PROJECT REPORT
ON

CAR RENTAL SYSTEM

Carried Out at

INSTITUTE FOR ADVANCED COMPUTING & SOFTWARE DEVELOPMENT, PUNE .

UNDER THE SUPERVISION OF

Mrs. Priyanka Hoval.

Mrs.Rupali Thorat.

C-DAC Pune

Submitted By

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PG DIPLOMA IN ADVANCED COMPUTING
C-DAC, PUNE

Candidate's Declaration

We hereby certify that the work being presented in the report entitled **CAR RENTAL SYSTEM**, in partial fulfilment of the requirements for the award of PG Diploma Certificate and submitted in the department of PG-DAC of the C-DAC Pune, is an authentic record of our work carried out during the period, 25th August 2022 to 26th September 2022 under the supervision of **Mrs. Rupali Thorat**, C-DAC Pune. The matter presented in the report has not been submitted by us for the award of any degree of this or any other Institute/University.

(Name and Signature of Candidate)

Myakal Gautam Birbal (220341220117).
Padol Nitin Sudhakar (220341220127).

Counter Signed by

ACKNOWLEDGMENT

We take this opportunity to express our gratitude to all those people who have been directly and indirectly with us during the competition of this project. we pay thanks to Mrs.Rupali Thorat who has given guidance and a light to us during this major project. Her versatile knowledge about “title name “has eased us in the critical times during the span of this Final Project.

we acknowledge here out debt to those who contributed significantly to one or more steps. We take full responsibility for any remaining sins of omission and commission.

CERTIFICATE

This is to certify that the work titled **CAR RENTAL SYSTEM** is carried out by Myakal Gautam Birbal (220341220117), Padol Nitin Sudhakar (220341220127), the bonafide students of Diploma in Advanced Computing and Diploma IT Infrastructure, Systems and Security of Centre for Development of Advanced Computing, Pune from 25th August 2022 to 26th September 2022. The Course End Project work is carried out under my direct supervision and 80% completed.

Mrs. Rupali Thorat
Name of Supervisor C-DAC
Pune-411035, India

ABSTRACT

Car Rental System (CRS) is one of the most important services keeping the Internet communication running. This project is being considered in order to reduce and totally eliminate loss of customer to competitors and save the company from folding up.
The current system is manual and it is time consuming it is also cost ineffective, space and average return is low and diminishing. The current system is error prone and customers are dissatisfied. The goal of this project is to automate vehicle rental and reservation so that customer do not need to walk-in or call-in order to reserve a vehicle.
The Car Rental System is the online facility to book cars online within few clicks only, some people cannot afford to have a car, for those people this system becomes very helpful. This system includes various cars as per the customer order and comfort, it place the order and deliver the car as per the location within the area.
Finally, We conclude that Car Rental System has offered an advantage to both customers as well as Car Rental Company to efficiently and effectively manage the business and satisfies customer's need at the click of a button.

TABLE OF CONTENT

CHAPTER-1

INTRODUCTION TO ONLINE CAR RENTAL SYSTEM

1.1 Introduction

This project is designed so as to be used by Car Rental Company specializing in renting cars to customers. It is an online system through which customers can view available cars, register, view profile and book car.

1.2 Reason for the Project

The advancement in Information Technology and internet penetration has greatly enhanced various business processes and communication between companies (services provider) and their customers of which car rental industry is not left out. This Car Rental System is developed to provide the following services:

- Enhance Business Processes: To be able to use internet technology to project the rental company to the global world instead of limiting their services to their local domain alone, thus increase their return on investment (ROI).
- Online Vehicle Reservation: A tools through which customers can reserve available cars online prior to their expected pick-up date or time.
- Customer's registration: A registration portal to hold customer's details, monitor their transaction and used same to offer better and improve services to them.
- Group bookings: Allows the customer to book space for a group in the case of weddings or corporate meetings (Event management).

1.3 Problem Statement

A car rental is a vehicle that can be used temporarily for a fee during a specified period. Getting a rental car helps people get around despite the fact they do not have access to their own personal vehicle or don't own a vehicle at all. The individual who needs a car must contact a

rental car company and contract out for a vehicle. This system increases customer retention and simplify vehicle and staff management.

1.4 Aims & Objectives

- To produce a web-based system that allow customer to register and reserve car online and for the company to effectively manage their car rental business.
- To ease customer's task whenever they need to rent a car.

1.5 Scope

This project traverses a lot of areas ranging from business concept to computing field, and required to perform several researches to be able to achieve the project objectives. The area covers include:

- Car rental industry: This includes study on how the car rental business is being done, process involved and opportunity that exist for improvement.
- J2EE Platform used for the development of the application.
- General customers as well as the company's staff will be able to use the system effectively.
- Web-platform means that the system will be available for access 24/7 except when there is a temporary server issue which is expected to be minimal.

CHAPTER-2

CAR RENTAL SYSTEM

How Car Rental System Work

A car rental is a vehicle that can be used temporarily for a period of time with a fee. Renting a car assists people to get around even when they do not have access to their own personal vehicle or don't own a vehicle at all. The individual who want to rent a car must first contact the car rental company for the desire vehicle. This can be done online. At this point, this person has to supply some information such as; dates of rental, and type of car. After these details are worked out, the individual renting the car must present a valid Identification Card.

Most companies throughout the industry make a profit based of the type of cars that are rented. The rental cars are categorized into economy, compact, compact premium, premium and luxury. And customers are free to choose any car of their choice based on their purse and availability of such car at the time of reservation.

2.1 Benefits of Online Car Rental System

- This online car rental solution is fully functional and flexible.
- It is very easy to use.
- This online car rental system helps in back-office administration by streamlining and standardizing the procedures.
- It saves a lot of time and money.
- Eco-friendly: The monitoring of the vehicle activity and the overall business becomes easy and includes the least of paper work.
- The software acts as an office that is open 24/7.
- It increases the efficiency of the management at offering quality services to the customers.
- It provides custom features development and support with the software.

CHAPTER-3

FUNCTIONAL AND NON-FUNCTIONAL REQUIREMENTS

3.1 Functional Requirements

Requirement analysis is a software engineering technique that is composed of the various tasks that determine the needs or conditions that are to be met for a new or altered product, taking into consideration the possible conflicting requirements of the various users.

Functional requirements are those requirements that are used to illustrate the internal working nature of the system, the description of the system, and explanation of each subsystem. It consists of what task the system should perform, the processes involved, which data should the system holds and the interfaces with the user. The functional requirements identified are:

a. Customer's registration: The system should allow new users to register online and generate membership card.
b. Online reservation of cars: Customers should be able to use the system to make booking and online reservation.
c. Automatic update to database once reservation is made or new customer registered: Whenever there's new reservation or new registration, the system should be able update the database without any additional efforts from the admin.

3.2 Non-Functional Requirements

It describes aspects of the system that are concerned with how the system provides the functional requirements. They are:

a. Security**:** The subsystem should provide a high level of security and integrity of the data held by the system, only authorized personnel of the company can gain access to the company's secured page on the system; and only users with valid password and username can login to view user's page.
b. Performance and Response time: The system should have high performance rate when executing user's input and should be able to provide feedback or response within a short

time span usually 50 seconds for highly complicated task and 20 to 25 seconds for less complicated task.

c. Error handling: Error should be considerably minimized and an appropriate error message that guides the user to recover from an error should be provided. Validation of user's input is highly essential. Also, the standard time taken to recover from an error should be 15 to 20 seconds.
d. Availability: This system should always be available for access at 24 hours, 7 days a week. Also, in the occurrence of any major system malfunctioning, the system should be available in 1 to 2 working days, so that the business process is not severely affected.
e. Ease of use: Considered the level of knowledge possessed by the users of this system, a simple but quality user interface should be developed to make it easy to understand and required less training.

CHAPTER-4

DATA FLOW DIAGRAMS

4.1 Data Flow Diagram (DFD)

A Data Flow Diagram (DFD) is a graphical representation that depicts the information flow and the transforms that are applied as data moves from input to output.

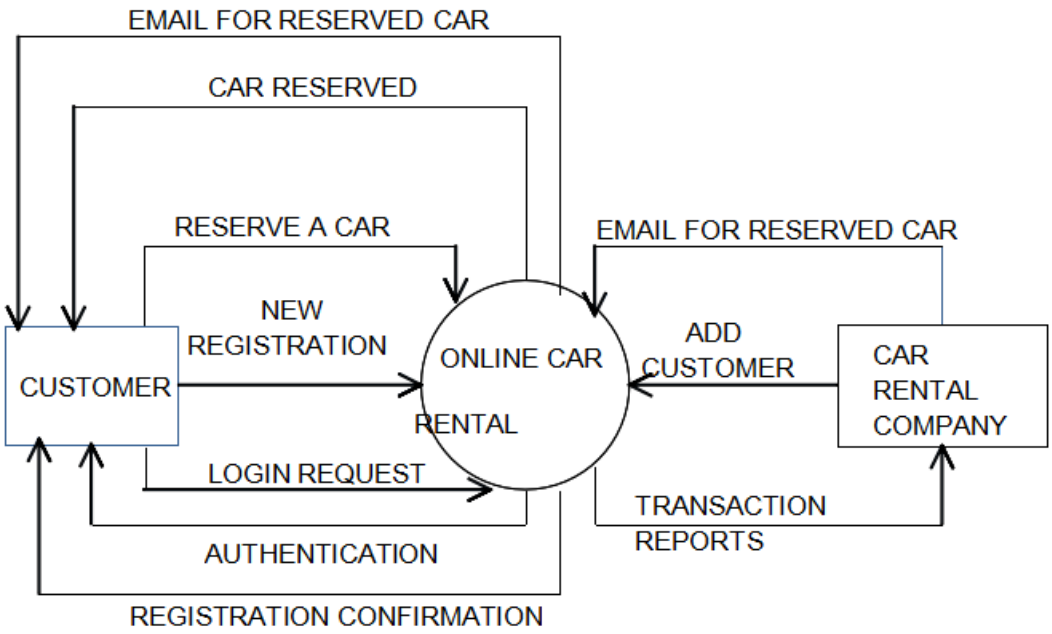


Figure 4.1 Level 0 DFD of Online Car Rental System

In this diagram, Customer and Car Rental Company are the two entity sets.

