CAR RENTAL

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CAR RENTAL

LANDY IBRAHIM AHMED

A thesis submitted in fulfilment of the
requirements for the award of the degree of
Bachelor of Computer Science (SOFTWARE ENGINEER)

School of Computing
Faculty of Engineering
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DEDICATION

This thesis is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task can be accomplished if it is done one step at a time.

ACKNOWLEDGEMENT

During the preparation of this dissertation, many people and researchers and scholars and practitioners. They contributed to my understanding and thought. Among them, I wish to express my sincere appreciation to my main thesis supervisor and co-Supervisor.

Mr. Mohammed Shihab, for encouragement, guidance, critics and friendship. for their guidance, advices and motivation. Without their continued support and interest, this thesis would not have been the same as presented here. And my students deserve their support. thank you I would like to thank all my colleagues and others who helped me Help in various situations. Their comments and advice are very helpful, it is impossible to list them all in this limited space. I am very grateful to all my relatives.

ABSTRACT

This Study of the Car Rental System, customers will be able to reserve their vehicles from anywhere in the world. Consumers fill in their personal information to submit information to this application. When a customer registers on the website, he or she will be able to book a car. The suggested system is a fully integrated online system. It effectively and efficiently automates laborious procedures. Customers benefit from this automated system since it allows them to fill in the specifics based on their needs. It contains information on the car they want to hire as well as the location. This system's purpose is to establish a website where clients may book cars and request services from anywhere on the planet. This report will contain the literature review, methodology used, requirement analysis & design, and Implementation and testing finally conclusion. This report will document all the previously mentioned points in detail, to demonstrate the overall structure of the system from the introduction to the conclusion.

ABSTRAK

Kajian Sistem Penyewaan Kereta ini, pelanggan akan dapat menempah kenderaan mereka dari mana-mana sahaja di dunia. Pengguna mengisi maklumat peribadi mereka untuk menyerahkan maklumat kepada permohonan ini. Apabila pelanggan mendaftar di laman web, dia akan dapat menempah kereta. Sistem yang dicadangkan ialah sistem dalam talian bersepadu sepenuhnya. Ia secara berkesan dan cekap mengautomasikan prosedur yang susah payah. Pelanggan mendapat manfaat daripada sistem automatik ini kerana ia membolehkan mereka mengisi butiran berdasarkan keperluan mereka. Ia mengandungi maklumat mengenai kereta yang mereka ingin sewa serta lokasi. Tujuan sistem ini adalah untuk mewujudkan tapak web di mana pelanggan boleh menempah kereta dan meminta perkhidmatan dari mana-mana sahaja di planet ini. Laporan ini akan mengandungi kajian literatur, metodologi yang digunakan, analisis & reka bentuk keperluan, dan kesimpulan Pelaksanaan dan ujian akhirnya. Laporan ini akan mendokumenkan semua perkara yang dinyatakan sebelum ini secara terperinci, untuk menunjukkan struktur keseluruhan sistem dari pengenalan hingga kesimpulan.

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Chapter 1

Introduction

1.1. Introduction

The world has evolved into a place of rapid technological advancement, with virtually everything done physically being converted into a digitized form. People's activities have been turned into computer-assisted jobs in recent years. One of them is the project's core goal, which is the Car Rental System. People used to rent cars for personal reasons, which was a system that existed in prior years. For these reasons, car rental is crucial to many people's plans to travel or move from one location to another for business, tours, visits, or vacations. Renting a car is quite beneficial. by the way for the older who want a car for rent with driver, this website can Help more older age to get their priority work in the time so the website is car Rental which leads car dealerships to rent their car, and the taxi driver to established, the visitors to get the car and service, which is car and driver with full of trust.

