Domestic Tours And Travel Management System

Project Report

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Sri Lanka Institute of Information Technology

IT2080 Information Technology Project

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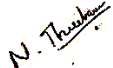
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October 2023

Declaration

This project report is our original work and the content is not plagiarized from any other resource. References for all the content taken from external resources are correctly cited. To the best of our knowledge, this report does not contain any material published or written by third parties, except as acknowledged in the text.

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Abstract

Rapid Travels is a Domestic Tours and Travel Management System (DTMS) which provides domestic tours and travel services within Sri Lanka. This system is an integrated management system which combines multiple management systems namely rides management system, boat tours reservation system and finally bus reservation system. Rapid Travels is company which offers a convenient way for a customer to book or reserve cars, bikes, three-wheelers, busses and boats which provides domestic services within the country.

This system is designed as a result of minimizing the physical interaction of customers who are planning to travel which saves a lot of time and effort. This system will also replace the currently existing systems, which will all of the systems will be integrated to a single system, which helps in managing the records of the components related to the system namely, clients, drivers, staff, vehicles, vehicle owners, destinations and payments. The company believes in developing this system in order to create and promote forms of travels and tours that provide better interaction opportunities for local and as well as for the tourists visiting the country.

Rapid Travels provides easy and effective solution for domestic travels and tours reducing the major risk factors which arise physically and the components which directly and in-directly interact with the system. The company's mission is to operate using innovative technology to improve the customer experience, bring positive change to the market, expand the business, increase revenues and the most important which is attracting new clients to the designed system.

<u>Acknowledgement</u>

We are extremely appreciative to our instructors and lecturers for giving us the opportunity to work on this project. We want to express our gratitude to them for sharing insightful advices and ideas.

We also want to express our gratitude to our university for giving us all the tools we needed for the project. Overall, we would want to thank everyone who contributed to this project and offered comments that helped us improve it.

Finally, we would want to express our gratitude to our parents and friends for always being there for us and helping us no matter what.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

Abbreviation	Description
DOB	Date of Birth
DTMS	Domestic Tours and Travel Management System
NIC	National Identity Card

Chapter 1 - Introduction

1.1 Background

Rapid Travels is a tours and travel management company which provides domestic tours and travel services within Sri Lanka. This system is an integrated management system which combines multiple management systems namely rides management system, train reservation system, flight management system, boat tours reservation system and finally bus reservation system. Rapid Travels is company which offers a convenient way for a customer to book or reserve cars, three-wheelers, busses, trains, boats and flights which provides domestic services within the country.

This system is designed as a result of minimizing the physical interaction of customers who are planning to travel which saves a lot of time and effort. This system will also replace the currently existing systems, which will all of the systems will be integrated to a single system, which helps in managing the records of the components related to the system namely, clients, drivers, staff, vehicles, vehicle owners, destinations and payments. The company believes in developing this system in order to create and promote forms of travels and tours that provide better interaction opportunities for local and as well as for the tourists visiting the country.

Rapid Travels provides easy and effective solution for domestic travels and tours reducing the major risk factors which arise physically and the components which directly and in-directly interact with the system. The company's mission is to operate using innovative technology to improve the customer experience, bring positive change to the market, expand the business, increase revenues and the most important which is attracting new clients to designed system.

1.2 <u>Problems and Motivations</u>

Current Process:

- Rapid Travels relies on a manual process to manage clients, vehicles, staff, vehicle owners, drivers, destinations and incomes/expenses.

- The current process involves maintaining physical records such as vehicle registers, staff registers and payment registers. Staff must spend a considerable amount of time maintaining these relevant records, which can lead to errors and inconsistencies.

- The current process involves tracking and analyzing the travel history of the client manually which could be really challenging.

Problems:

- The traditional method of managing data is time-consuming, prone to errors, and is not scalable as the number of clients and vehicles increases.

- Manual attendance marking for each employee which takes up a significant amount of time.

- The current system lacks an efficient method to track income/expenses leading to delays and errors in financial management.

- The lack of automation in the process results in mismanagement of data, making it difficult to track the travel history of a client manually.

- The current system lacks the ability to provide notifications to clients making it difficult to notify about new travel itineraries and discounts.

- Customer service is not always available for the clients to resolve their problems which arise using the system.

Motivation:

- Rapid Travels is interested in implementing a system to automate the entire process of data management.

- The attendance of the employees working in the company should be taken in an automated process such as fingerprint scanning or QR code.

- The system should be able to able to track income/expenses which contributes or helps to make future decisions for the improvement of the company.

- The new system should provide a centralized platform for storing all information related to clients, vehicles, staff, drivers, vehicle owners, destinations and financial records.

- The system should have separate dashboards for each component enabling them to access relevant information easily.

- The system should include a report generation feature to generate customized reports on client travels and income/expenses.

- Implementing a FAQ chatbot to the system gives the customer ability to solve their problems related to the system operations.

1.3 <u>Literature Review (Summary)</u>

Domestic tours and travel managements system have recently become popular due to several factors. One of the main reasons is the increasing use of technology in the travel industry and the need for more efficient and streamlined processes. Manually managing the clients, vehicles, drivers and finances can be time-consuming and error-prone. Domestic tours and travel management system provide an automated solution to manage these processes, reducing administrative workload and allowing for more accurate and timely reporting. This literature review, will follow a comparison of the domestic tours and travel management system described in this project with existing systems to identify unique features and advantages which are specific to this system. When compared to other projects, domestic tours and travel management system offers a significant advantage over other systems.

1.4 <u>Aim and Objectives</u>

<center>**<u>Aim</u>**</center>

The aim of this project is to design and develop a "Domestic Tours and Travel Management System" which integrates multiple systems to a single system in order to provide the customer with convenient and effective way to plan the travel itinerary. This system also automates the process of managing clients, vehicles, staff, drivers, vehicle owners and financial data.

This system will enable Rapid Travels company to streamline its administrative process effectively and improve the business operations.

<center>**<u>Objectives</u>**</center>

- Develop a centralized database to store clients, vehicles, staff, drivers and vehicle owners' information.

- Develop a module to manage income/expenses which also includes automatic computation of EPF/ETF of employees.

- Integrate a notification system for discounts and travel itineraries.

- Design and develop a user-friendly interface for convenient navigation for the users of the system.

- Test and refine the system to ensure until it meets the needs of the company and is free of bugs and errors.

1.5 <u>Solution Overview</u>

Our proposed Domestic Tours and Travel Management System is designed to streamline and automate the company's operations by providing a web-based application that is highly sophisticated and user-friendly.

The system also integrates with other multiple systems to provide and manage multiple aspects of the company operations in line with multiple standards. The system also offers separate dashboards for each of the major stakeholders involved in the system and as well as separate portals for registrations and payments.

Figure 1.5.1

6

1.6 <u>Methodology</u>

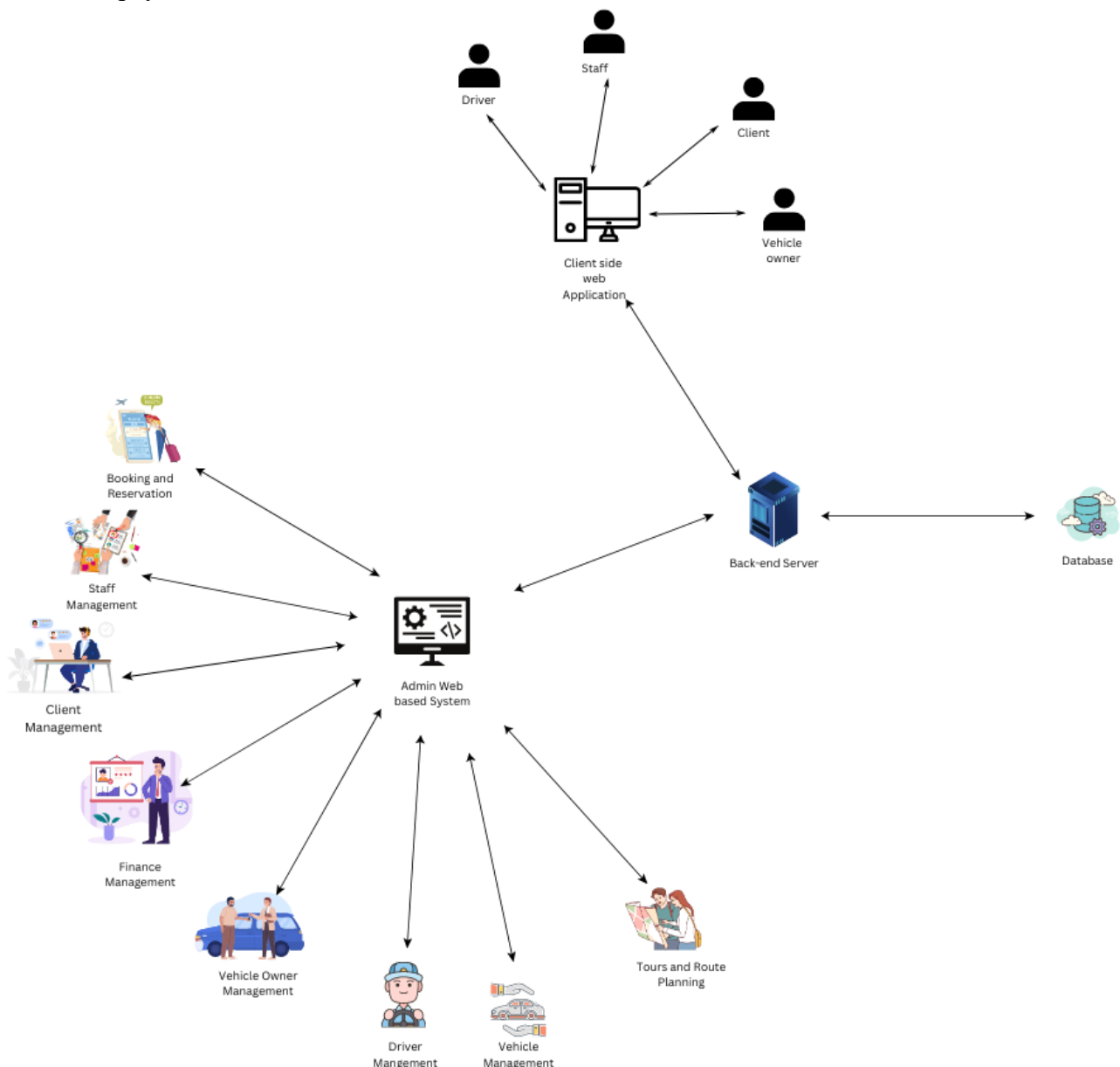The project will follow an agile development methodology to ensure that to deliver a quality product without risking time and budget. As for the methodology of the project it will be discussed according to the following sections,

- Requirements Engineering Methods
- Design Methods
- Development Tools and Technologies
- Project Management Tools
- Testing Methods
- Alternatives and Justifications

1.7 <u>Report Structure</u>

The structure of the report will follow the following flow based on six sections namely,

1. Literature Review

   - Explanation of the system with currently existing systems.

