 BACKEND IMPLEMENTATION

1. Backend implementation

- 1.1. The core functionality of the tour drive application revolves around its backend component, which efficiently manages all database interactions. Built on the robust Node.js platform, this backend system follows the widely adopted Model-View-Controller (MVC) architecture. Additionally, it provides a user-friendly Representational State Transfer (REST) Application Programming Interface (API), ensuring seamless interaction with the tour drive's resources. Through this API, users can conveniently access and manipulate system data using standardized methods, enhancing the overall usability and versatility of the tour drive.

1.2. Code Editor

Visual Studio Code is used to develop the tour drive application.

Figure 94

- Configuration File

The screenshot shows a browser window with the URL `http://tourdrive`. The page displays a JSON response from the `/api/tour` endpoint, listing several tour entries with details like title, description, price, and date.

```
[{"id": 1, "title": "Grand Canyon Tour", "description": "A scenic tour of the Grand Canyon with stops at the South Rim and North Rim.", "price": 150, "date": "2023-09-15"}, {"id": 2, "title": "Yellowstone National Park Tour", "description": "A comprehensive tour of Yellowstone National Park, including geysers, hot springs, and wildlife.", "price": 200, "date": "2023-09-18"}, {"id": 3, "title": "Mesa Verde National Park Tour", "description": "A tour of Mesa Verde National Park, featuring ancient Ancestral Puebloan ruins.", "price": 120, "date": "2023-09-16"}, {"id": 4, "title": "Great Smoky Mountains Tour", "description": "A tour of the Great Smoky Mountains, known for its lush forests and waterfalls.", "price": 180, "date": "2023-09-17"}, {"id": 5, "title": "Death Valley National Park Tour", "description": "A tour of Death Valley National Park, featuring the lowest point in North America.", "price": 140, "date": "2023-09-19"}]
```

Figure 95

```

const express = require('express');
const mongoose = require('mongoose');
const dotenv = require('dotenv');
const app = express();
const port = process.env.PORT || 5000;
const cors = require('cors');

// catch synchronous errors
app.use((err, req, res, next) => {
    console.error(err);
    console.log(`UNCAUGHT EXCEPTION ERROR ${err.message} ${err.stack}`);
    res.status(500).send(`Internal Server Error`);
});

// set the path of the configuration file which stores the environment variables
dotenv.config({ path: './config.env' });

// const app = require('./app');
const app = require('./app.js');

const DB = process.env.DATABASE.replace(
    'mongodb://', `mongodb+srv://${process.env.DB_USERNAME}:${process.env.DB_PASSWORD}`
);

// database connection
DB.connect(DB, {
    useNewUrlParser: true,
    useUnifiedTopology: true,
    autoIndex: true,
})
    .then(() => {
        console.log(`DB connection Success ${DB.host}`);
    })
    .catch((err) => {
        console.log(`UNHANDLED DB CONNECTION ERROR ${err.message} ${err.stack}`);
        console.error(err);
        process.exit(1);
    });

// create and server endpoint in the listening requests
app.listen(port, () => {
    console.log(`Server is listening in port ${process.env.PORT}`);
});

```

Figure 96

- The server.js file serves as the entry point, defining the application's configuration and behavior. It establishes a connection to the MongoDB database, enabling efficient storage and retrieval of data for the tour drive app. Additionally, the server.js file sets up an application listener, allowing the backend to receive incoming requests and provide the necessary functionality. With this setup, the Node.js and Express combination forms a powerful foundation, empowering the tour drive app with seamless backend capabilities and seamless interaction with the API, facilitating efficient tour management and exploration.

• Models

```

const mongoose = require('mongoose');
const validator = require('validator');
const bcrypt = require('bcryptjs');
const crypto = require('crypto');

const userSchema = new mongoose.Schema({
    name: {
        type: String,
        required: [true, 'A user must have a name'],
    },
    country: {
        type: String,
        required: [true, 'A user must have a name'],
    },
    email: {
        type: String,
        unique: true,
        required: [true, 'A user must have an email'],
        lowercase: true,
        validate: [validator.isEmail, 'please provide a valid email'],
    },
    id: {
        type: String,
        unique: true,
    },
    passportID: {
        type: String,
        unique: true,
    },
    mobile: {
        type: Number,
        unique: true,
    },
    password: {
        type: String,
        minlength: 8,
    },
});