Functions of Customer:

- New Registration
- Login Request
- Registration Confirmation by the System
- Reserve Car
- Car Issued by the System

Functions of Car Rental Company:

- Add Customer
- View Transaction reports

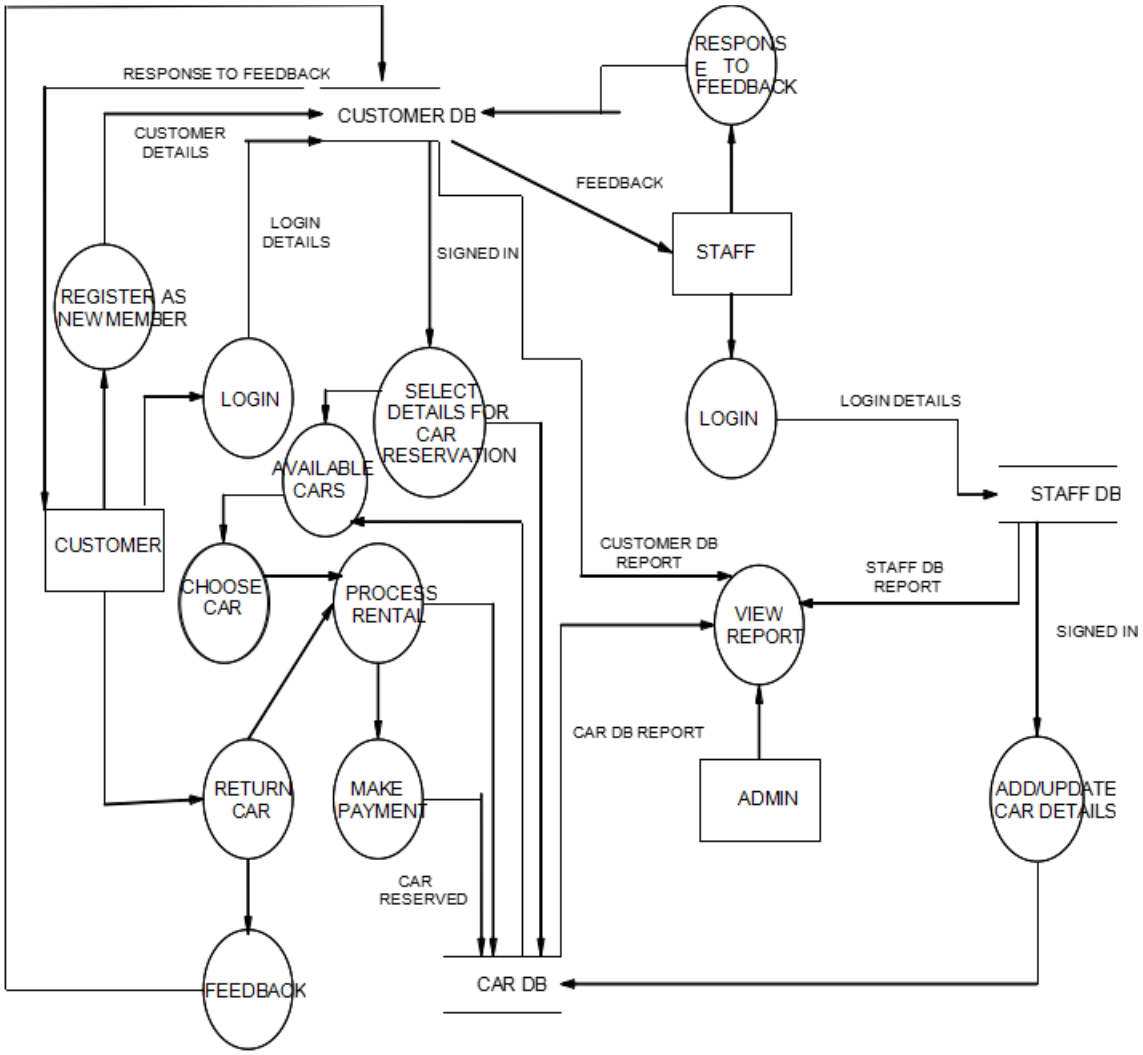


Figure 4.2 Level 1 DFD of Online Car Rental System

CHAPTER-5

USE-CASE DIAGRAMS

5.1 Actor and Use Case Description

Actor and use case description shows the detail description of interaction between the actors and their use cases. The description enables to have a proper understanding of how actor interacts with the system through their use cases.

Actor	Use Case	Use Case Description
User	Register as member	This use case describes the activities of the customer to register online and become a member. Customer's details are required as part of the registration. Login detail is automatically sent to the customer after successful registration.
	Make reservation	This use case enable customer to search and make reservation. Non-register customer will be directed to register before their reservation can be confirmed. Notification is automatically sent to the customer after the task is completed.
	Return car	This use case describes the event of customer returning the car borrowed, the use case extends "process rental" use case from the staff actor.
Employee	Add new car	This use case is used by the staff to add new car to the company's fleet database. Staff will need to login to activate this use case.
	Update car details	This use case is used by the staff to edit and modify car details whenever there is new renewal (insurance, road tax). It allows the company to keep up-to-date record of their fleet.
	Process rental	This use case described the event by which staff updates the system when customer pick up or when returning car.

Admin	Add new employee	This use case describes the event by which Admin add new staff detail to the company's staff database. It is invoked whenever a new staff join the company.
	View report	This use case is used by the admin to view transaction report.

Table 5.1 Actors and Use Case Description

5.2 Use Case Diagram

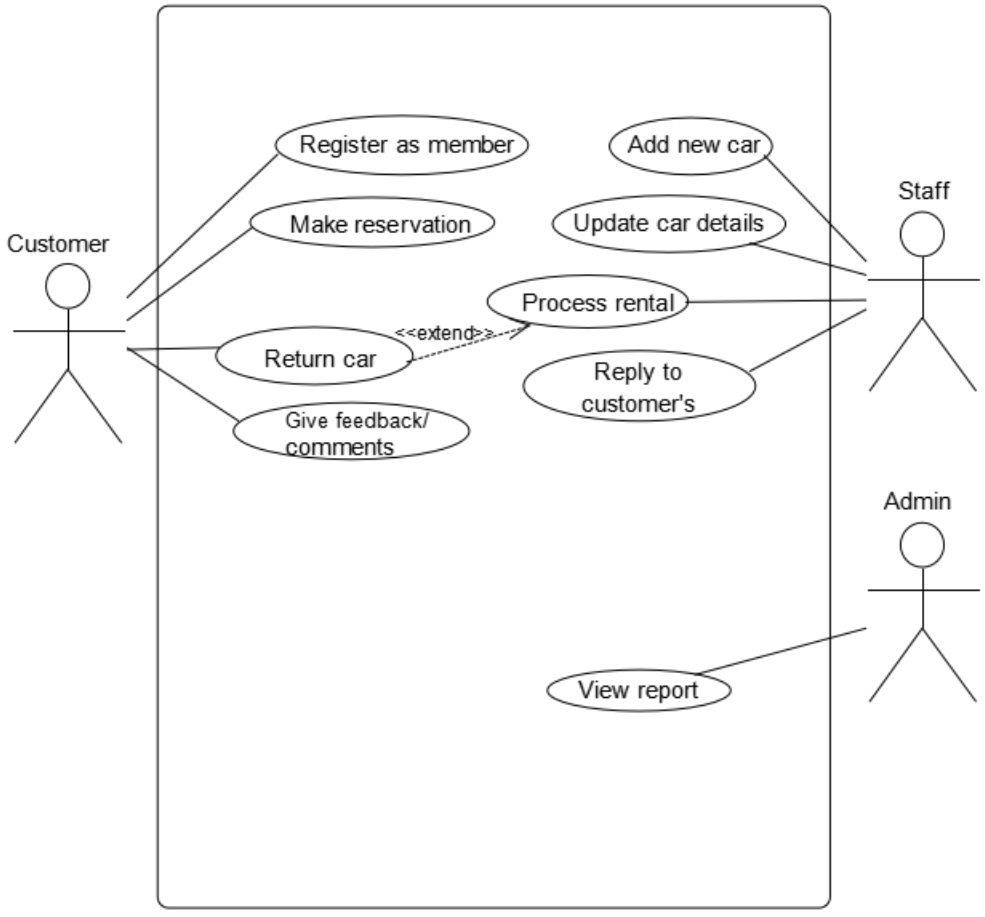


Figure 5.2: Car Rental System [use case]

5.3 Use-Case Dependency Diagram

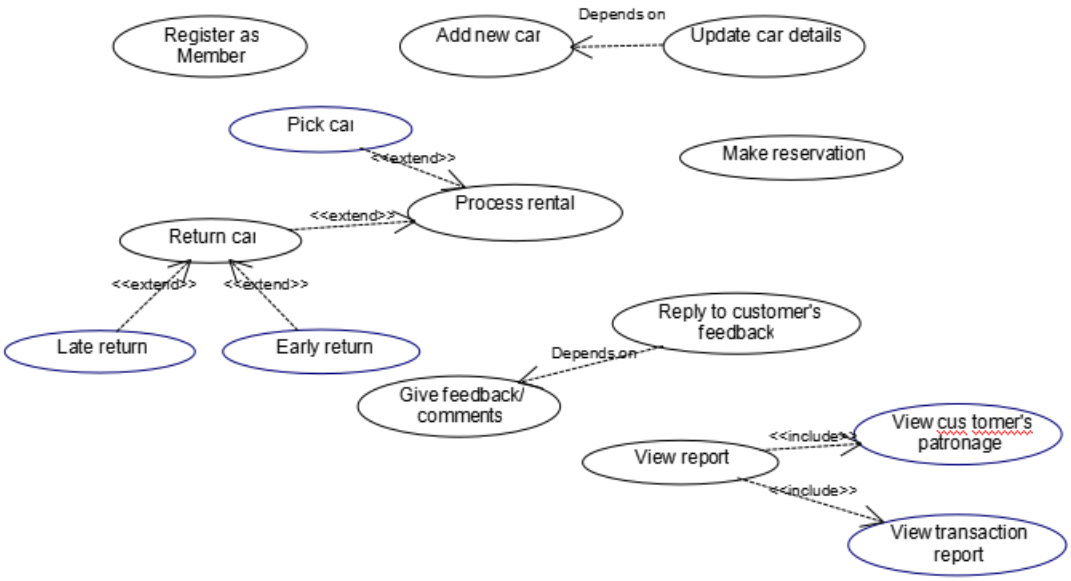


Figure 5.3: Use Case Dependency Diagram

CHAPTER-6

ACTIVITY DIAGRAMS

Activity diagrams graphically represent the sequential business and operational workflows of a system. It is a dynamic diagram that shows the activity and the event that causes the object to be in the particular state. The workflows from activity diagram will serve as guide for system navigation in the final design phase of the system.