2. Methodology

   - Different requirement engineering and design methods.

   - Development tools and technologies used.

   - Testing methods.

   - Explanation of the alternatives and justifications.

3. Requirements Analysis

   - Stakeholder analysis.

   - Requirements analysis.

   - Requirements modelling.

4. Design and Development

   - High-level architecture diagram.

   - ER diagram.

   - Class diagram.

   - Diagrams of components (User Interfaces).

5. Testing

   - Test cases and results.

6. Evaluation and Conclusion

   - Evaluation of the test results and conclusion.

GIT Project Repository - https://github.com/IT21831454/ITP23_WD_B1_09-ITP-SLIIT

Chapter 2 – Literature Review & Methodology

Literature Review

Firstly, booking and reservation is a feature of the domestic tours and travel management system which gives clients the ability to make bookings and reservations conveniently. It is designed to help operators manage their businesses more efficiently from one central place. This simplifies time-consuming administrative tasks, organize bookings, track and monitor bookings, and help grow the business.[1] This feature helps the administrator to manage tours and travels for different mediums of travel effectively and efficiently. Also, the administrator has the privilege to generate reports based on the destinations and tours by tracking and monitoring the popularity.

Secondly, tours and route planning is a feature which is considered as an important and crucial part of the domestic tours and travel management system. Efficient tour and route planning give the end customers a considerable advantage. Tour planning is much more extensive than route planning. The client has the ability to select a tour and a route of his/her choice which will be optimized accordingly. The tours and routes are organized which helps in managing and accessing the tours and routes. Efficient route planning enables to minimize travel time, reduce fuel consumption, and streamline operations. With the ability to provide accurate estimated arrival times (ETAs), we can provide enhance customer satisfaction and built trust.[2] The administrator has the ability to manage the tours and routes and generate reports based on the records.

Compared to other systems, the domestic tours and travel management system stands out due to several unique features. Client management is the process of overseeing and coordinating an organization's interactions with its clients and potential clients. In client management, the ultimate goal is to build and maintain good client relationships, so a company can retain more of its customers and ensure ongoing success.[3] Our system provides administrators with the ability to efficiently manage clients, vehicles, staff, drivers and vehicle owners. This allows for more effective communication and collaboration between all parties involved in the process. Administrators can create new client accounts, view, search, edit and delete existing client accounts as needed. Additionally, when a new client is added to the system, the system will automatically generate a new secure password and send it to the user via email.

Tracking and monitoring are other unique features of the domestic tours and travel management system. The administrator has the ability to track and monitor each modules performance at the given time namely client monitoring, vehicle monitoring and popularity of destinations are some of them. This feature helps to in enhancing the and improving the system.

When compared to other projects, our domestic tours and travel management system offers a significant advantage over other systems. For example, Kabtamu Atale Reta et al. (2014) of Hawassa University developed a web-based tours and travel management system. Although their system was efficient, it lacked the finance management module that administrators could use to monitor the payments and income/expenses of the company. The finance management function gives administrators complete visibility into the payments done for bookings and reservations. Furthermore, the system gives the ability for the administrators to manage the finances and automatically generate reports based on the income/expense records.

Sreeraj Menon (2016) developed a tours and travel management system that provides a platform for reserving bus tickets although the system implies that it is a tours and travel management system. However, our domestic tours and travel management system gives the ability to book and reserve various travel mediums such as cars, three-wheelers which provides rental services along with or without a driver where busses, boats and flights which provides local travels and tours. In conclusion, domestic tours and travel management system have become a valuable tool in travel industry, and the system described in this project offers several unique features and advantages over previously done projects. Our system provides a user-friendly and comprehensive dashboard for all the stakeholders enabling them to manage their respective tasks easily and efficiently. Additionally, the system's financial module offers detailed reporting and insights into the company's financial status.

Overall, our domestic tours and travel management system offers a complete solution for tours and travel companies providing them with a powerful tool to streamline their administrative processes and enhance their financial management. We believe that our system can make a significant contribution to the travel industry, and we are confident that it will be well-received companies looking to improve their efficiency and effectiveness in the travel sector.

Methodology

2.1 Requirements Engineering Methods

- **User Interviews:** We will conduct interviews with key stakeholders such as clients, vehicle owners and drivers to gather their requirements and expectations for the domestic tours and travel management system.

- **Surveys:** We will conduct surveys to gather feedback and opinions from a considerable number of users.

- **Use Case Diagram:** Use case diagrams will be used in this project in order to model the system's requirements and identifying the interactions between the users and the system.

2.2 Design Methods

- **Unified Modeling Language (UML):** UML diagrams such as activity diagrams, sequence diagrams, and class diagrams are used to model and design the system.

- **Wireframes:** Wireframes will be designed prior to the development process in order to visualize the user interfaces of the system.

2.3 Development Tools and Technologies

- **MERN Stack:** To develop the system we will use the MERN stack to develop the web application.

- **Git:** We will use Git to enable collaboration of team members for the development of the project and to monitor the changes.

- **Visual Studio Code:** As the IDE for developing the project we will use Visual Studio Code.

3

2.4 Project Management Tools

- **Jira:** To manage and assign project tasks, track and monitor progress, and keep team members regularly updated of project updates Jira will be used.

- **GitHub:** A repository will be used in GitHub to store the project source files and track changes made over the development period.

2.5 Testing Methods

- **Frontend and Backend Testing:** We will use "Selenium" as the testing tool for frontend testing to verify the user-interface and as well as for the backend to verify the functionality of the applications server-side and database.

2.6 Alternatives and Justifications

- Design tools such as Sketch and Figma were considered but not used because, they were not suitable for specific requirements of the project. Both tools are visually appealing but, MockFlow which used to design wireframes offered better support. Additionally, our development team had experience with MockFlow, making it the more efficient and effective.

- Agile was chosen as the methodology for requirements engineering and development due to its flexibility, collaboration and ability to accommodate changing requirements throughout the process. As the domestic tours and travel management system is a complex project, it has a high probability of changes in requirements over the development period, which is why agile methodology is more suitable for the success of the project.

Chapter 3 – Requirements Analysis

3.1 Stakeholder Analysis

Stakeholder analysis is an essential before developing a system because, it helps to identify the internal as well as the external stakeholder who are collaborating with the system to be implemented.

The graphical representation below gives an idea of the stakeholders that are directly and in-directly collaborating with the system.
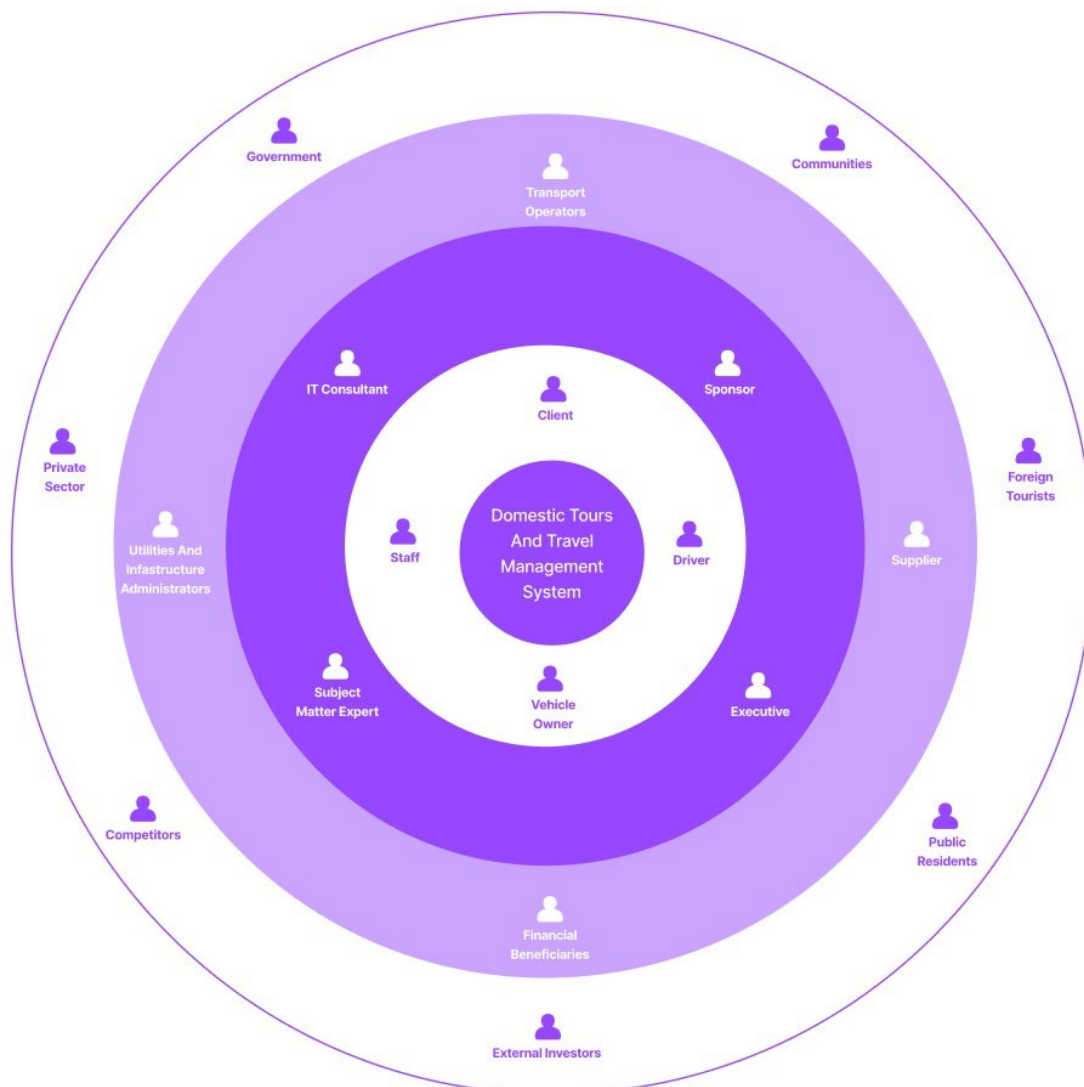

Figure 3.1.1

3.1.1 <u>User Stories</u>

1) **Client**
   - As a client I want to login and register to the system online so that it is easy and convenient.
   - As a client I want to book/reserve a specific tour online so that I do not want to wait in a queue and be present physically to get the service.
   - As a client I want to view the summary of the trips so that I can plan and manage the budgets of the trips.
   - As a client I want to change profile information so that I can keep every detail up-to date.