```

Figure 97

- In the data models folder, all the mongo db collection schemas are defined with relevant properties and methods to store data.
- It contains all the data types and constraints of the properties

- Controllers

```

server > controllers > authController.js > signUp > catchAsync callback
11 // MIDDLEWARE STACK START -----
12 // this middleware checks the request for JWT cookie and whether the user exists before reaching it to the controller.
13 > const protect = catchAsync(async (req, res, next) => {
14   // ===== MIDDLEWARE STACK END =====
15   // restrict users from accessing particular controllers
16   > const restrictio = (...roles) => {
17     ...
18   };
19   // sign the JWT token and add the id of the user document
20   const signToken = (id) => {
21     return jwt.sign({ id }, process.env.JWT_SECRET, {
22       expiresIn: process.env.JWT_EXPIRES_IN,
23     });
24   };
25   // create the cookie to send JWT to the browser and send it with the response
26   > const createSendToken = (user, statusCode, req, res) => {
27     ...
28   };
29   // ===== controllers START =====
30   // @ DESCRIPTION      -> sign up new users
31   // @ ENDPOINT        -> api/v1/auth/signup [POST]
32   // @ ACCESS          -> 'all'
33   > const signUp = catchAsync(async (req, res, next) => {
34     ...
35   );
36   // @ DESCRIPTION      -> login to the system using email and password
37   // @ ENDPOINT        -> api/v1/auth/login [POST]
38   // @ ACCESS          -> 'all'
39   > const login = catchAsync(async (req, res, next) => {
40     ...
41   );
42   // ===== controllers END =====
43   // ===== routes START =====
44   // @ DESCRIPTION      -> get current user, getCurrentUser
45   // @ ENDPOINT        -> /get-current-user
46   // @ ACCESS          -> 'all'
47   > const authRoutes = require('./controllers/authController');
48   const router = express.Router();
49   router.get('/get-current-user', getCurrentUser);
50   router.post('/signup', signUp);
51   router.post('/login', login);
52   router.get('/logout', logout);
53   router.get('/facebook', continueWithFacebook);
54   router.post('/Facebook', continueWithFacebook);
55   router.post('/forgotPassword', forgotPassword);
56   router.post('/resetpassword/:resetToken', resetPassword);
57   router.patch('/update-password', protect, updateMyPassword);
58   router.patch('/update-me', protect, updateMe);
59   export { router as authRouter };

```

Figure 98

- Controllers are functions that are plugged into different routes to handle incoming requests. They read incoming requests and perform different tasks like CRUD operations and send the client response.

- Routes

```

server > routes > authRoutes.js ...
1 import express from 'express';
2 import {
3   resetPassword,
4   forgotPassword,
5   continueWithFacebook,
6   continueWithGoogle,
7   login,
8   signUp,
9   logout,
10  getCurrentUser,
11  updateMyPassword,
12  protect,
13  updateMe,
14 } from './controllers/authController';
15 const router = express.Router();
16 router.get('/get-current-user', getCurrentUser);
17 router.post('/signup', signUp);
18 router.post('/login', login);
19 router.get('/logout', logout);
20 router.get('/facebook', continueWithFacebook);
21 router.post('/Facebook', continueWithFacebook);
22 router.post('/forgotPassword', forgotPassword);
23 router.post('/resetpassword/:resetToken', resetPassword);
24 router.patch('/update-password', protect, updateMyPassword);
25 router.patch('/update-me', protect, updateMe);
26 router.patch('/update-password', protect, updateMe);
27 router.patch('/update-me', protect, updateMe);
28
29 export { router as authRouter };

```

Figure 99

- Routes are used to redirect incoming client requests to relevant controllers. They are also used to prevent unauthorized access to controllers.