6.1 User Registration

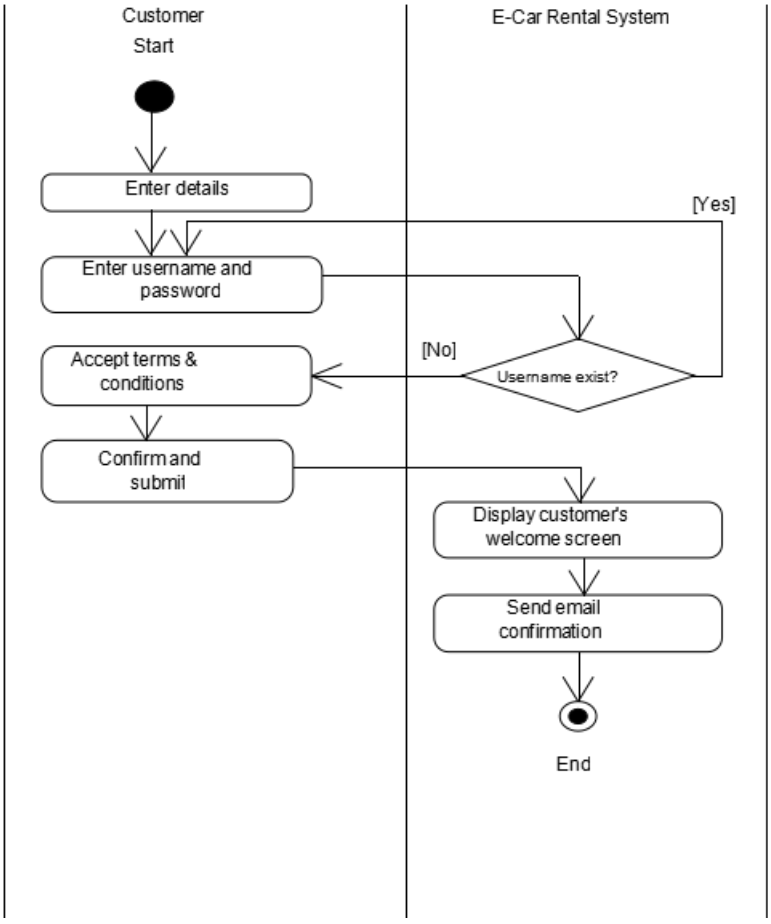


Figure 6.1: Register as User

6.2 Profile Modification

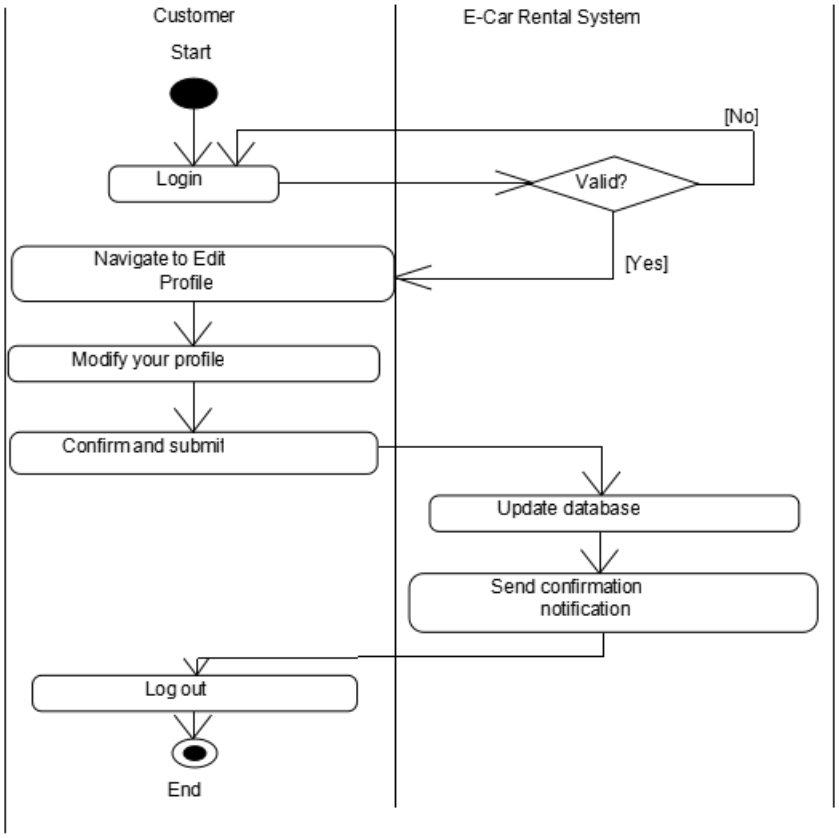


Figure 6.2: Modify profile

6.3 Reservation of Car

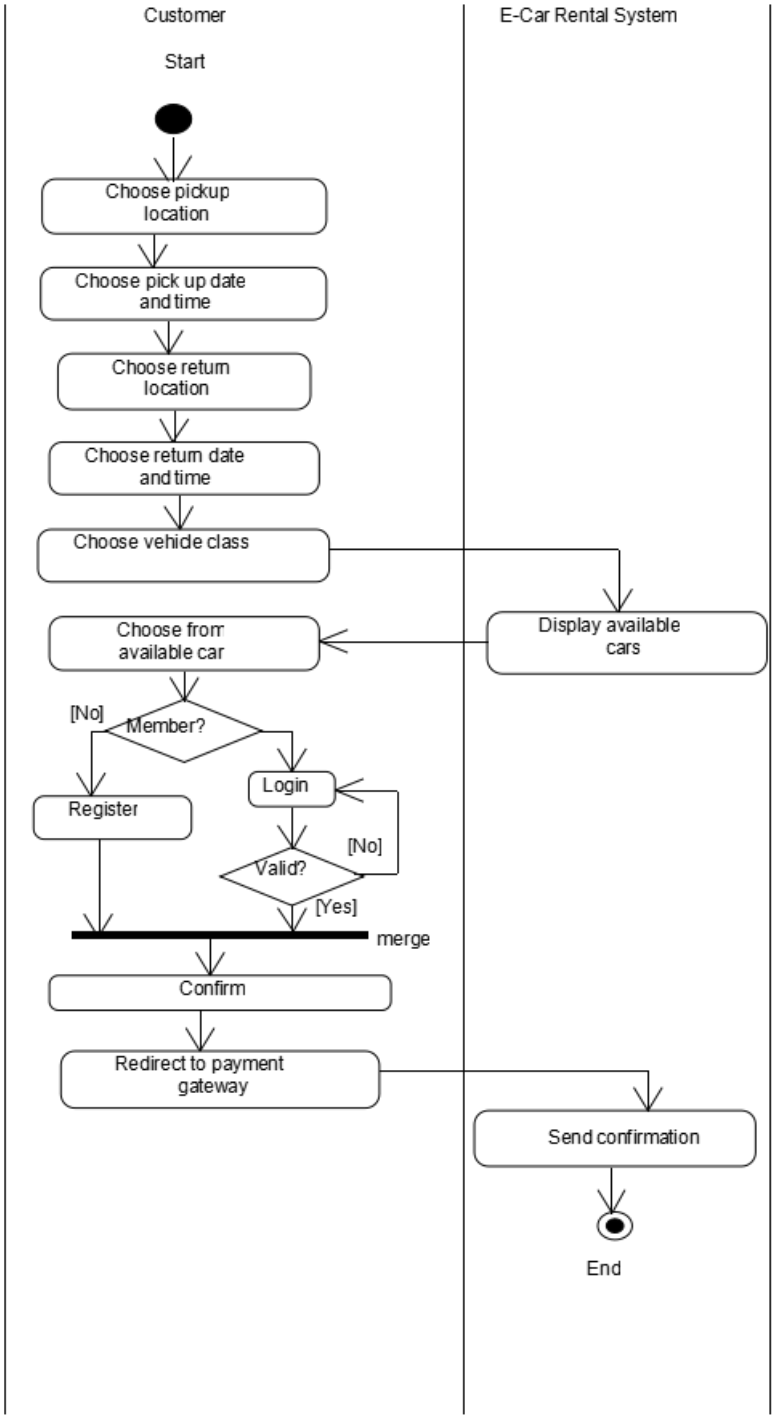


Figure 6.3: Make Reservation

6.4 Payment of Car Rent

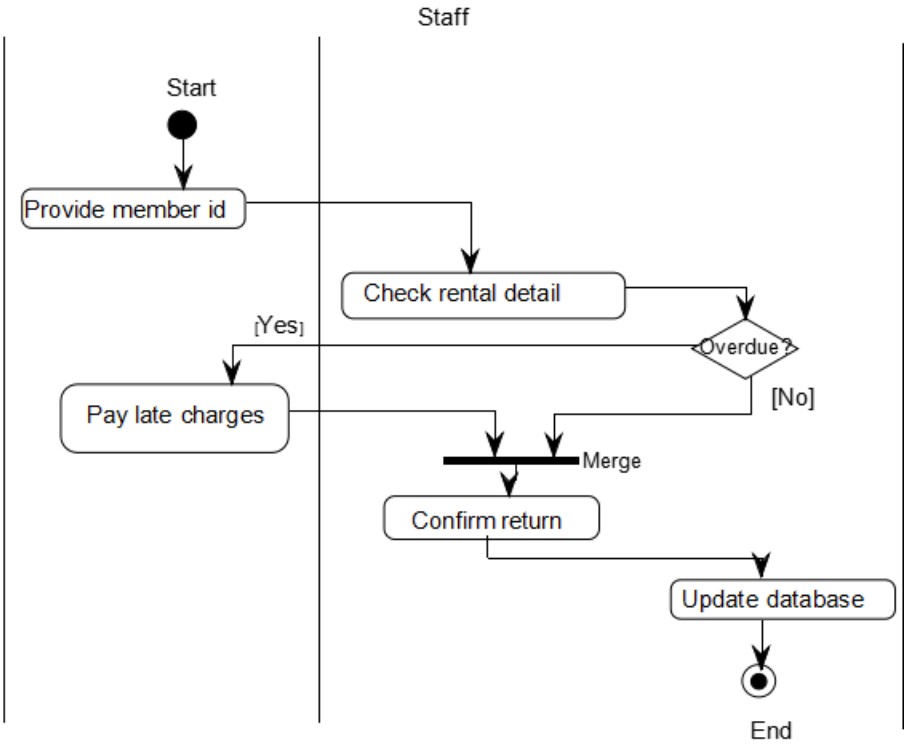


Figure 6.4: Rent a Car

6.5 Adding a New Car

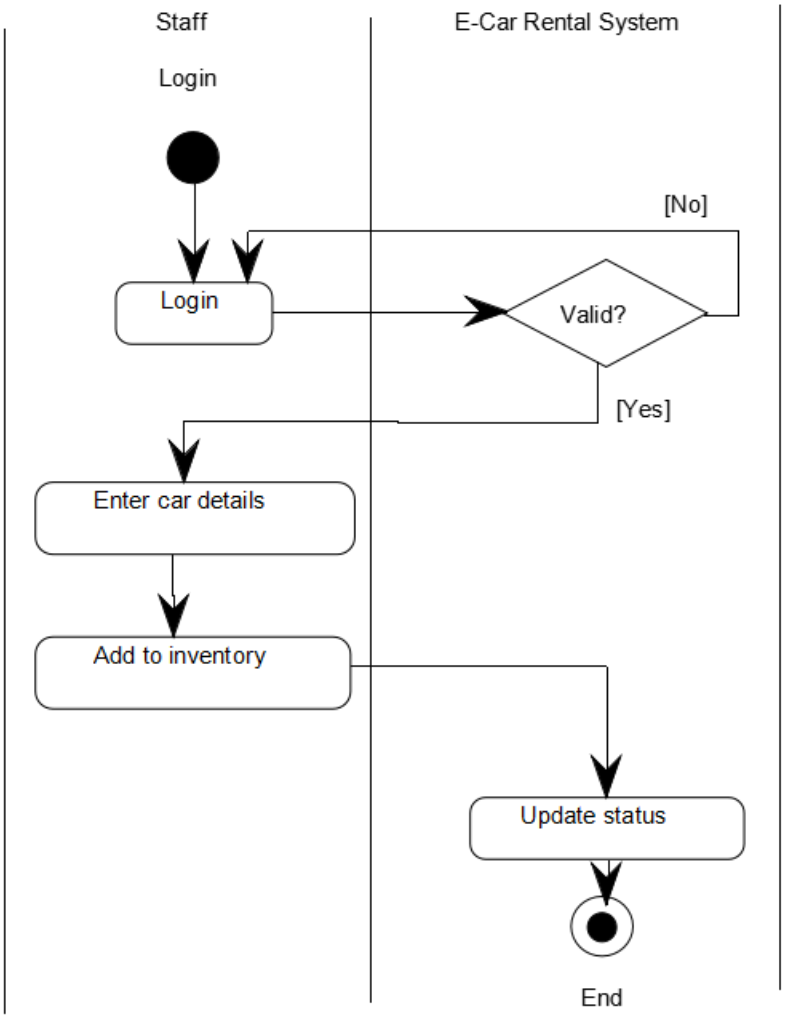


Figure 6.5: Add a New Car

6.6 View Report

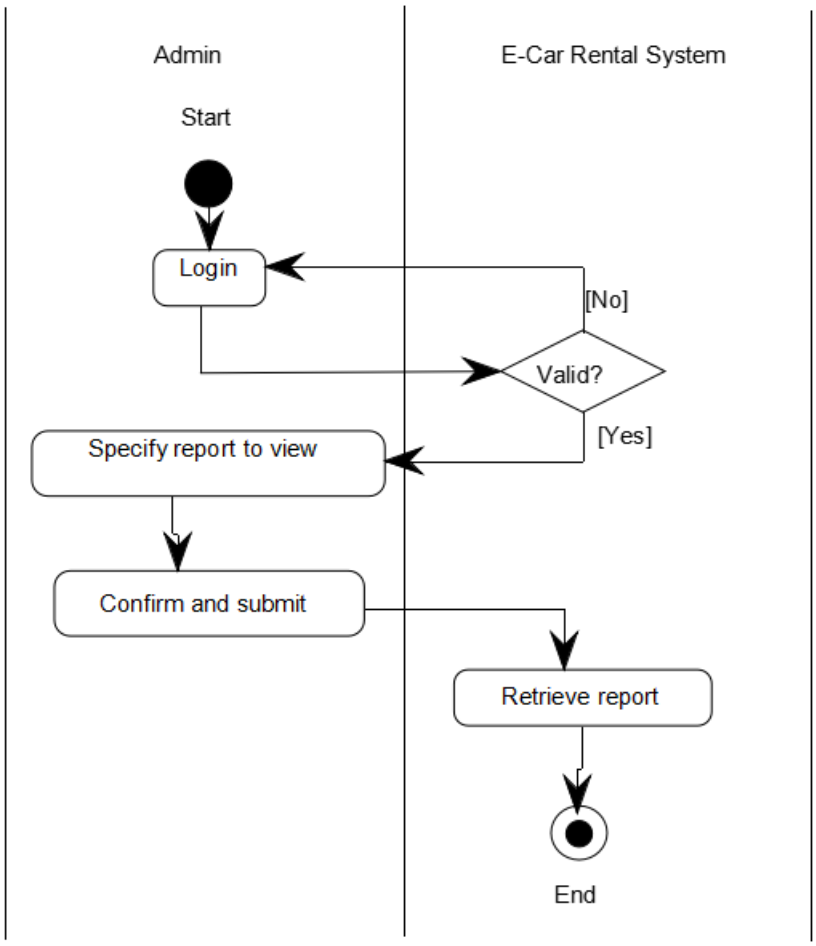


Figure 6.6: View report

CHAPTER-7

SEQUENCE DIAGRAMS

Sequence Diagram

Sequence diagrams are used to demonstrate the behaviour of objects in a use case by describing the objects and the messages they pass. It provides a graphical representation of object interactions over time. Sequence diagrams show an actor, the objects and components they interact with in the execution of a use case. One sequence diagram represents a single Use Case 'scenario' or events. Sequence diagrams show the flow of messages from one object to another, and as such correspond to the methods and events supported by an object.