2) **Vehicle Owner**
   - As a vehicle owner I want to login and register to the system so that it enables to manage the vehicles through the system.
   - As a vehicle owner I want to add vehicles to the system online so that it is convenient and saves time.
   - As a vehicle owner I want to check the status of the vehicles added and the summary so that it will be easy to manage the vehicles.

3) **Staff**
   - As a staff member I want to operate according to the given privileges to the system so that I will be able to do and accomplish the duties assigned.
   - As a staff member I want to check salary information and financial summary so that it is easy to manage financial activities.
   - As a staff member I want to access and update account information so that it easy to keep details up-to date.

4) **Driver**
   - As a driver I want to login and register to the system online so that it is convenient.
   - As a driver I want to check the summary of the trips driven including the profit earned for each trip so that it is easy to manage the financial activities.
   - As a driver I want to update the profile details so that it is easy to keep the information up-to date.

3.2 Requirements Analysis

3.2.1 Functional Requirements

- **Register –** Client, Vehicle Owner, Driver
- **Login –** Client, Vehicle Owner, Staff, Driver
- **Book/Reserve Tours –** Client
- **Edit Profile Information –** Client, Vehicle Owner, Staff, Driver
- **Add Vehicles –** Vehicle Owner, Staff
- **View Vehicle Status –** Vehicle Owner
- **Generate Salary Report –** Staff, Vehicle Owner, Driver
- **View Trip Summary –** Client, Vehicle Owner
- **View/Generate Financial Reports –** Staff

3.2.2 Non-Functional Requirements

- **Client –** Security, Availability, Performance, Usability, Accuracy, Scalability
- **Vehicle Owner –** Performance, Security, Scalability, Reliability
- **Staff –** Security, Scalability, Performance, Reliability
- **Driver –** Availability, Security, Performance, Reliability, Scalability

3.2.3 Technical Requirements

- **System -** Web-Based System
- **Technology –** MERN Stack
- **Security –** SSL Encryption