- Middleware

```

server > controllers > authController.js > (1) signUp > catchAsynchronous callback
9 import { Email } from './utils/email';
10 import { promiseify } from 'util';
11 import { log } from 'console';
12 // ===== MIDDLEWARE STACK START =====
13 // this middleware checks the request for JWT cookie and the whether the user exists before reaching it to the controller.
14 > const protect = catchAsynchronous(async (req, res, next) => {
15   > const token = req.cookies['tourDrive'];
16   > if (!token) {
17     > return res.status(401).json({ message: 'User is not logged in' });
18   }
19   > const decoded = jwt.verify(token, process.env.JWT_SECRET);
20   > const user = await User.findById(decoded.id);
21   > if (!user) {
22     > return res.status(401).json({ message: 'User does not exist' });
23   }
24   > req.user = user;
25   > next();
26 }
27 // ===== MIDDLEWARE STACK END =====
28 // restrict users from accessing particular controllers
29 const restrictTo = (...roles) => {
30   > return (req, res, next) => {
31     > if (!roles.includes(req.user.role)) {
32       > return res.status(403).json({ message: 'You don't have permission to perform this action!' });
33     }
34     > next();
35   };
36 }
37 // sign the JWT token and add the id of the user document
38 const signToken = (id) => {
39   > return jwt.sign({ id }, process.env.JWT_SECRET, {
40     > expiresIn: process.env.JWT_EXPIRES_IN,
41   });
42 }
43 // create the cookie to send JWT to the browser and send it with the response
44 > const createSendToken = (user, statusCode, req, res) => {
45   > res.cookie('tourDrive', signToken(user._id), {
46     > maxAge: process.env.JWT_EXPIRES_IN * 1000,
47     > httpOnly: true
48   });
49   > res.status(statusCode).json({
50     > _id: user._id,
51     > name: user.name,
52     > email: user.email,
53     > role: user.role,
54     > token: signToken(user._id)
55   });
56 }
57
58 // ===== controllers START =====
59
60
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86
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88
89
90
91
92
93 // ===== controllers END =====

```

Figure 100

- Middleware is used between routes and controllers. They modify the incoming request before it reaches the controller. They are used to upload images and perform role-based authentication

4 TESTING AND EVALUATION

4.1 TESTING

4.1.1 WEB APPLICATION

For the testing of web application, we used Visual Studio Code's Terminal and Google Chrome's Developer Tools, such as Browser console, performance testing console, Network Console.

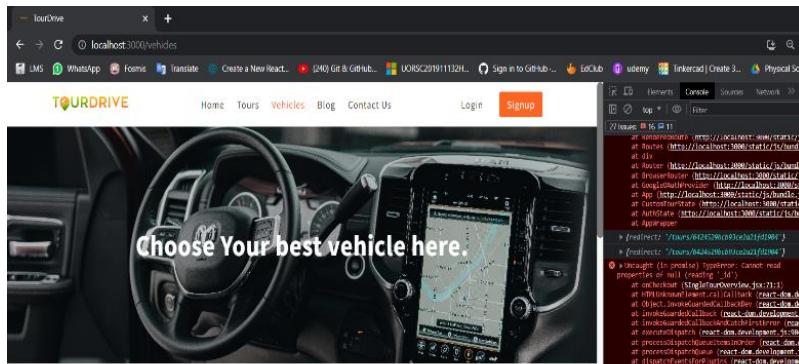


Figure 101

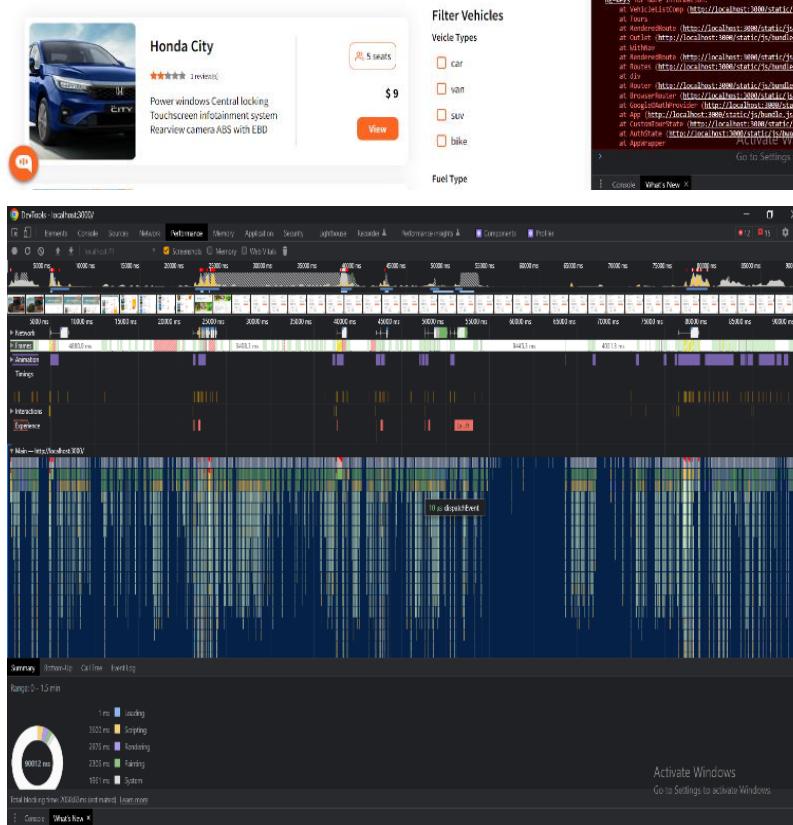


Figure 102

4.1.2 MOBILE APPLICATION

For the testing of mobile application, we used Visual Studio Code's terminal debugging tool set and device preview tool.