7.1 User Registration

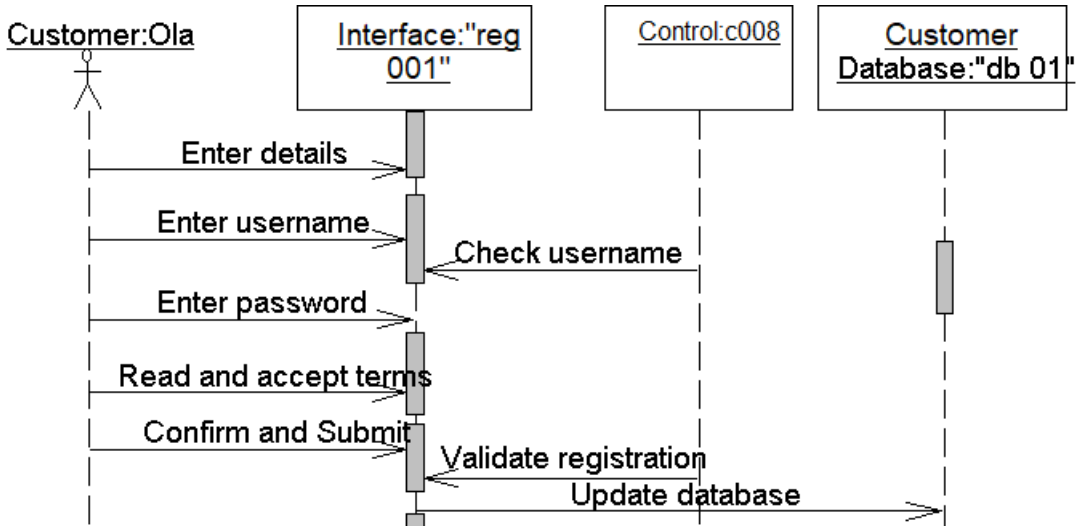


Figure 7.1: Register as User

7.2 Reservation of Car

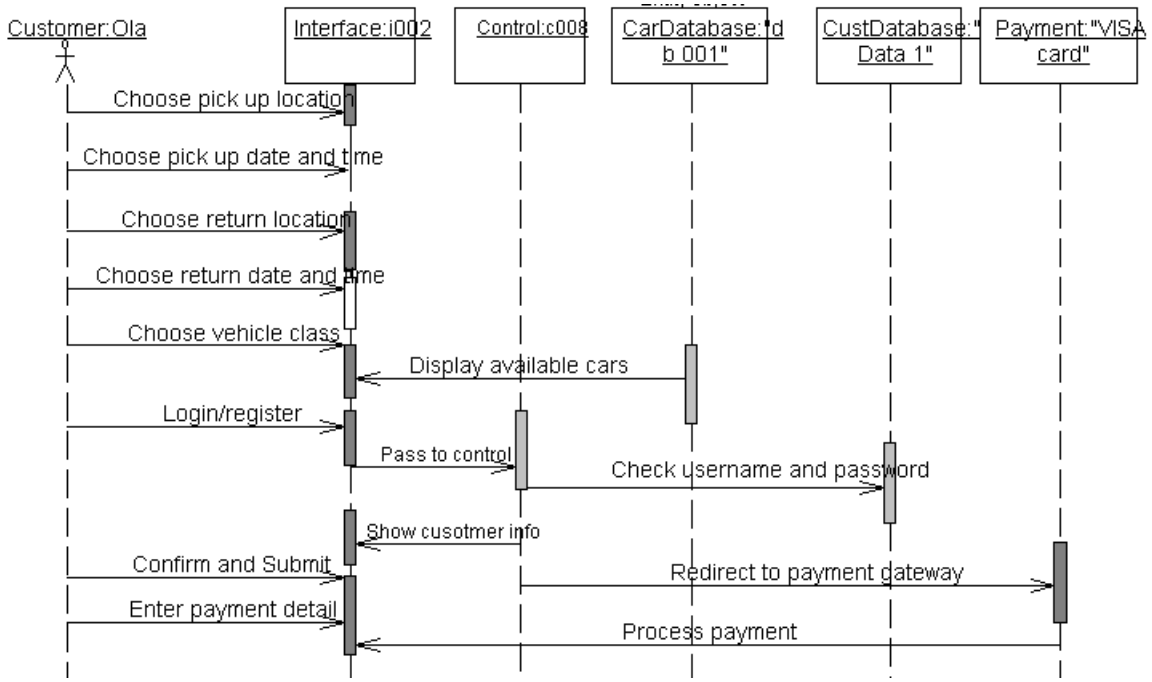


Figure 7.2: Make reservation

7.3 Adding a New Car

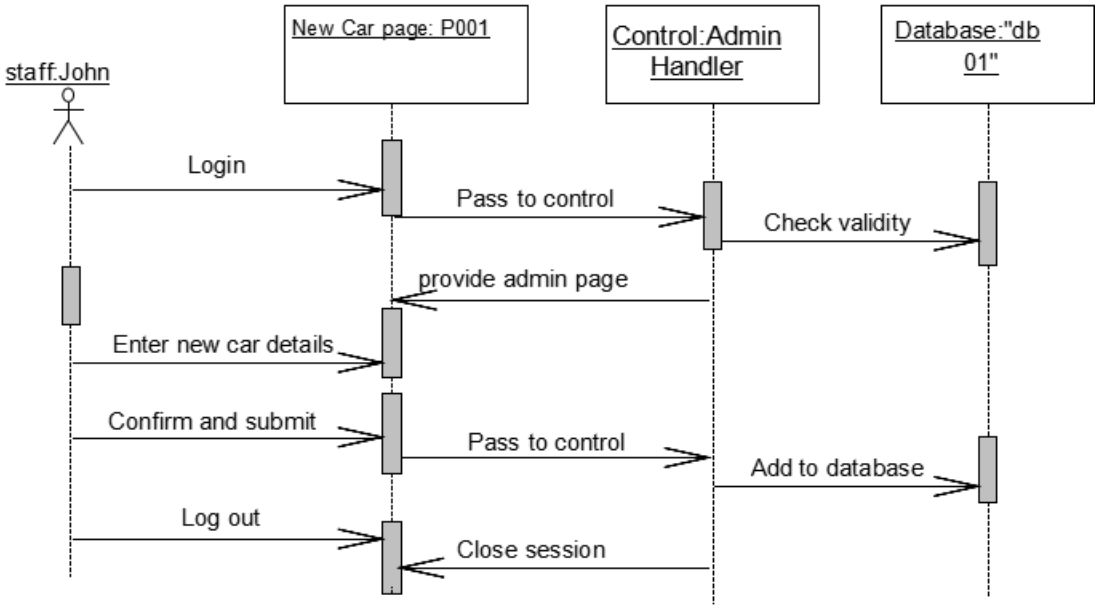


Figure 7.3: Add new car

7.4 Return Car and Check Rental Details

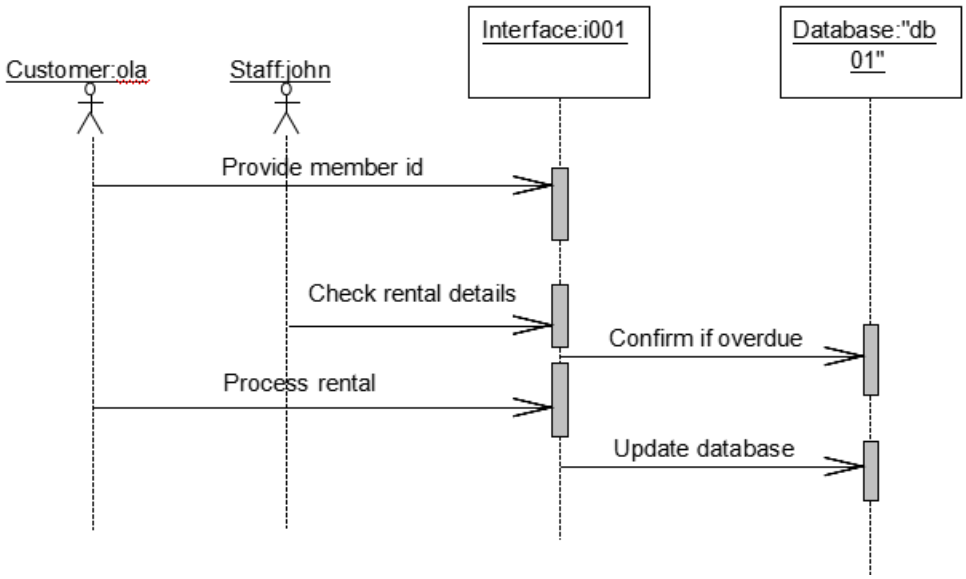


Figure 7.4: Return car

7.5 View Report

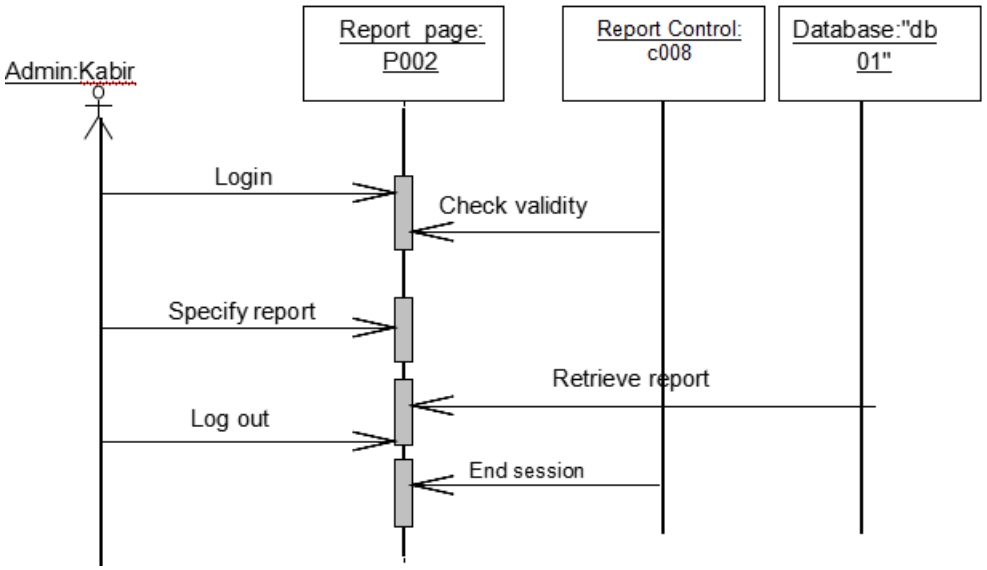


Figure 7.5: View report

CHAPTER-8

CLASS DIAGRAM

Class Diagram

The class diagram is the main building block, a number of classes are identified and grouped together in a class diagram which helps to determine the statically relations between those objects.