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3.3 Requirements Modelling

3.3.1 Use Case Diagram

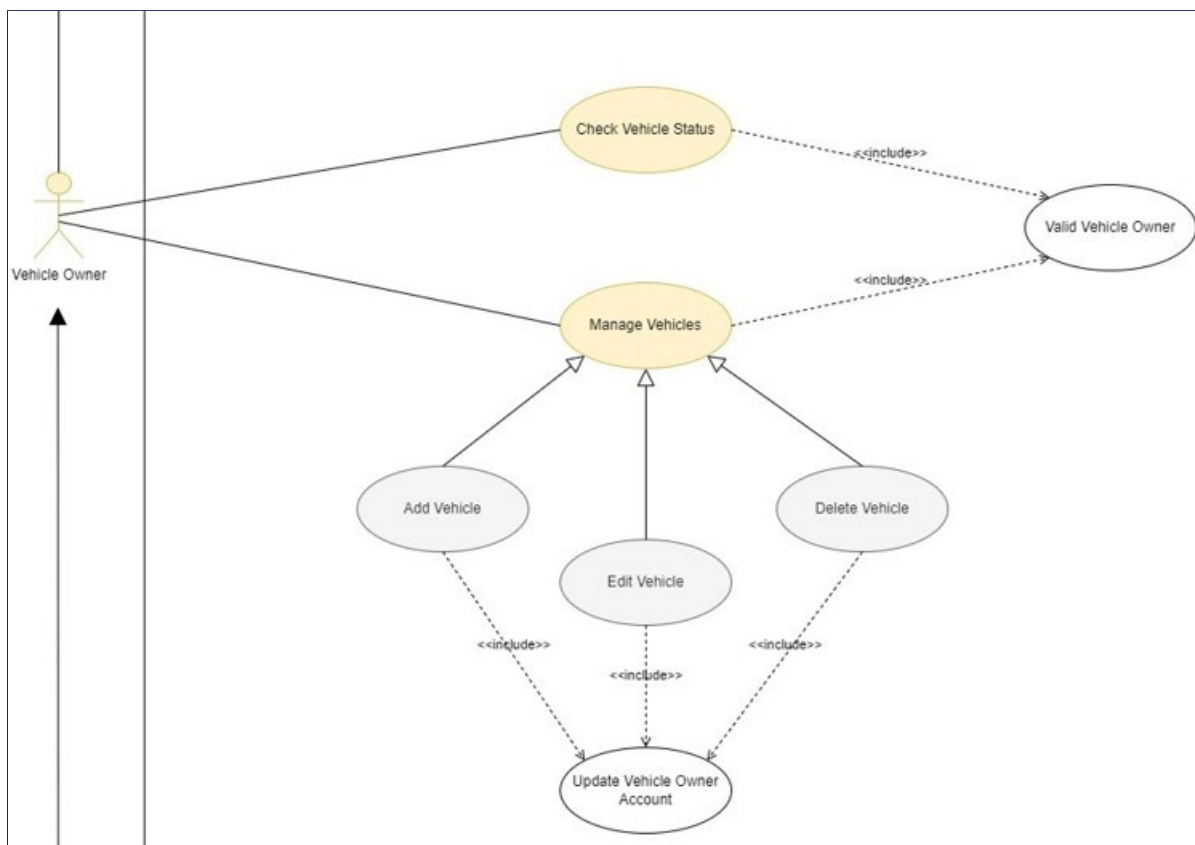*Figure 3.3.1.1*

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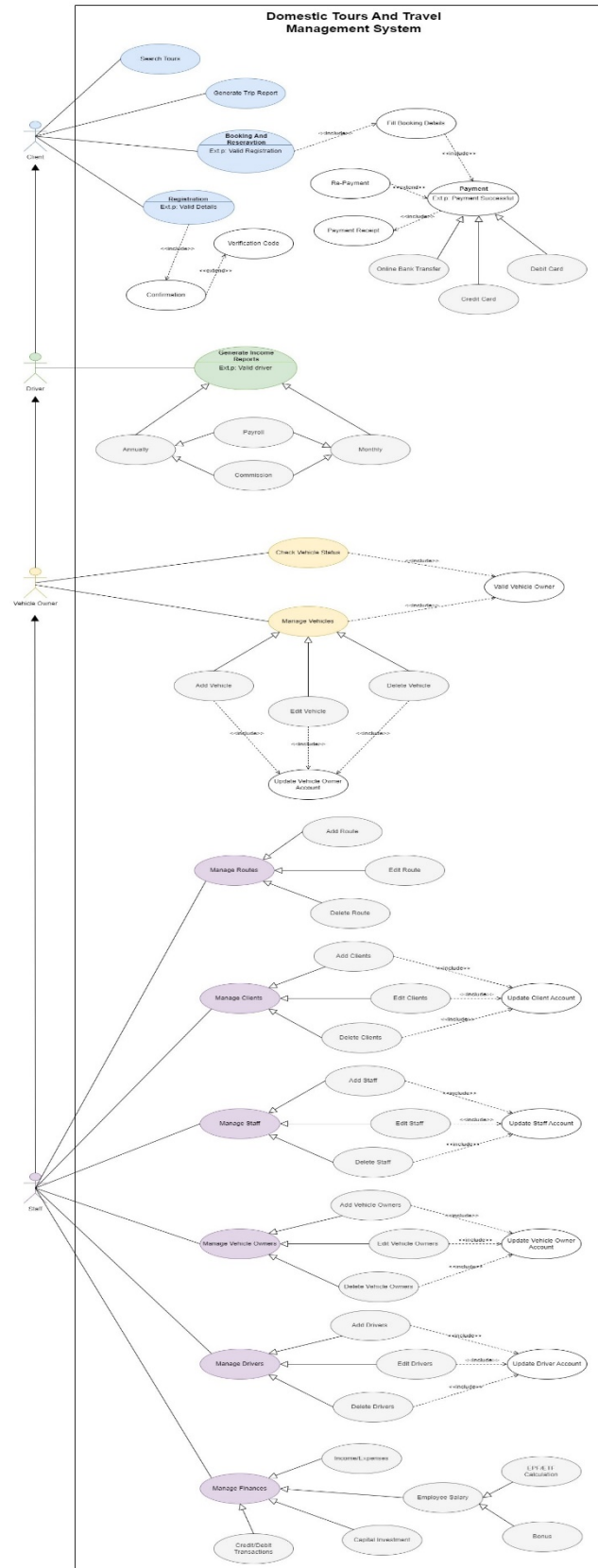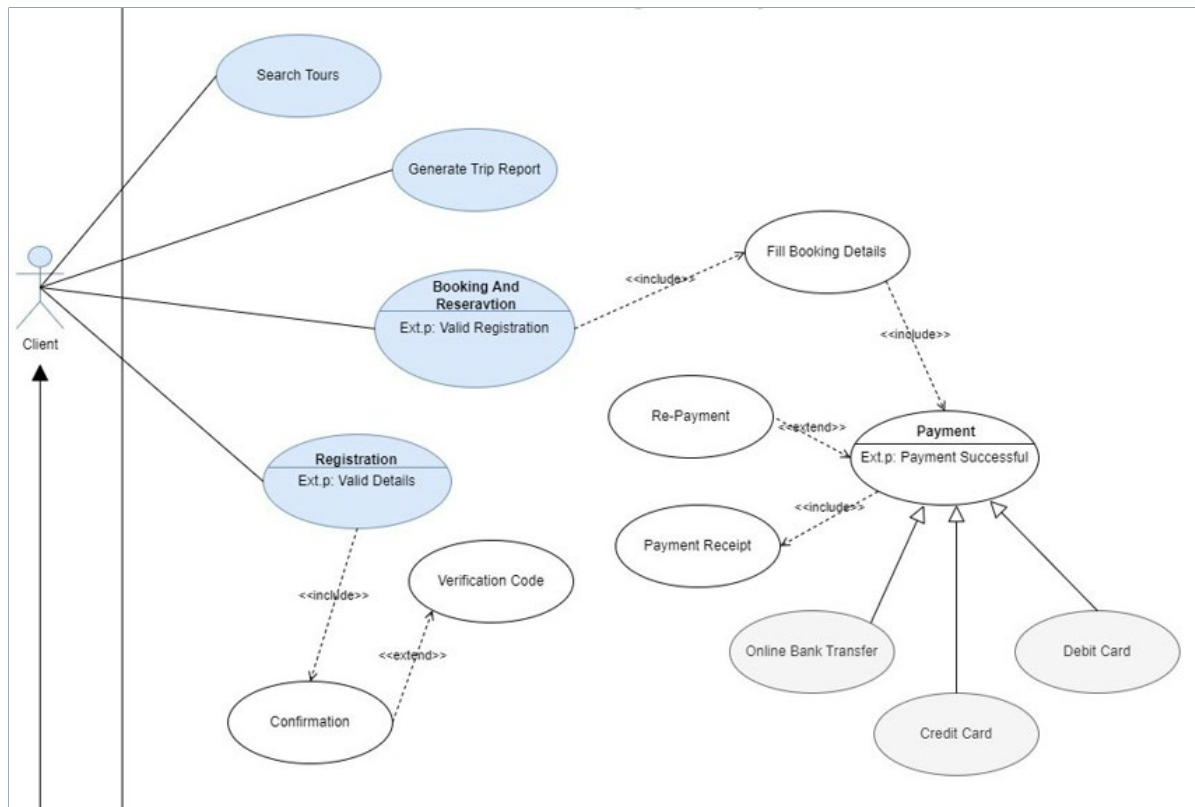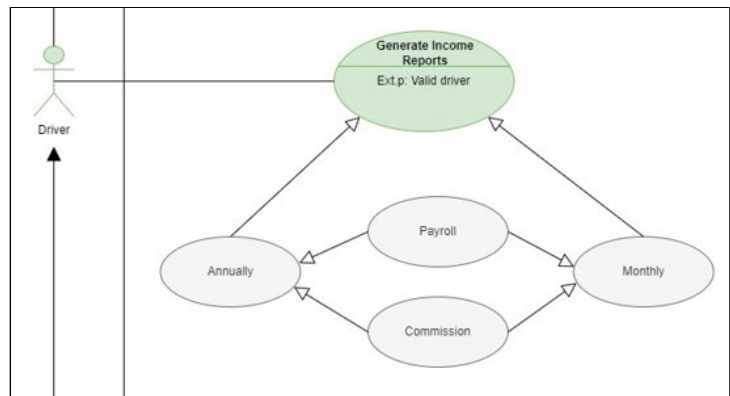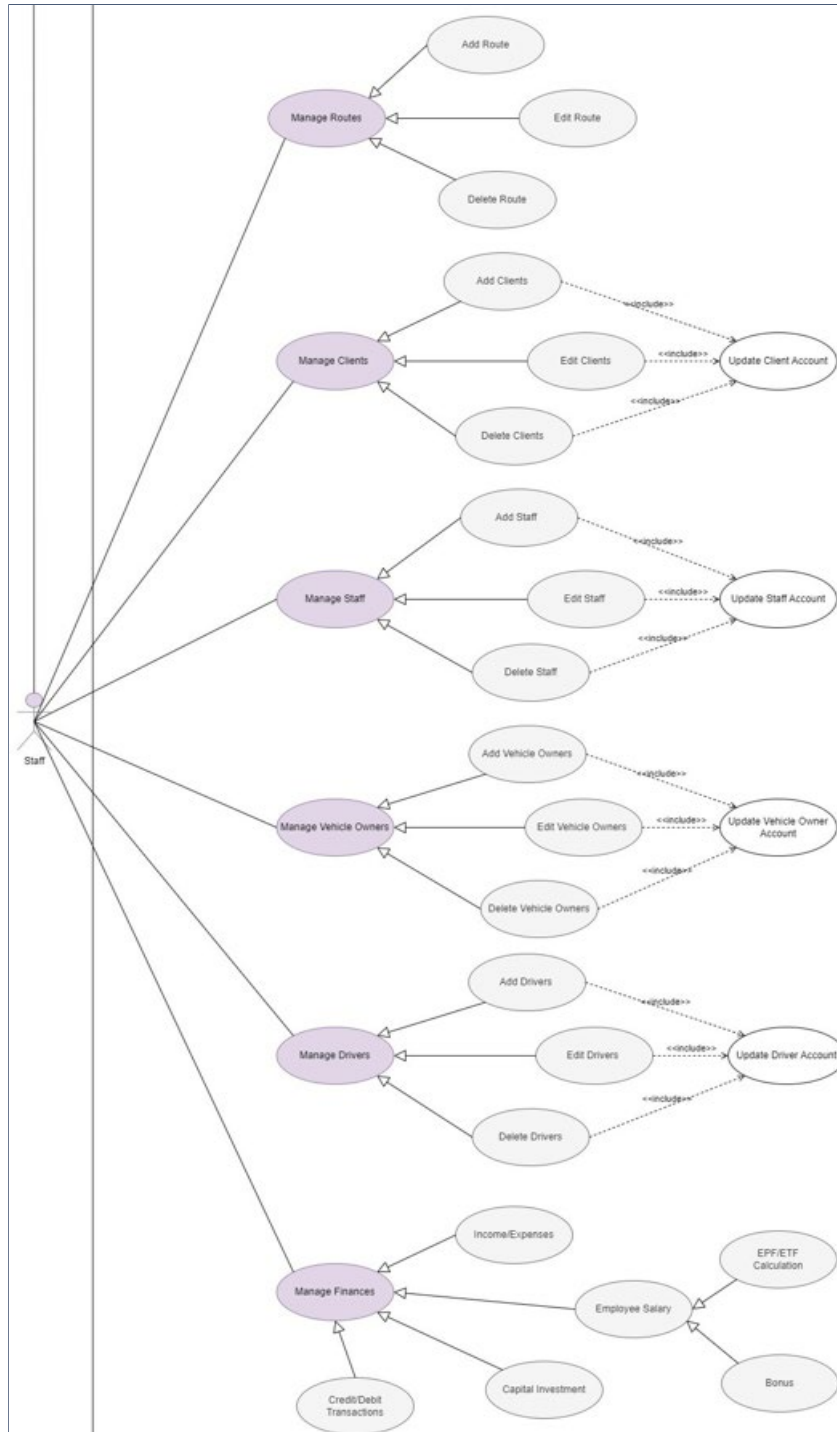
Figure 3.3.1.2