1.2. Problem background

Car dealerships now show new models of cars for sale all year, some of which are sold and others which are left or unsold, so most of the time they will park the car which is unsold from the other and suffer the consequences, here are the car dealership problem they face every year, and the other problem is that Sulaymaniyah city is very crowded because of taxi drivers. They function without any structure or rule in place, and when the street is full of taxis, the environment suffers as a result of the increased number of taxis, and they cause some automobile accidents, as well as the customer's lack of trust in the taxi driver. Another issue that this approach will tackle is when one of the locations has a luxury party and guests are unable to obtain a luxury car. By

using car dealerships and establish some taxi drivers and allowing users to choose taxi drivers and cars, the street becomes more deserted because the drivers follow the rules and can only get out when they have a booking or order, those who do not want a driver can simply book a car without driver for those who do not want a driver, they can simply book a car without driver for the luxury part of the website, users can choose a car with a driver to go to a party, visitors when they travel to here they can do same as luxury part.

1.3. Project aim

The aim of the proposed project is to Design, Develop and implement a Car Rental System that Helps visitors and nation people to rent a car at a cheap price and trust.

1.4. Objectives

The objective of this website is

i. To review the existing system Car Rental System
ii. To analyze all the requirement to the Proposed system.
iii. To design and implement a system of Car Rental.
iv. To test the project of Proposed System.

1.5. Scopes

i. This website work on all the devices because it is website and web-based which is work in all the devices like tablet-phone computer and they can use it easily because we design it for the user to work on it easily
ii. -This website work in Sulaymaniyah-Iraq and it was useful for visitors and it was safe a visitor and they can trust it.
iii. -Language of the website is web-based which is (JavaScript- Html - CSS – PHP-C#)

1.6. Importance of the Project

The importance of this project is to provide a system to save the city from this number of taxis – and help car dealerships to didn't get detriment, to help taxi driver established with monthly paid, to show visitor by this website Sulaymaniyah is the beautiful city and forward city for digitized website and application and they can trust it for traveling. This system is a new system that is why we are motivated to work on it. Also, this helps user to get benefit from it by renting car for priority work. Finally, by using this website the users get benefits and then the developers of the system will get %15 benefit of the money from total money.

1.7. Organization of the Report

Chapter 1**:**

The organization of the chapter starts with an introduction then problem background and after the problem background, there is the project aim, objectives, and scopes finally, the importance of this project is shown above here are that chapter 1 is included it.

Chapter 2:

include literature review, this study has used some existing system for getting benefit and how they develop their system and create comparison table for divide their language and understand how to start coding and chapter 2 format is introduction and Comparison And current system Analysis.

Chapter 3:

This chapter include methodology, for this project the study used agile for this because this methodology is very useful because its easy to use and easy for change also cheap for using, this chapter include introduction and justification and using technology and tools and summery.

Chapter 4:

This chapter include Design and interface and how this study imagines and how explain the website by interface and how to design.

Chapter 5:

This chapter include implementation and testing and for this project the study uses white box and black box testing so the propose system have test case

Chapter 2

Literature Review

2.1. Introduction

This literature goal is to elicit related to the proposed project and compare existing studies. This project entails the creation of a car rental system, with an analysis based on the current system in use in Our Region. In addition, research of already existing related papers with similar features will be conducted will be undertaken on currently available systems on the market that offer similar features. Then we concentrate on the issues that they are having with the current method. This might be viewed as a critical issue that must be addressed before the development process. The developer will use all of the outcomes as information in the requirement.

2.2. Overview

Nowadays, in the world, people have 3 types of transportation such as land, air and water, specifically this project significant on lands such as bus and car. Increasing the global population and creating new road and creating more location in the world, people can't go by walk so they use car for this problem. people need to use some new thing for their transportation so they innovation car and most of the people nowadays use the car for their transportation.

The Corona Virus pandemic has wreaked havoc on economies in the entire world across all industries bearing the brunt of the losses. The transportation in our region the problem that came across as a result of the worldwide closure is huge intractable. Due to travel, restrictions around the world to stop the spread of the virus,

demand for rental cars has slowed at airports, resulting in lower worldwide aviation traffic.