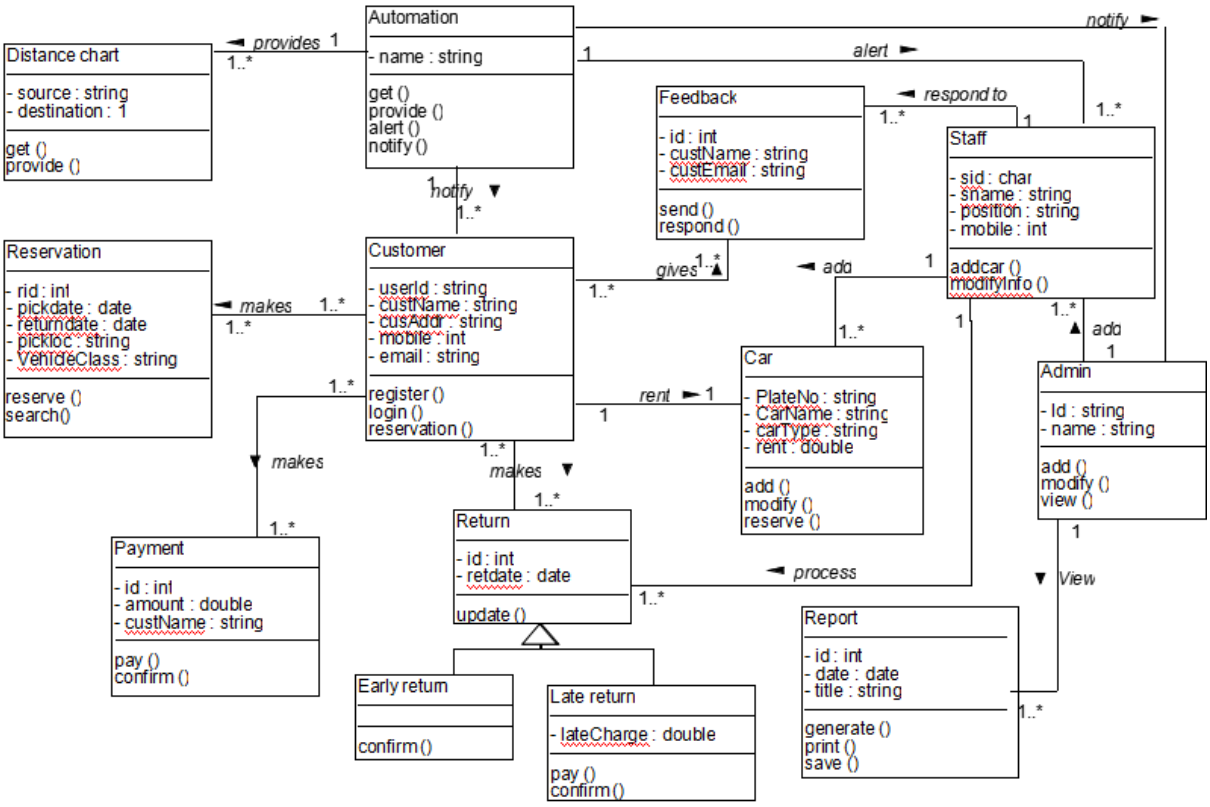


Figure 8 Class Diagram of Online Car Rental System

CHAPTER-9

INTRODUCTION OF TECHNOLOGIES USED IN PROJECT

9.1 Introduction to Spring Boot:

Spring Boot is an open-source Java-based framework used to create a micro-Service. It is developed by Pivotal Team and is used to build stand-alone and production ready spring applications. This chapter will give you an introduction to Spring Boot and familiarizes you with its basic concepts.

What is Spring Boot?

Spring Boot provides a good platform for Java developers to develop a stand-alone and production-grade spring application that you can **just run**. You can get started with minimum configurations without the need for an entire Spring configuration setup.

Advantages

Spring Boot offers the following advantages to its developers −

- Easy to understand and develop spring applications
- Increases productivity
- Reduces the development time

Goals

Spring Boot is designed with the following goals −

- To avoid complex XML configuration in Spring
- To develop a production ready Spring applications in an easier way
- To reduce the development time and run the application independently • Offer an easier way of getting started with the application

Why Spring Boot?

You can choose Spring Boot because of the features and benefits it offers as given here −

- It provides a flexible way to configure Java Beans, XML configurations, and Database Transactions.
- It provides a powerful batch processing and manages REST endpoints.
- In Spring Boot, everything is auto configured; no manual configurations are needed.
- It offers annotation-based spring application
- Eases dependency management
- It includes Embedded Servlet Container

How does it work?

Spring Boot automatically configures your application based on the dependencies you have added to the project by using **@EnableAutoConfiguration** annotation. For example, if MySQL database is on your classpath, but you have not configured any database connection, then Spring Boot auto-configures an in-memory database.

The entry point of the spring boot application is the class contains **@SpringBootApplication** annotation and the main method.

Spring Boot automatically scans all the components included in the project by using **@ComponentScan** annotation.

9.2 Introduction to ReactJS:

ReactJS is a simple, feature rich, component-based JavaScript UI library. It can be used to develop small applications as well as big, complex applications. ReactJS provides minimal and solid feature set to kick-start a web application. React community compliments React library by providing large set of ready-made components to develop web application in a record time. React community also provides advanced concept like state management, routing, etc., on top of the React library.

Features

The salient features of React Library are as follows −

- Solid base architecture
- Extensible architecture

- Component based library
- JSX based design architecture
- Declarative UI library

Benefits

Few benefits of using *React library* are as follows −

- Easy to learn
- Easy to adept in modern as well as legacy application
- Faster way to code a functionality
- Availability of large number of ready-made components
- Large and active community

Applications

Few popular websites powered by *React library* are listed below −

- Facebook, popular social media application
- Instagram, popular photo sharing application
- Netflix, popular media streaming application
- Code Academy, popular online training application
- Reddit, popular content sharing application

As you see, most popular application in every field is being developed by React Library.

React library is built on a solid foundation. It is simple, flexible and extensible. As we learned earlier, React is a library to create user interface in a web application. React's primary purpose is to enable the developer to create user interface using pure JavaScript. Normally, every user interface library introduces a new template language (which we need to learn) to design the user interface and provides an option to write logic, either inside the template or separately.

React elements

JavaScript representation of HTML DOM. React provides an API, **React.createElement** to create React Element.

JSX

A JavaScript extension to design user interface. JSX is an XML based, extensible language supporting HTML syntax with little modification. JSX can be compiled to React Elements and used to create user interface.

React component

React component is the primary building block of the React application. It uses React elements and JSX to design its user interface. React component is basically a JavaScript class (extends the **React.component** class) or pure JavaScript function. React component has properties, state management, life cycle and event handler. React component can be able to do simple as well as advanced logic.

9.3 Introduction to MySQL:

MySQL is a relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases. MySQL is officially pronounced ("My S-Q-L"), but is often pronounced ("My Sequel"). It is named for original developer Michael Widenius's daughter My.

The MySQL development project has made its source code available under the terms of the GNU General Public License, as well as under a variety of proprietary agreements. MySQL is owned and sponsored by a single for-profit firm, the Swedish company MySQL AB, now owned by Sun Microsystems, a subsidiary of Oracle Corporation.

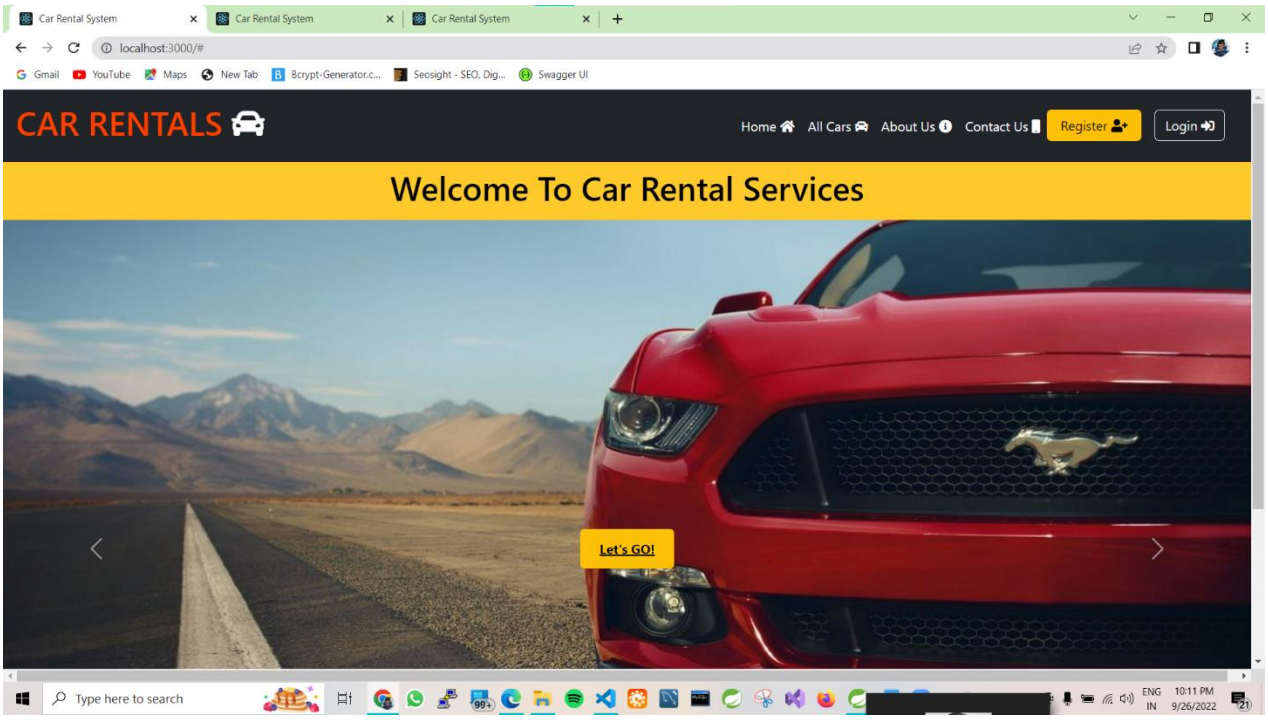
MySQL code uses C and C++. The SQL parser uses yacc and a home-brewed lexer, sql_lex.cc.

MySQL works on many different system platforms, including AIX, BSDi, FreeBSD, HP-UX, i5/OS, Linux, Mac OS X, NetBSD, Novell NetWare, OpenBSD, Open Solaris, eComStation, OS/2 Warp, QNX, IRIX, Solaris, Symbian, SunOS, SCO Open Server, SCO UnixWare, Sanos, Tru64 and Microsoft Windows. A port of MySQL to OpenVMS also exists.