Figure 3.3.1.3

Figure 3.3.1.4

Figure 3.3.1.5

6

3.3.2 <u>Activity Diagrams</u>

Booking And Reservation

Client

Login

Login credentials invalid

Login credentials valid

Homepage

Book/Reserve
tour or trip

Select payment
method

Make payment

Payment invalid

Payment valid

Payment Success
message
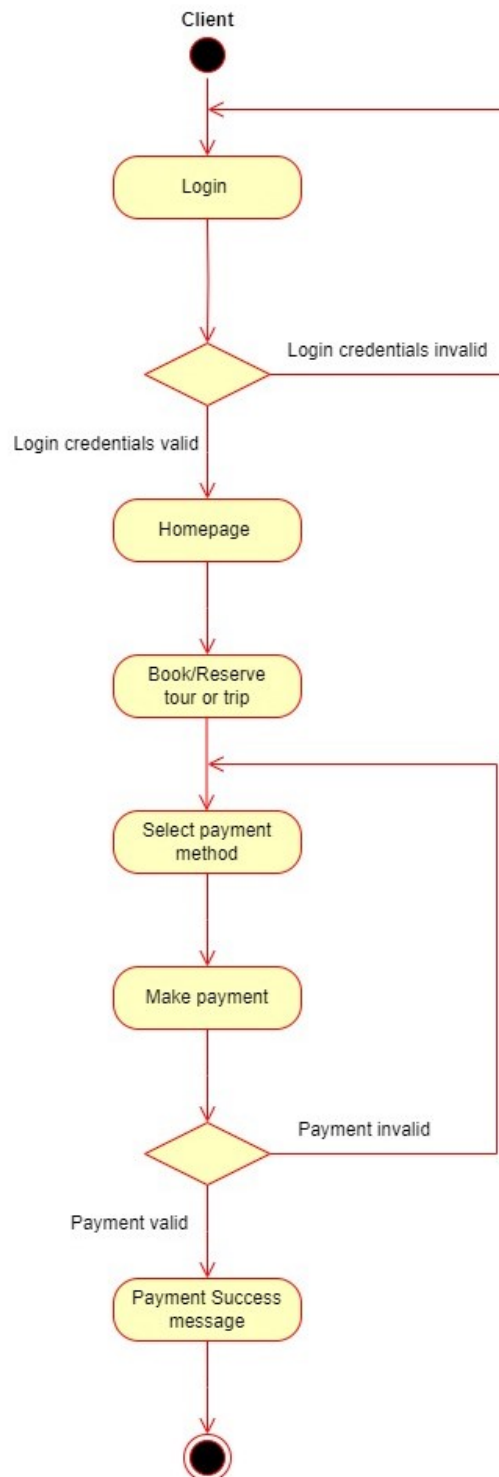
Figure 3.3.2.1

Tours And Route Planning

Figure 3.3.2.2

8
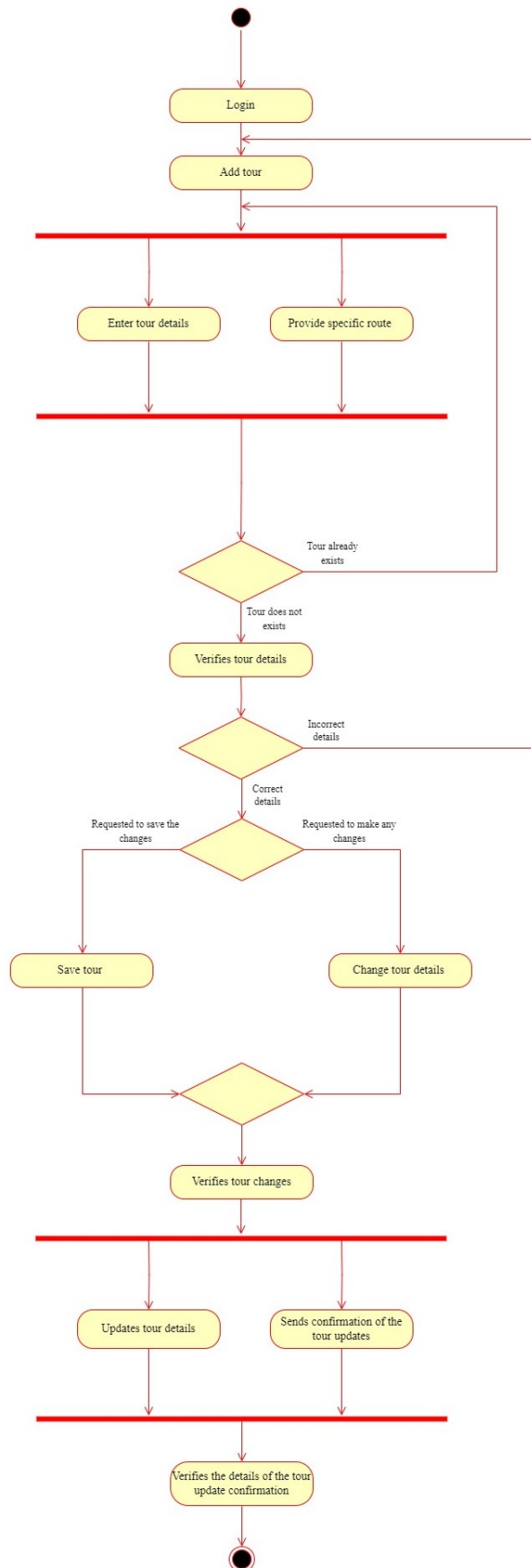
Registration
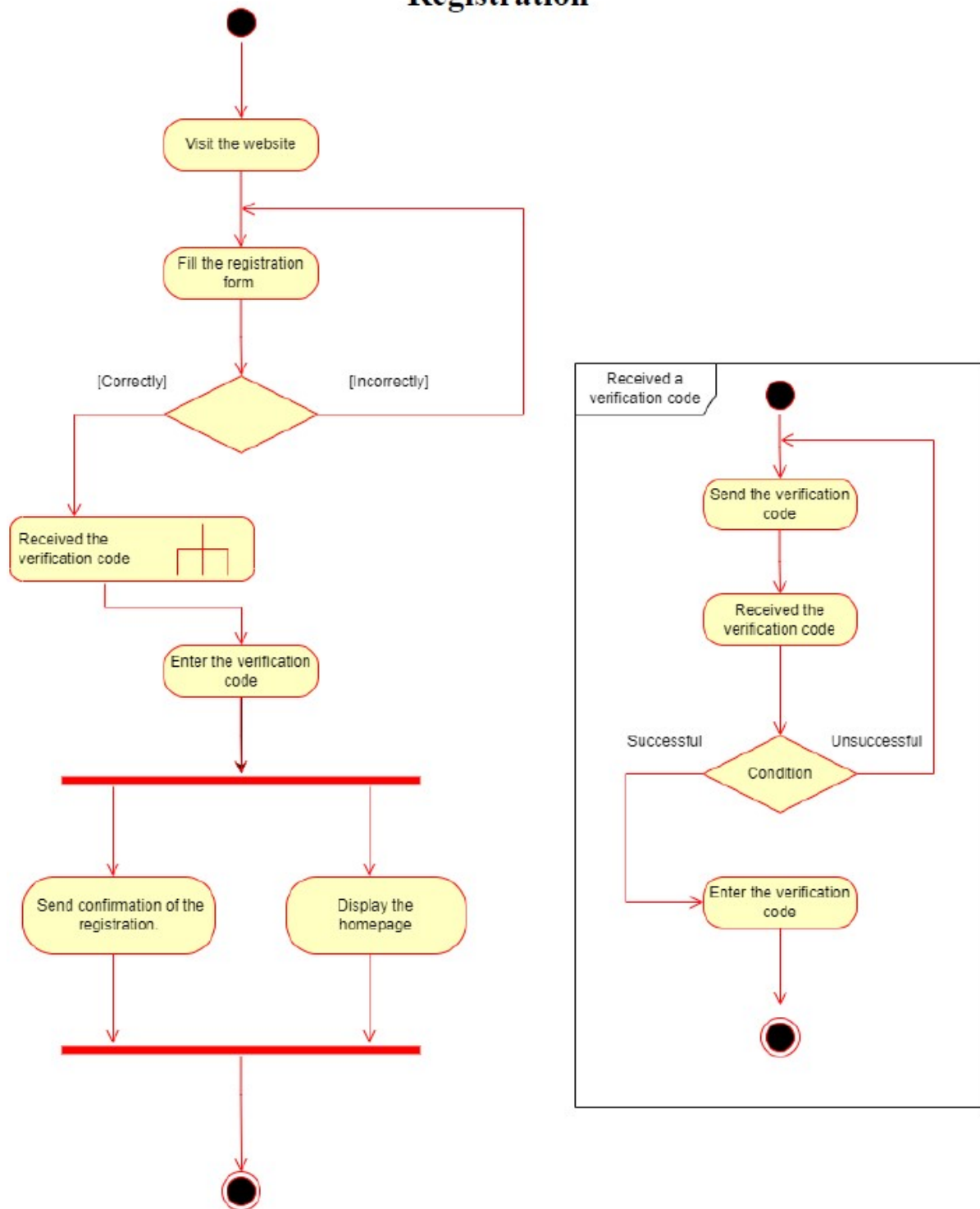
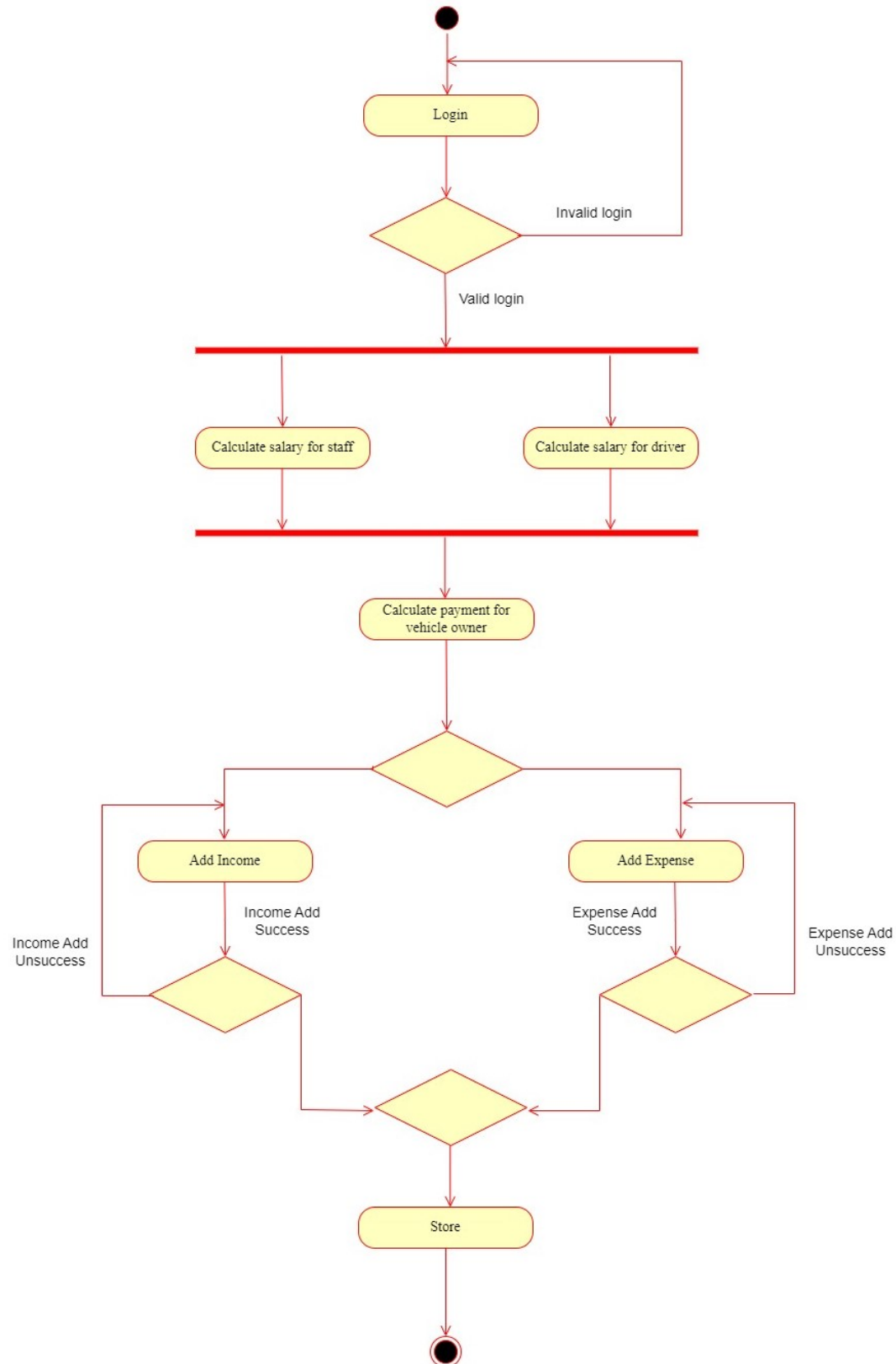