The sector has been badly damaged furthermore, rising petrol and diesel prices in developing countries are expected to stifle market expansion over the projection period. In addition, rising gasoline and diesel prices in developing countries are likely to hinder market expansion over the forecast period. this was according to the [car rental market trend, 2021].

The global financial crisis has only encouraged the use of rental automobiles. Car disinfection protocols are, nevertheless, strictly followed in the aftermath of the pandemic, when sanitation and safety are most essential than ever. Individual movement segregation norms will almost increase become business conditions. In recent years, the subscription model has become the face of the car rental industry. Because this model allows customers to experience temporary ownership of a vehicle while avoiding additional fees like as maintenance and insurance premiums,

Nowadays technology is very fast progress it and this progress have an effect all the factors and this progress have an important effect on the transportation which most of the car dealerships use technology to sell and rent their car and all over the world use it which developed by the programmers, technology had effect dealership and the world but Kurdistan not been relevant to that development the proposed application try to achieve requirement that new technology provided for the entire world.

2.3. Current system analysis

There are numerous online automobile rental websites, such as Booking.com, Rentalcars.com, and Kayak.com, which I will include in this section, and this topic will define characteristics and provide an analysis for each website.

2.3.1. Booking.com

A tiny company was established in the Netherlands in 1996. Tried to become a most significant sector in the entire world in terms of booking lead to travel provider. The goal of the company was to the provided best experience for customers to have a better experience. By involving technology to sustain the traveling process. Diversity of the wealthy option for accommodation from house and hotel and villa. Booking become the most popular website around the world by making contracts with most of the hotels around the world. Evidence of that is the feedback of the travel and rating. The booking facilitated the process of booking by providing better vital service to the travel. The reliability of the booking website is 24 hours available for the entire universe. Connects million of the travel around the world. [largest selection of hotels,1996].