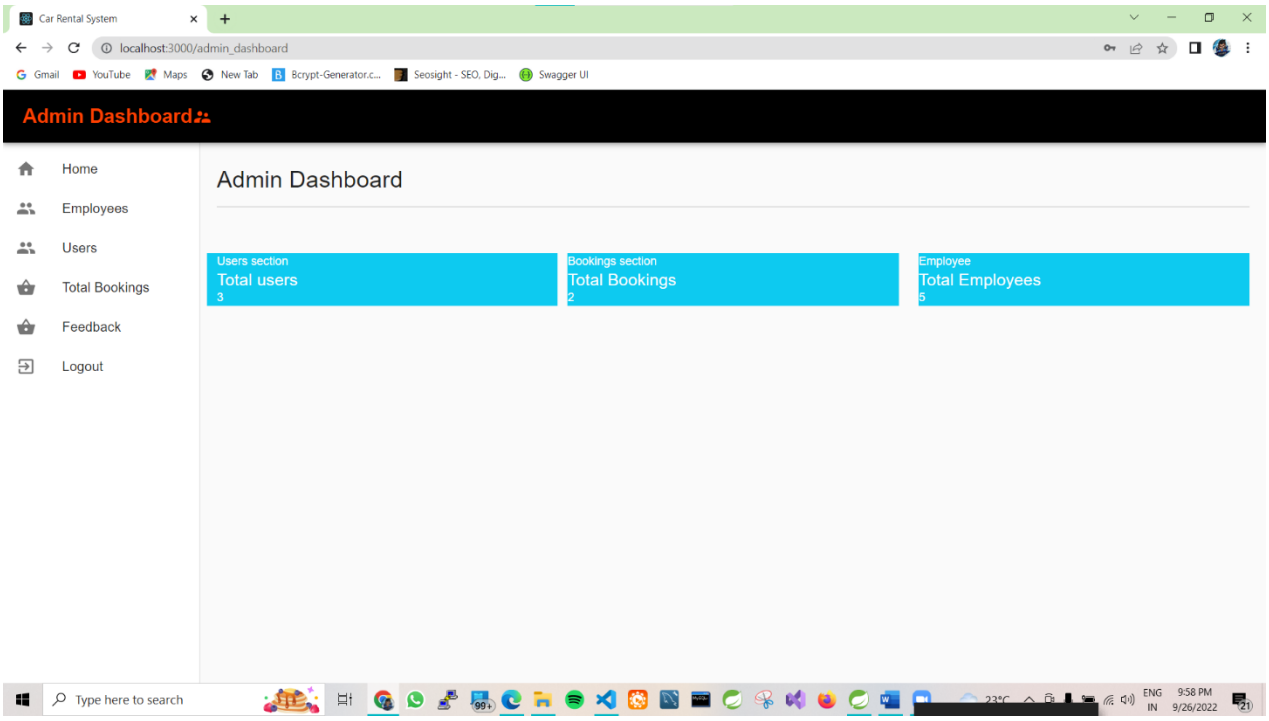
All major programming languages with language-specific APIs include Libraries for accessing MySQL database. In addition, an ODBC interface called MyODBC allows additional programming languages that support the ODBC interface to communicate with a MySQL database, such as ASP or ColdFusion. The HTSQL - URL based query method also ships with MySQL adapter allowing direct interaction with MySQL database from any web client via structured URLs. The MySQL server and official libraries are mostly implemented in ANSI C/ANSI C++.