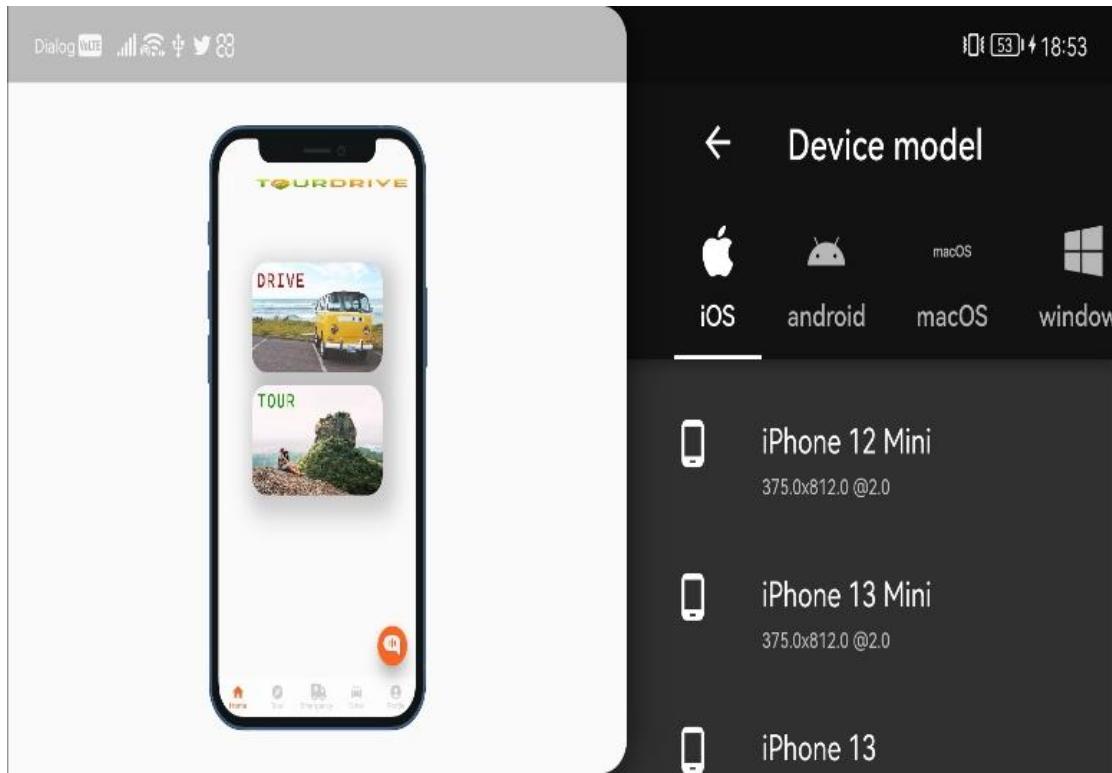


Figure 103

A screenshot of the Visual Studio Code interface. The title bar says "tour_drive_frontend". The code editor shows a Dart file named "ProfileScreenState.dart". The code defines a state class "ProfileScreenState" with methods for setting a name and initializing state. A tooltip is visible over the "super.initState();" line. The bottom status bar shows "File 1 (1 test, 108 errors, 107 warnings, 80 info)" and "Activate Windows Go to Settings to activate Windows." The bottom right corner has a page number "62".

Figure 104

4.1.3 BACKEND IMPLEMENTATION

We used Postman, a tool for testing REST APIs, to make sure our API is working correctly. With Postman, we could check that our endpoints are functioning properly. We thoroughly tested our endpoints to avoid any unexpected problems.