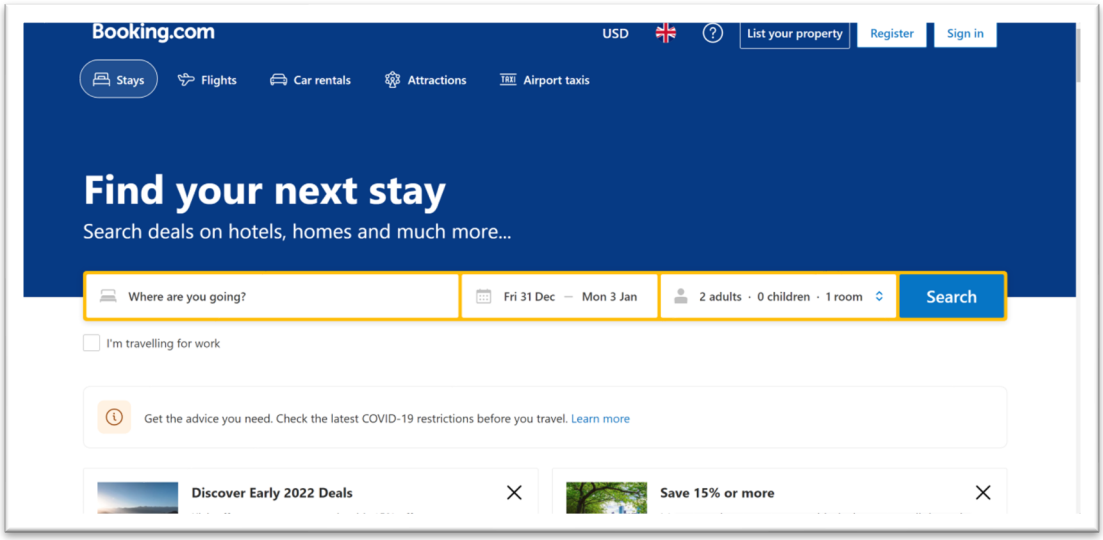


Figure 2-1 Home page

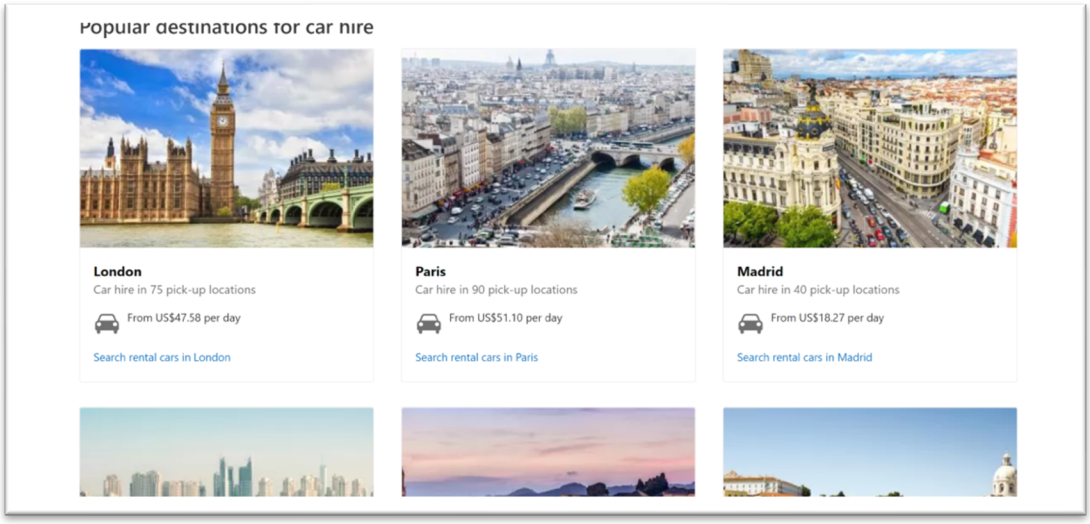


Figure 2-2 Car Rental Page

2.3.2. Rental Cars

The website's founder made it a lot easier by renting a car a lot better. The website was founded in 2004 as TravelJigasw, and after four years. the website joined the Priceline team and was rebranded as RentalCars.com. Real-time and the website has bookings a year and is present in 60000 locations across 160 countries. The website grew from a terrific team of over 1200 colleagues from 70 countries, most of them are from Manchester, United Kingdom, and who work for an online rental firm. [Cheap car rental,2004].