CHAPTER-10

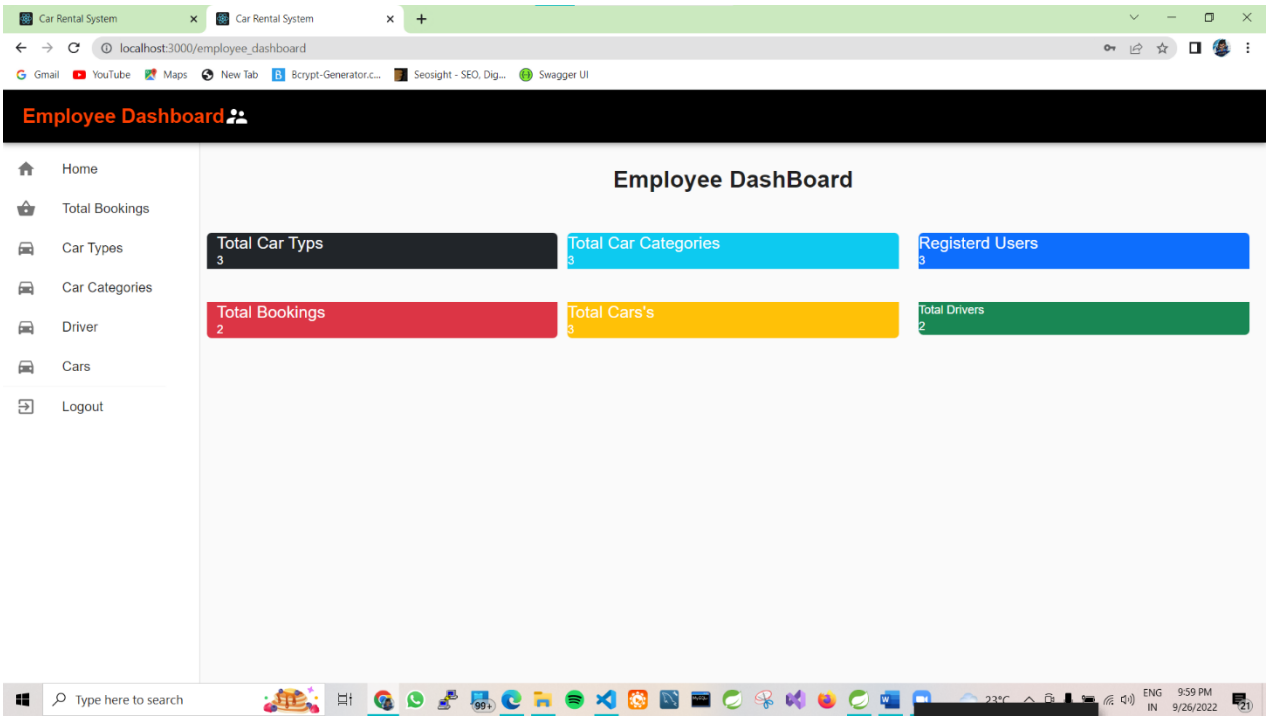
SNAPSHOTS



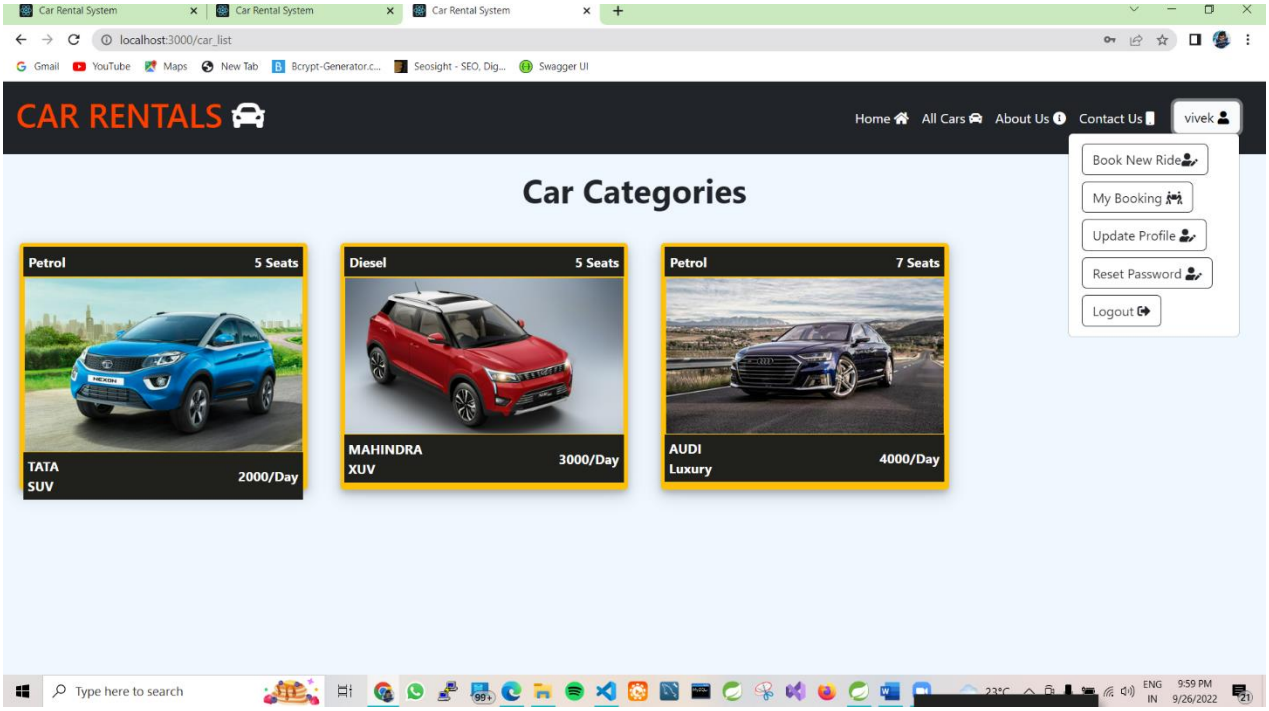
SNAPSHOT 1: HOMEPAGE



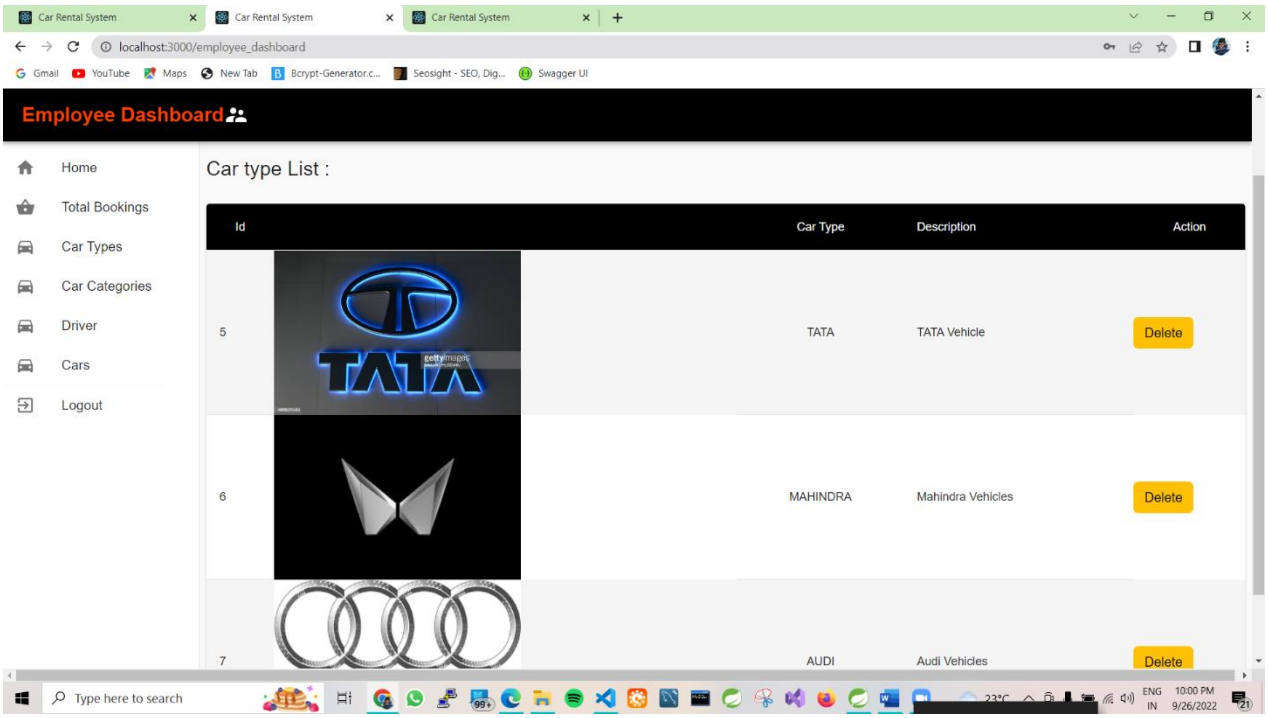
SNAPSHOT 2: ADMIN DASHBOARD



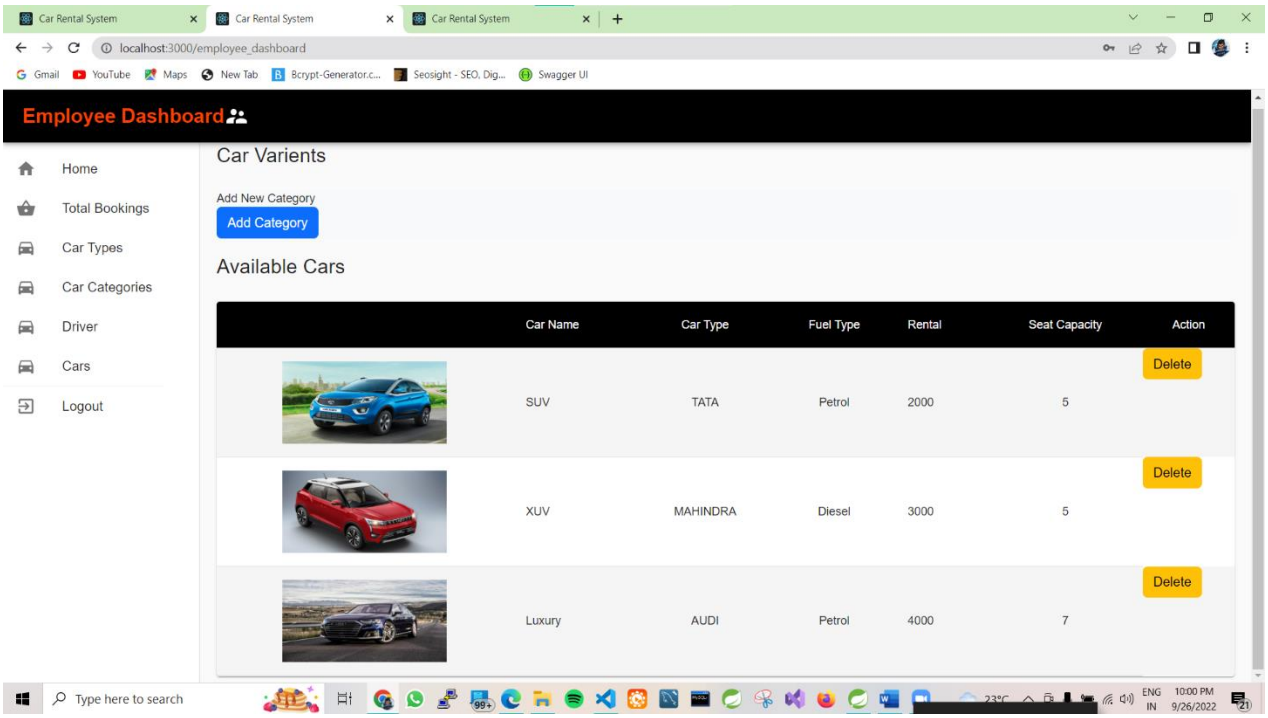
SNAPSHOT 3: EMPLOYEE DASHBOARD



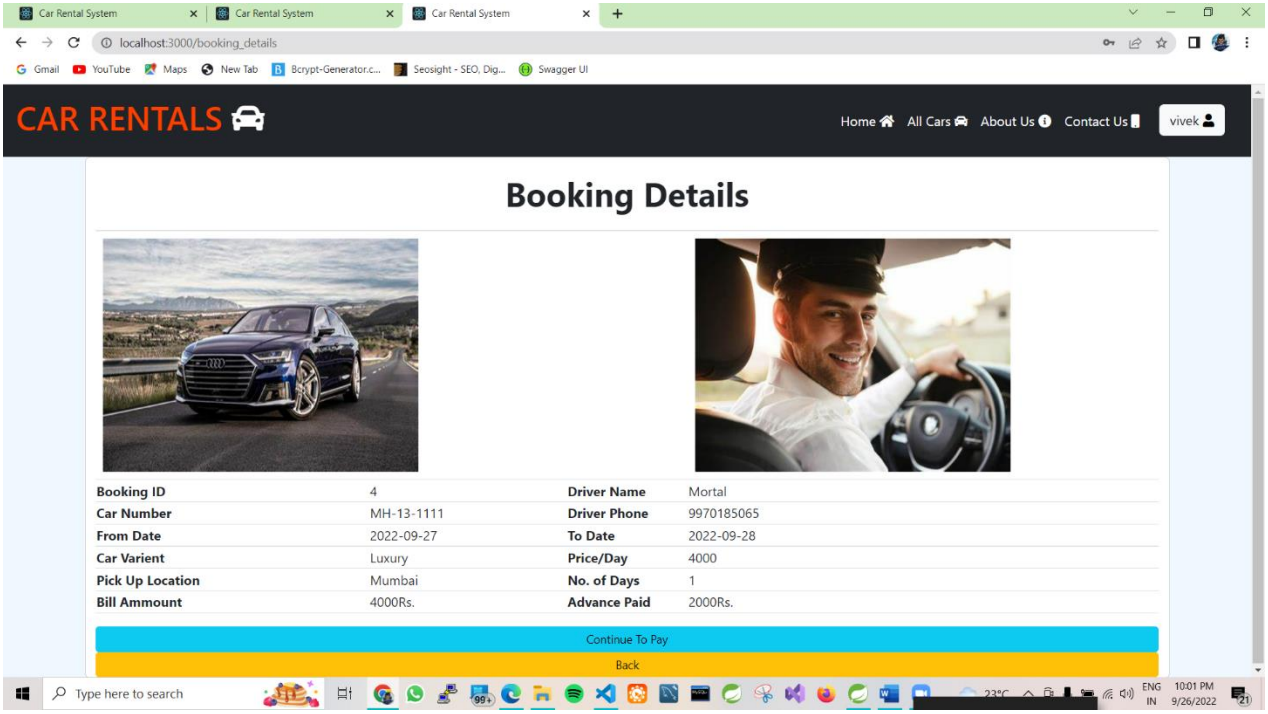
SNAPSHOT 4: USER DASHBOARD



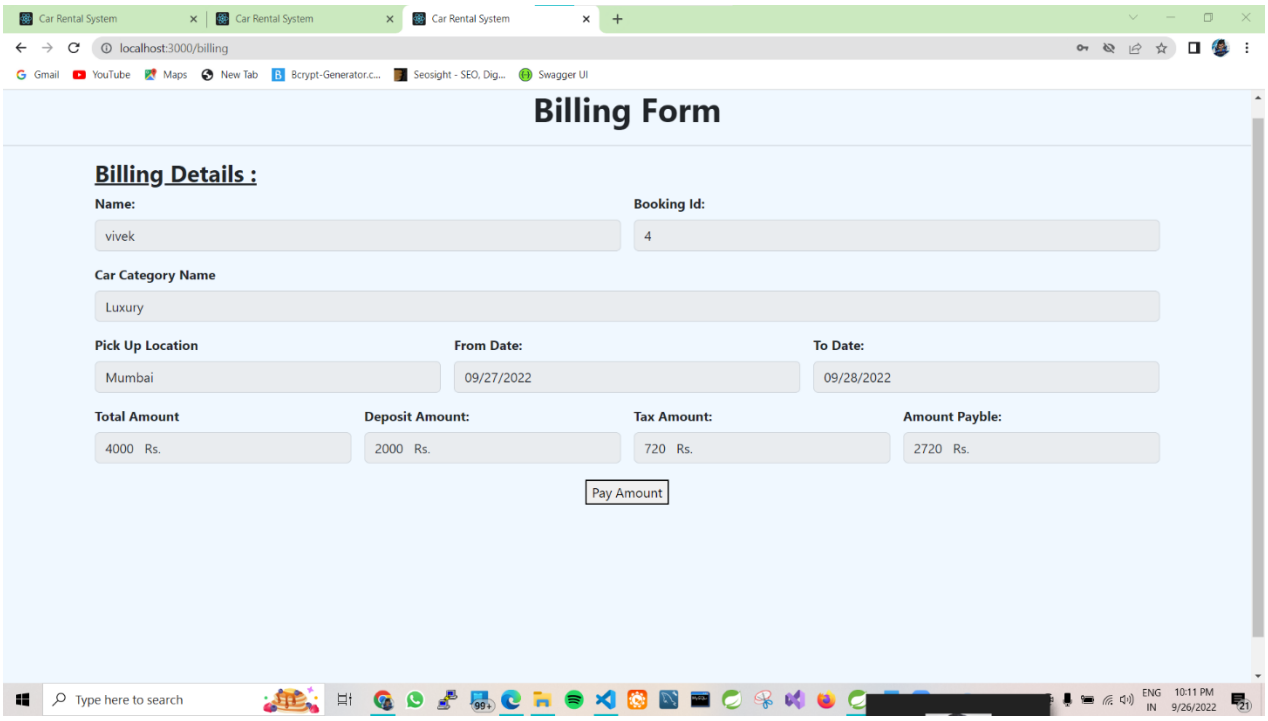
SNAPSHOT 5: CAR-TYPE



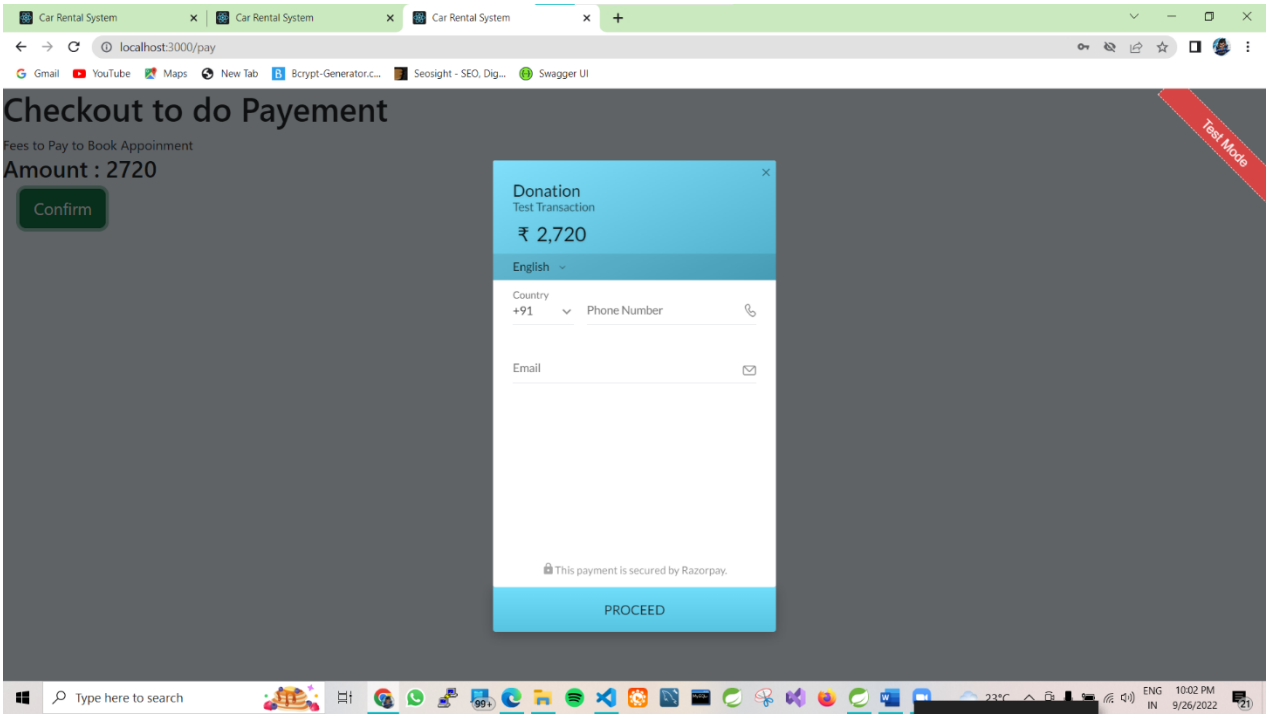
SNAPSHOT 6: CAR CATEGORY

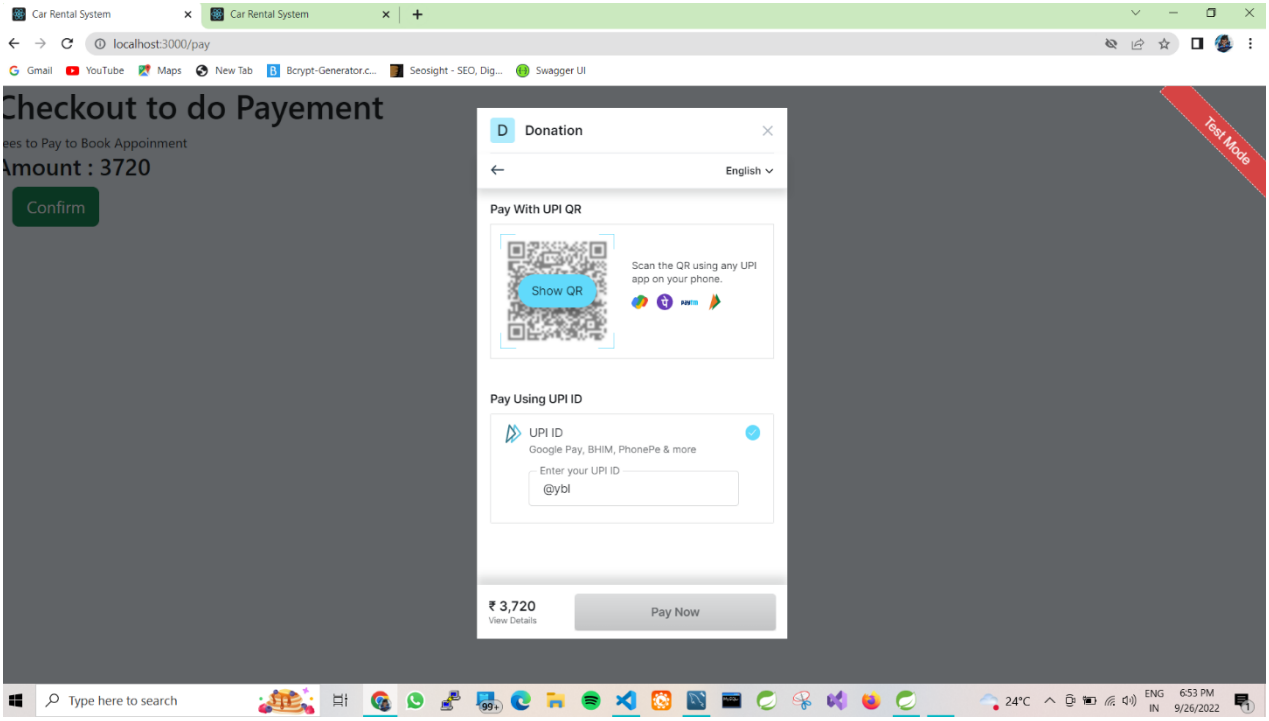


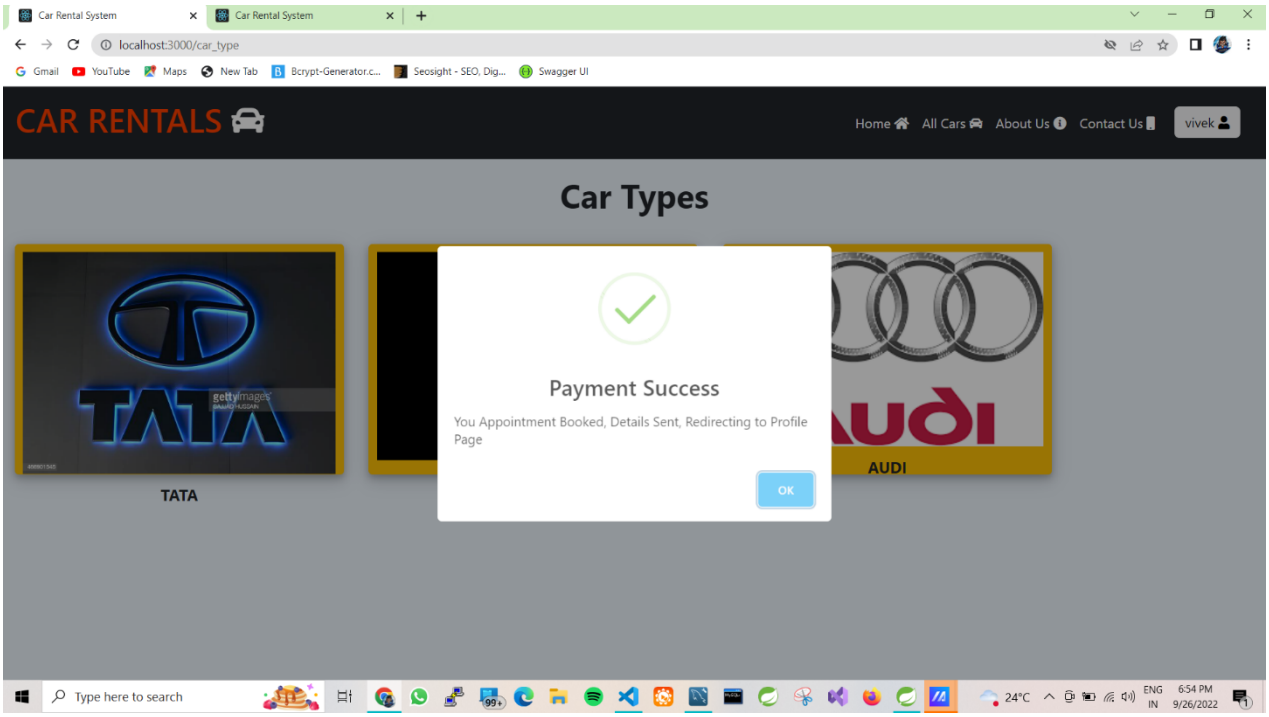
SNAPSHOT 7: BOOKING DETAILS



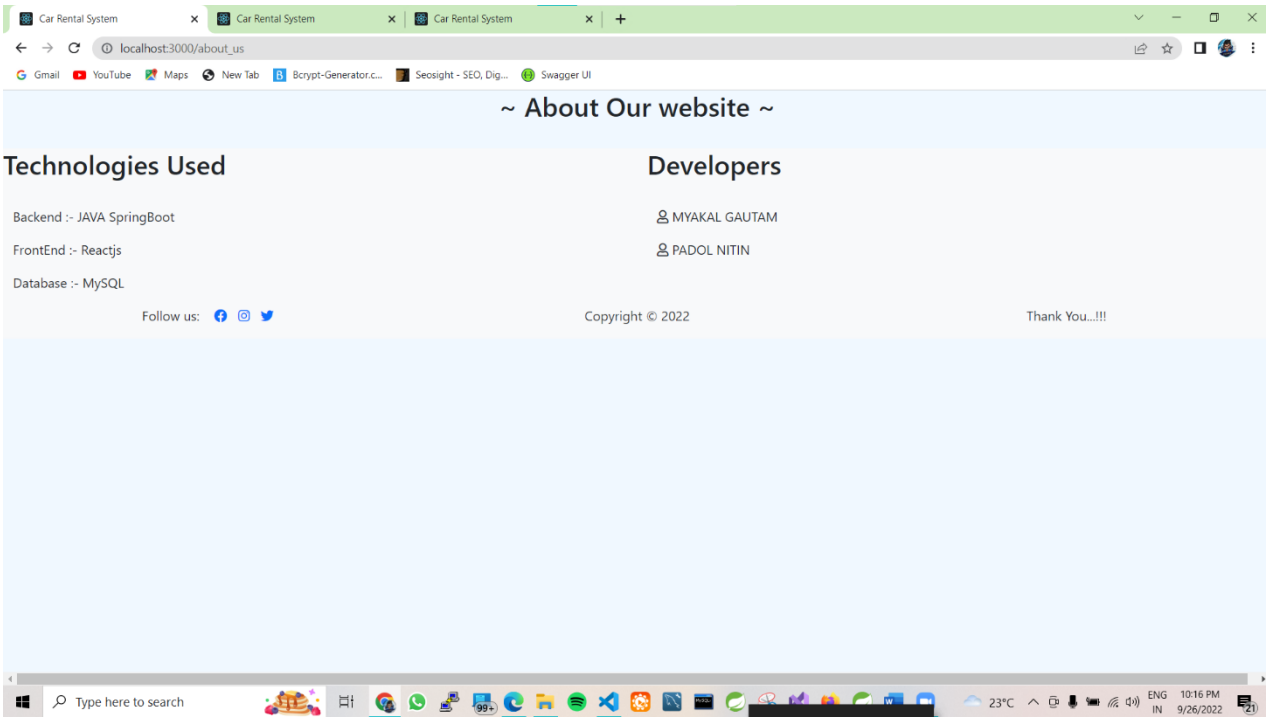
SNAPSHOT 8: BILLING



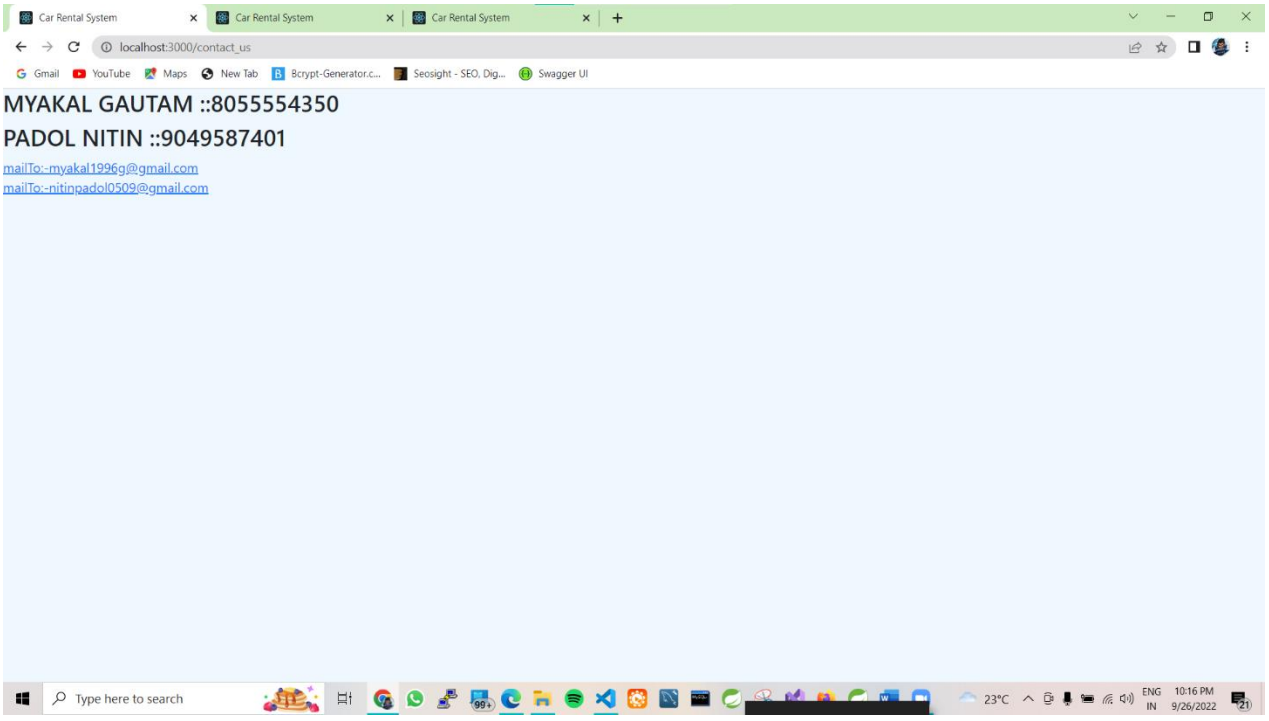




SNAPSHOT 9: RAZOR-PAY



SNAPSHOT 10: ABOUT US



SNAPSHOT 11: CONTACT US

CHAPTER-11
CONCLUSION

Car rental business has emerged with a new goodies compared to the past experience where every activity concerning car rental business is limited to a physical location only. Even though the physical location has not been totally eradicated; the nature of functions and how these functions are achieved has been reshaped by the power of internet. Nowadays, customers can reserve cars online, rent car online, and have the car brought to their door step once the customer is a registered member or go to the office to pick the car.

The web-based car rental system has offered an advantage to both customers as well as Car Rental Company to efficiently and effectively manage the business and satisfies customer's need at the click of a button.

CHAPTER-12

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