The screenshot shows the Postman interface with the following details:

- Left Sidebar (My Workspace):** Shows collections like 'flutter app', 'tour-drive' (selected), and 'tours'. Under 'tour-drive', there are endpoints for authentication (sign_in_google, POST login, POST signup, GET get_details, POST forget password), tours (GET Get all tours, GET Get one tour), vehicles (GET get all vehicles, GET get single vehicles), review, tour, vehicle, emergencies (POST create emergency), Booking, tour, vehicle, and profile.
- Request Details:** A POST request for 'tour-drive / emergencies / create emergency' is selected. The URL is http://192.168.8.152:8000/api/v1/emergencies. The body is set to 'raw' and contains the following JSON:

```
1 "user": "6429727fdc7d95680b18e2f7",
2 "message": "I am lost near badull.please help",
3 "latitude": "7.199848356564282",
4 "longitude": "79.85387827669739"
```

- Response Preview:** The response status is 201 Created. The response body is:

```
1 {
2   "status": "success",
3   "message": "emergency request created successfully",
4   "data": [
5     {
6       "request": {
7         "user": "6429727fdc7d95680b18e2f7",
8         "status": "pending",
9         "message": "I am lost near badull.please help",
10        "coordinates": {
11          "lat": 7.199848356564282,
12          "long": 79.85387827669739
13        },
14        "_id": "647363f5dd60ddded60277fe",
15        "createdAt": "2023-05-28T14:23:49.548Z",
16        "updatedAt": "2023-05-28T14:23:49.548Z",
17        "__v": 0
18      }
19    }
20  ]
```

Figure 105

4.2 TESTING PERFORMED

- Integration testing
- System testing
- Performance testing
- Compatibility testing
- End-User testing



4.3 TEST CASES

Test Case ID	Test Case Description	Test Steps	Test Data	Expected Result	Actual Result	Pass /Fail
01	Check sign in	Go to the sign in page Enter email and password Hit the sign in button	Email: hashan@gmail.com Password: test1234	User should login to the system	As expected	Pass
02	Check booking a tour	Go to the home page and press tour button Select a tour Check the availability Fill the payment form Check Booked tours for existence	select Beach Gateway Tour and do a test payment	The payment should give a "Payment Success" pop up dialog And the ordered tour should present in Ordered tour page	As expected	Pass
03	Check Booking a vehicle	Go to the home page and press Drive button Select a vehicle Check the availability Fill the payment form Check Booked vehicles for existence	Select Honda Vezel vehicle and do a test payment	The payment should give a "Payment Success" pop up dialog And the ordered vehicle should present in Ordered vehicle page	As expected	Pass
04	Check emergency button	Go to the emergency page Add an emergency message Select emergency type Press the Add SOS button to send the emergency message	Test Message: Help me Emergency Type : Mechanical break down	At the button click ask for location access permission Process of the circular indication Popup The popup message just after sending the emergency With an embedded contact number	As Expected	Pass

Figure 106

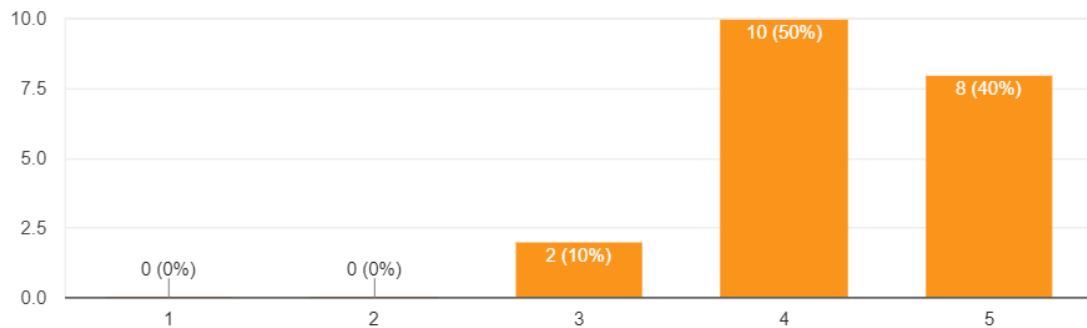
4.4 EVALUATION

We finished evaluating our application using a Google form. The user interface of the application received mainly favorable comments, and we also received some recommendations on how to improve our system. Details about these recommendations can be found in the section headed "Future Work."

How would you rate the overall usability and user-friendliness of the "TOUR DRIVE" web application?

 Copy

20 responses



What did you think about the "Custom Tour" request option in the website?