Figure 3.3.2.3

Finance Management

Figure 3.3.2.4

10

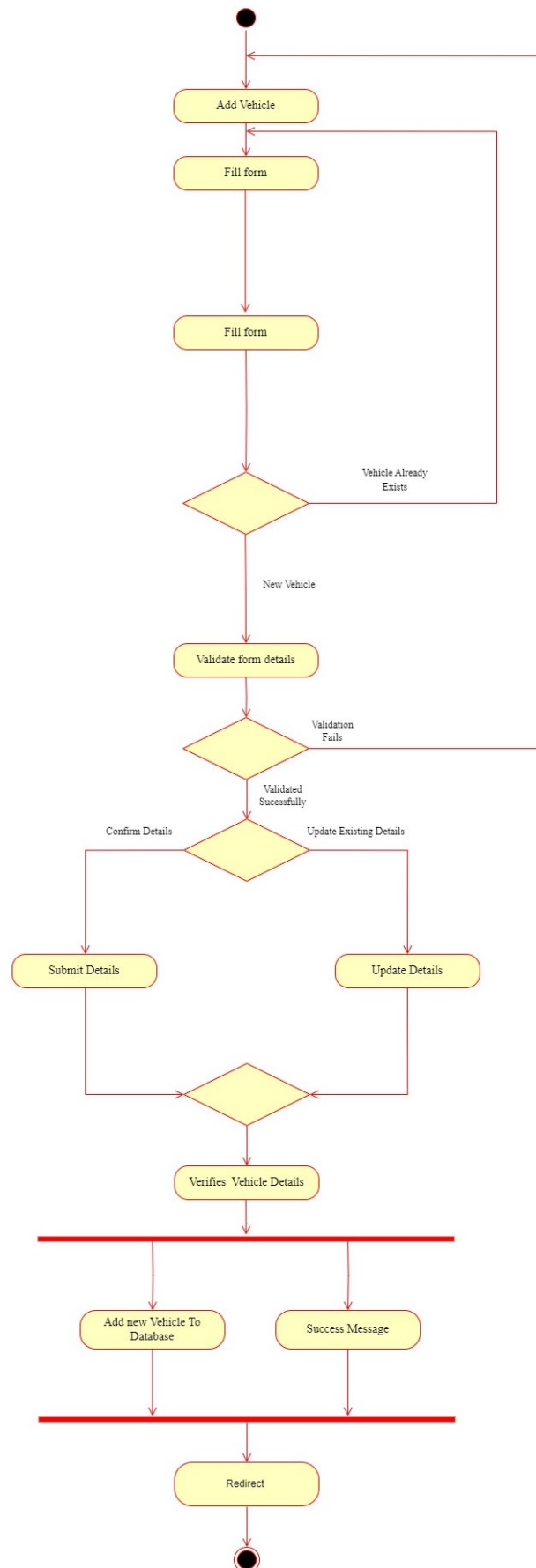**Vehicle Management**

Figure 3.3.2.5

11

Staff Management

Figure 3.3.2.6
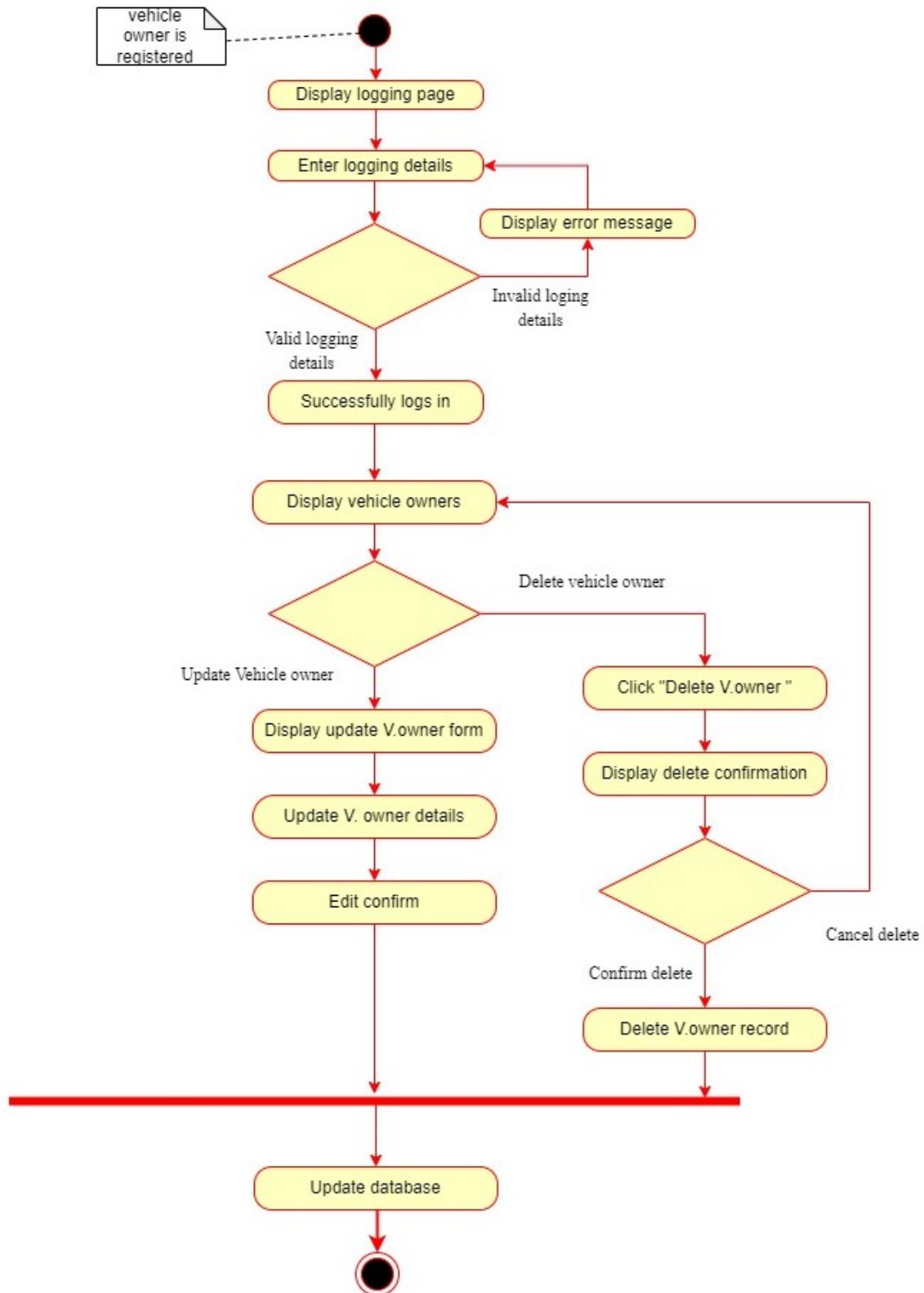
Vehicle Owner Management

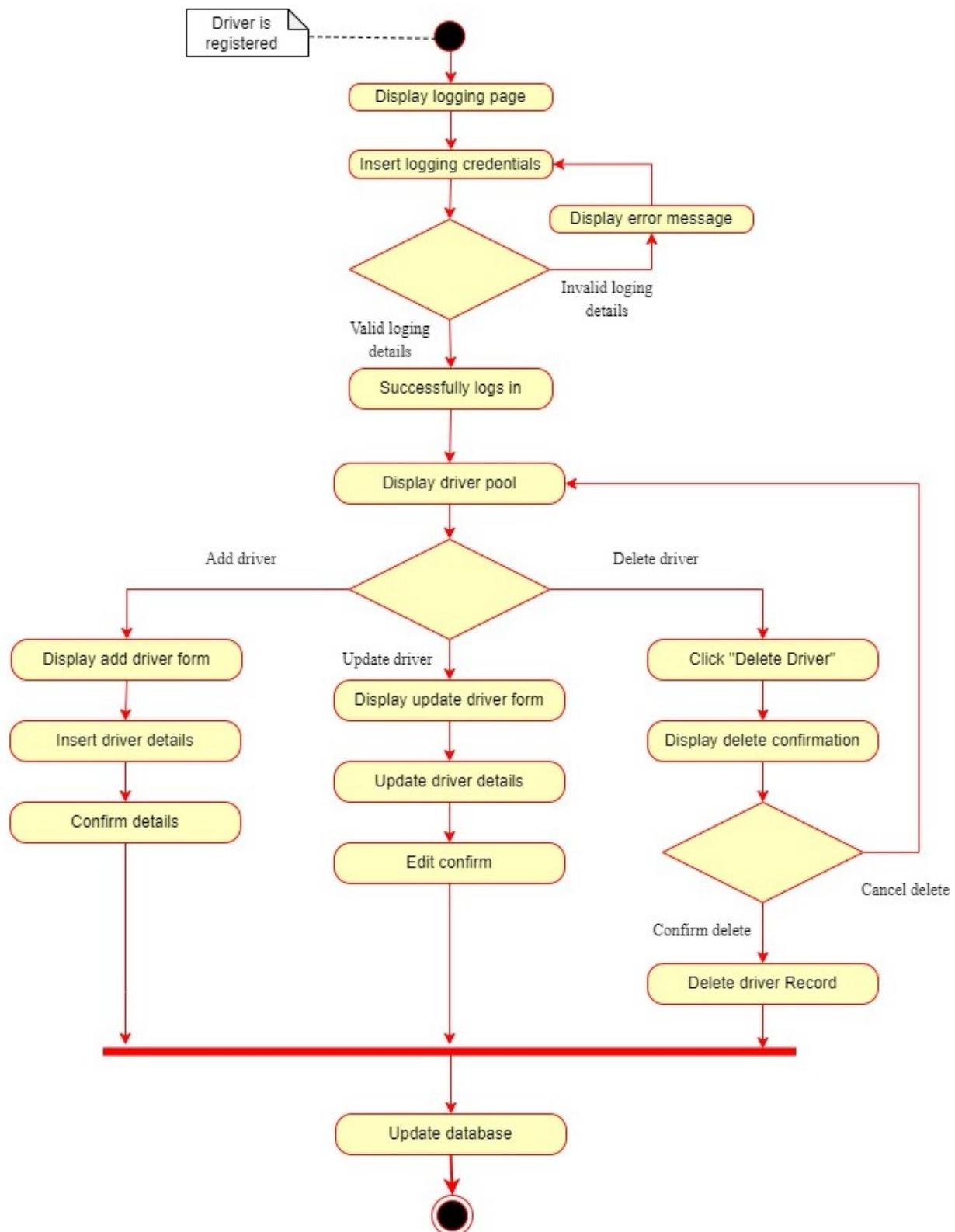*Figure 3.3.2.7*

13

Driver Management

Figure 3.3.2.8

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Chapter 4 – Design and Development

4.1 High-level Architecture diagram

The following diagram (*Figure 5.1.1*) shows a detailed graphical representation of the system architecture. The system is developed using the 3-tier architecture.

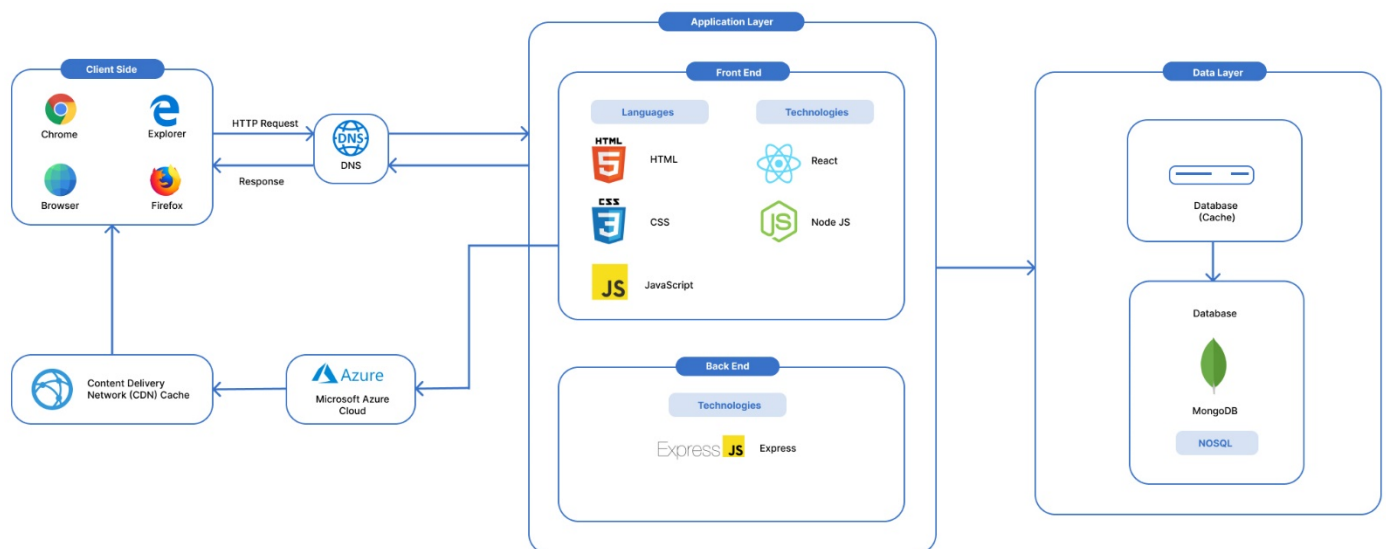For the development of the system MERN technology will be used.

Figure 4.1.1

- The relationships of entities and components in the system is represented using a class diagram and an ER diagram below.

- To refer the work breakdown structure, refer appendix A.

- For the main User Interfaces (UIs) of the system refer appendix B.
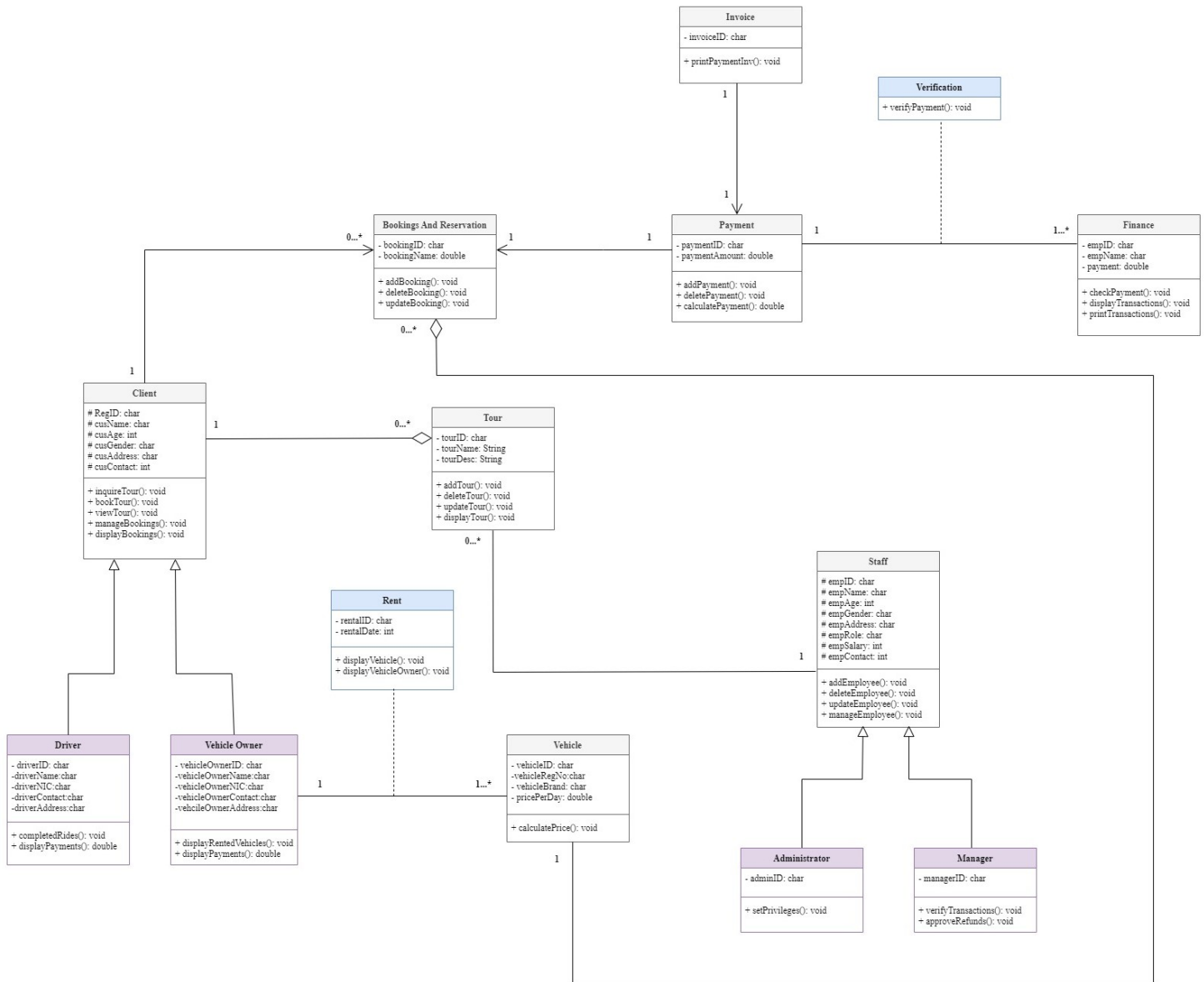
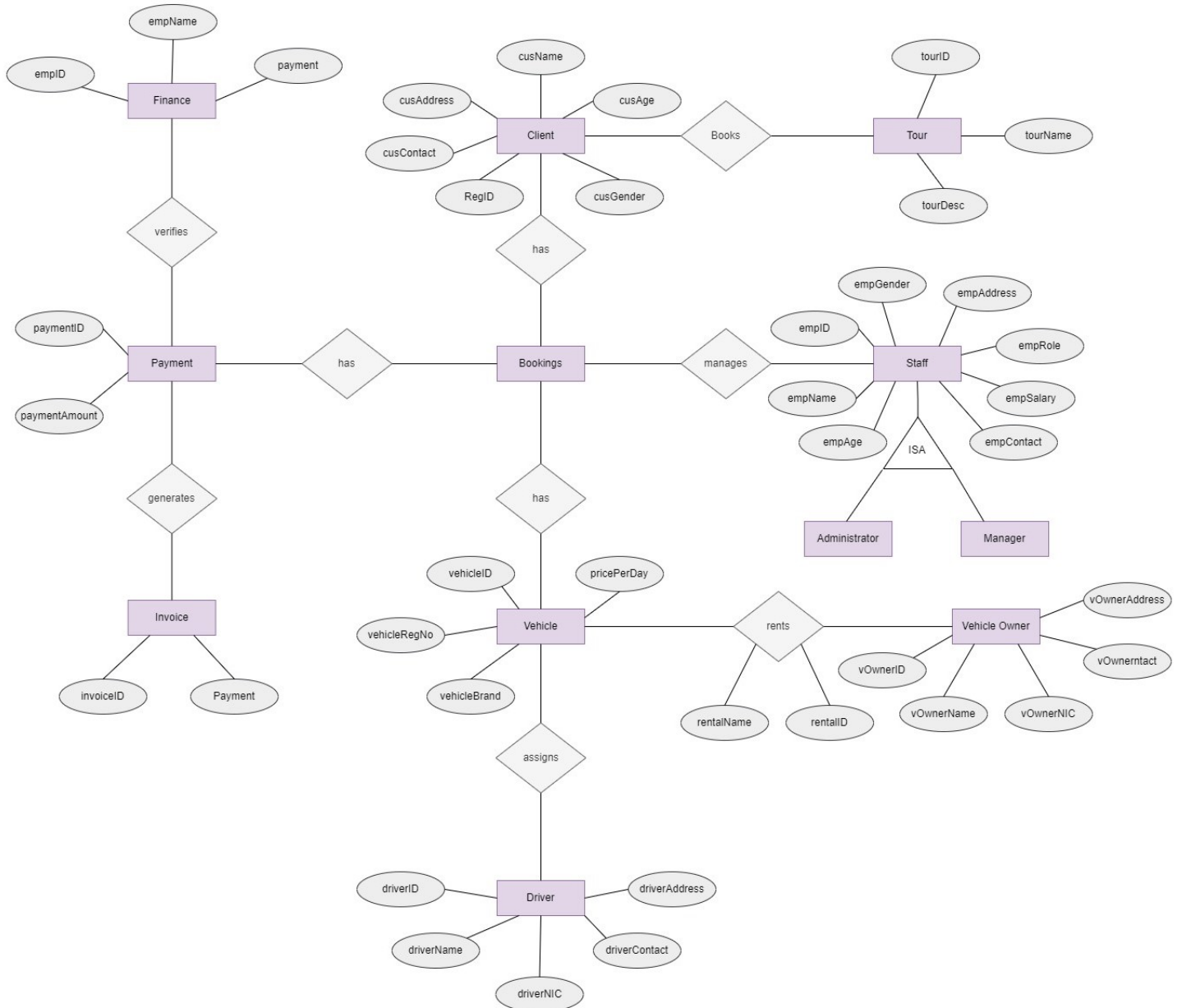## 4.2 Class Diagram