 Copy

20 responses

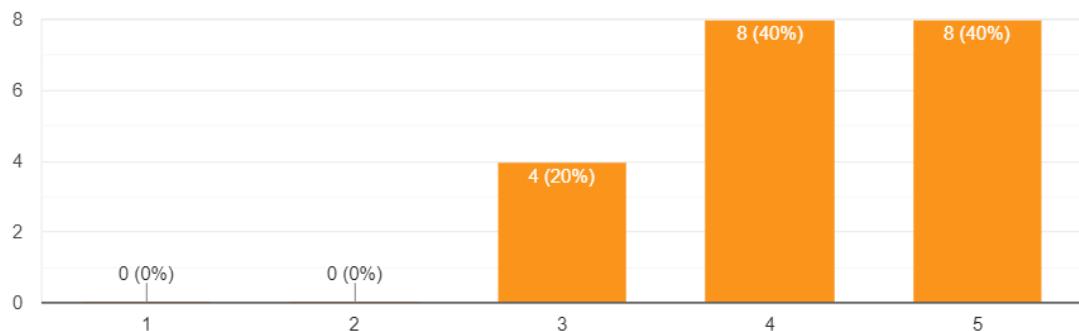


Figure 107

Were you satisfied with the system's response time and performance?

 Copy

20 responses

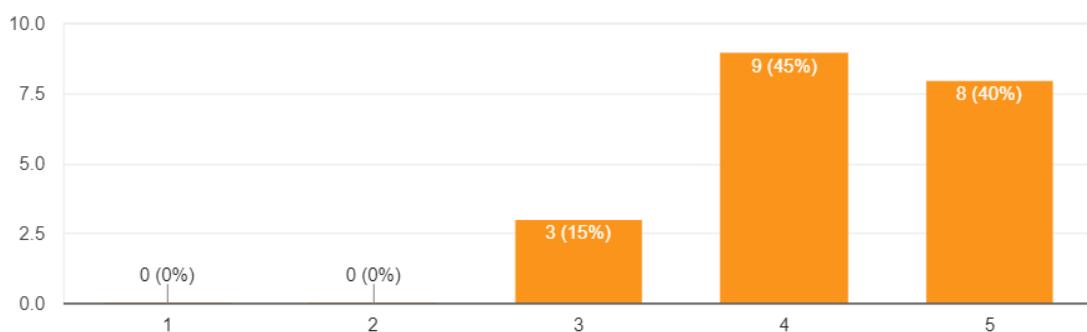


Figure 108

5 CONCLUSION & FUTURE WORK

5.1 CONCLUSION

The tourism and travel industry is a major industry in Sri Lanka. It directly impacts the development of our country, but tourists who visit Sri Lanka face some major problems in visiting Sri Lanka. Travel issues are one type of major issue they face. It takes time for them to find a trustworthy vehicle renter. So we realized that problem and created a web and a mobile application which they can benefit from and save their valuable time in visiting Sri Lanka. Other than that we offer them tour packages which can give them the best experience in visiting Sri Lanka. Furthermore, we considered their safety and granted an emergency service handled by local experts, and also we introduced a chatbot to give immediate answers to frequently asked questions. As we provide mobile applications everything is in their hand and just one click away. So that they can save their time and invest that in enjoying Sri Lanka.

5.2 FUTURE WORK

- **Smooth the best route selection in custom tours**
 - Currently, the web application is only providing a rough route, it may be confusing the tourists as they don't get an exact idea of visiting places. By understanding that problem we are going to smooth the best route selection so that the tourists will be doubtless in having a tour in Sri Lanka.
- **Introducing accommodation handling functionality.**
 - We did not implement accommodation handling for both of our applications, but it is a major fact to be considered. So we have decided to introduce the accommodation service through our applications. Then the tourists not only can book tours and vehicles, but also they can choose their preferred accommodations.
- **Completion of the custom tour feature of the mobile app**
 - The custom tour feature is still in the development stage. We are intended to complete its all functionalities and grant them the opportunity to select and customize the tours they want as they wish. So that the client will not have to switch to the web to make a custom tour they can use a mobile app instead.

- **Recommend frequent custom tours to be under predefined categories by the admin**
 - Currently, the client can make custom tours from the web application. If there are frequently used custom tours, the tourists can select them and book if they are predefined, so it can save them time.
- **Advanced search and recommendation system**
 - Currently, we do not have that feature implemented. So we understood the importance of that feature and decided to add it to our applications to make the clients more satisfied with our applications. We are going to integrate an AI-based Recommendation system from Google to achieve that process.

6 References

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