Figure 4.2.1

4.3 ER Diagram

Figure 4.3.1

Chapter 5– Testing

Table 5.0.1

Test ID	Test Component	Test Case	Test Inputs	Expected Output	Actual Output	Result (Pass/Fail)	Description
T001	Booking and Reservation	Input text number for name	alex123	Cannot enter numbers	alex123	Fail	Name field should not accept numbers
T002	Tours and Route Planning	Input past year for the date field	01/01/2010	Cannot enter past dates	01/01/2010	Fail	Date field should not accept past dates
T003	Client Management	Input email without "@" sign	tmail.com	Enter a valid email	Enter a valid email	Pass	Email must have "@" sign
T004	Finance Management	Input text for salary field	1000s	Enter a valid salary	Enter a valid salary	Pass	Salary field should not contain text
T005	Vehicle Management	Input special character for License plate no	ABC 10@1	Enter a valid license plate no	Enter a valid license plate no	Pass	License plate no should not contain special characters
T006	Staff Management	Keep blank for employee designation	-	"Please enter a valid designation"	"Employee registered"	Fail	Employee must have a valid designation
T007	Vehicle Owner Management	Input invalid NIC	123456v	"Please enter a valid NIC"	"Please enter a valid NIC"	Pass	NIC must be valid
T008	Driver Management	Input DOB field blank	-	"Enter a valid Date of Birth"	"Enter a valid Date of Birth"	Pass	Must enter a valid DOB

Chapter 6 – Evaluation and Conclusion

As for the evaluation of the tests conducted for the system to check and verify the accuracy and efficiency of the system, there were some test cases where the expected output is not received for test IDs such as T001, T002 and T006.

As to fix these cases proper validation techniques are used which are specifically used with the development technology which was used to develop the system. By using these validations, the previously flagged test cases were solved after re-testing the system.

The following describes how the objectives were met,

- Developed a centralized database to store clients, vehicles, staff, drivers and vehicle owners' information using mongoDB.

- Developed a module to manage income/expenses which also includes automatic computation of EPF/ETF of employees by accessing the other relations of the database schema.

- Designed and develop a user-friendly interface for convenient navigation for the users of the system by using React libraries and packages.

- Backend testing was carried out by using "Postman" tool which checks all the backend routes to the database to ensure whether the data is correctly passing.

The aim of this project was to design and develop a "DTMS" which integrates multiple management systems to a single system in order to provide the customer with convenient and effective way to plan the travel itinerary which was achieved by implementing the system in a timely manner and ensure a smooth transition from the current or existing manual process to a new system with advance functionalities developed using MERN technology.

References

[1] Reta, K. A. (2014). *Development of Web-Based Tours and Travel Management System*.
      Retrieved from
      https://www.studocu.com/row/document/addis-ababa-institute-of-technology/system-
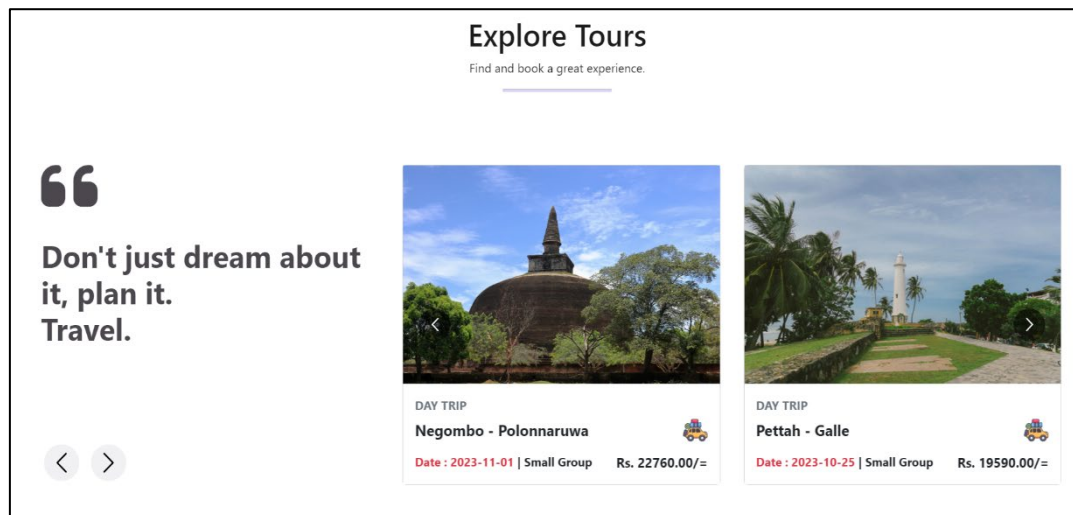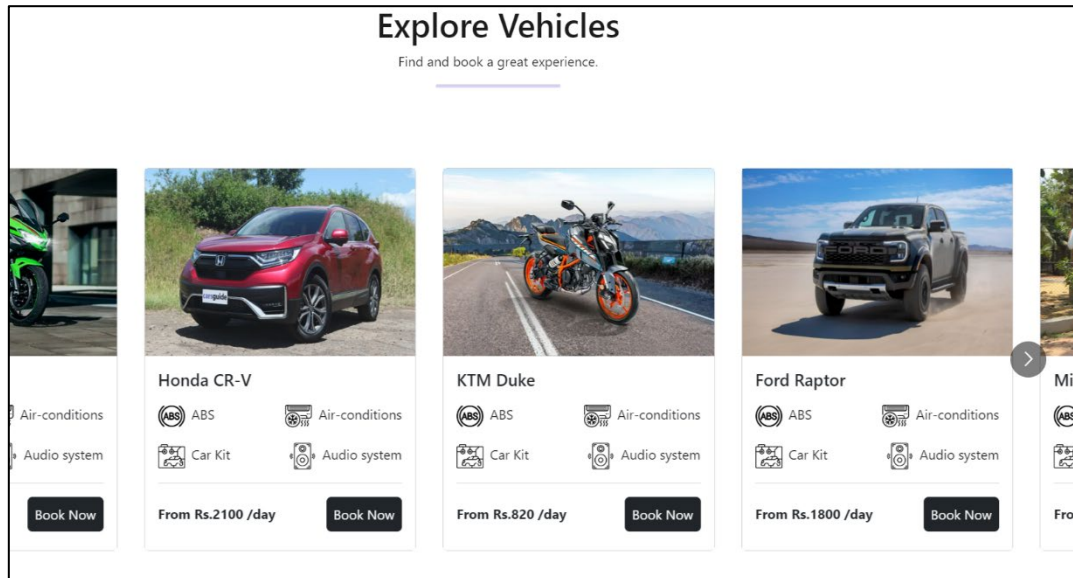   programing/tour-and-travel-managment-system-final/32213784

[2] Menon, S. (2016). *Development of Tours and Travel Management System. University of Mumbai*.
      Retrieved from
      https://www.academia.edu/41583393/PROJECT_REPORT_ON_Tours_and_Travels_Manage
      ment_System_SUBMITTED_TO_UNIVERSITY_OF_MUMBAI

Appendices

Appendix A – Work Breakdown Structure

Task No	Main Task	Sub Tasks	Duration (Days)	Members
01	Requirement Gathering & Analysis	• Client interview • Gather requirements • Create project charter document • Understand project risks • Create project documentation	28	• Nithila • Shehan • Pasindu • Theekshana • Zaheem • Naveen • Thisal • Kalpa
02	Design & Development	• User-Interface design (Wireframes) • Database design • Coding and development 1. Booking and reservation 2. Client management 3. Finance management 4. Vehicle management 5. Staff management 6. Vehicle owner management 7. Driver management 8. Payment UI	60	• Nithila • Shehan • Pasindu • Theekshana • Zaheem • Naveen • Thisal • Kalpa
03	Testing	• Unit testing (Testing each module functionalities) • Integration testing (Testing all modules after integrating) • Acceptance testing	24	• Nithila • Shehan • Pasindu • Theekshana • Zaheem • Naveen • Thisal • Kalpa

Appendix B – Main User Interfaces (UIs)

Explore Vehicles

Find and book a great experience.

Honda CR-V

- ABS
- Air-conditions
- Car Kit
- Audio system

From Rs.2100 /day — Book Now

KTM Duke

- ABS
- Air-conditions
- Car Kit
- Audio system

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II

III