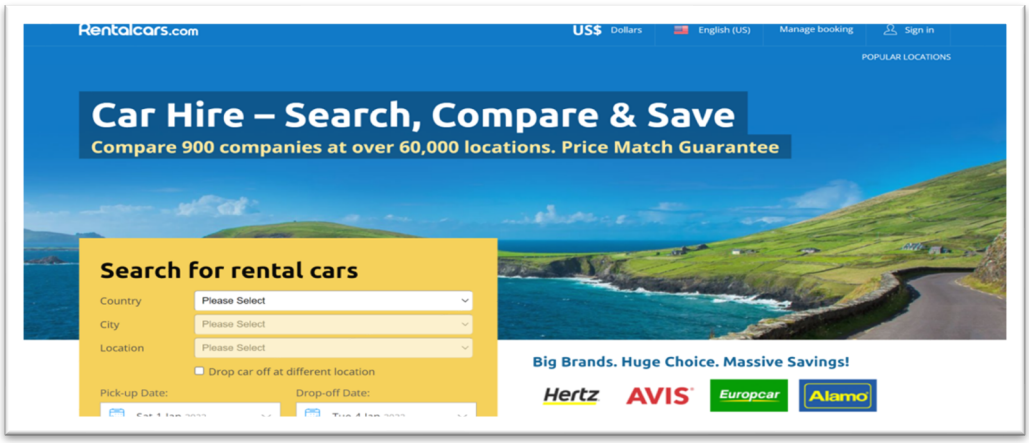


Figure 2-3 Home Page

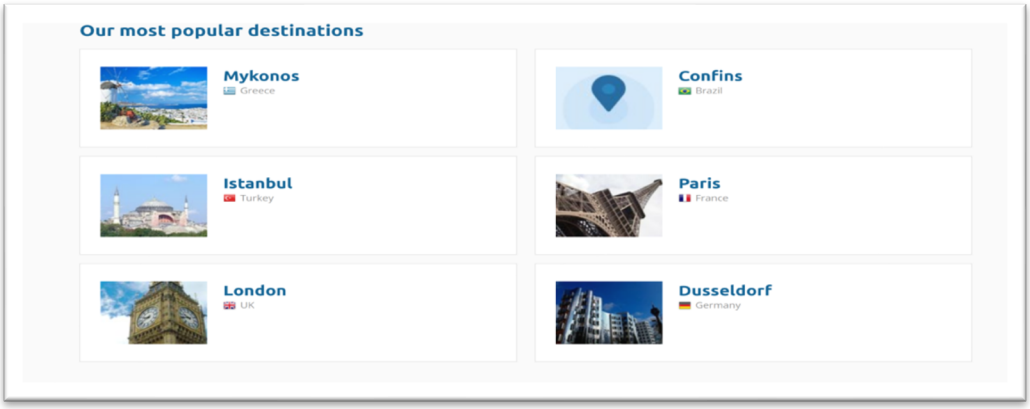


Figure 2-4 Popular Destination

2.3.3. KAYAK.com

Every year, we process billions of inquiries for travel information across our platforms, assisting millions of travelers throughout the world in making informed decisions. KAYAK analyzes for each inquiry, there are plenty of travel sites with about the knowledge on travel, accommodation, rental cars, and vacation packages. KAYAK, SWOODOO, check Felix, MO Mondo, Cheap flights, Mundi, and Hotels Combined have grown from a 14-person office to a corporation with travel-obsessed employees working across universe such as KAYAK, SWOODOO, check Felix, MO Mondo, In one location, you can find cheap flights, Accommodation. Working together, make it simple for everyone to discover the world. Booking Holdings, the world's leading online travel company, bought us in 2013. [kayak,2013].

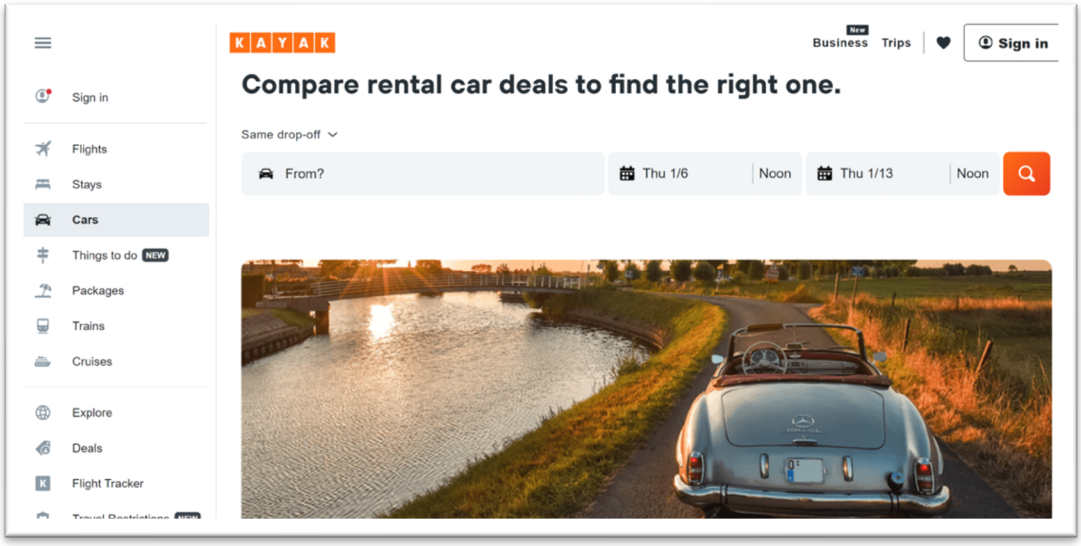


Figure 2-5 Home Page

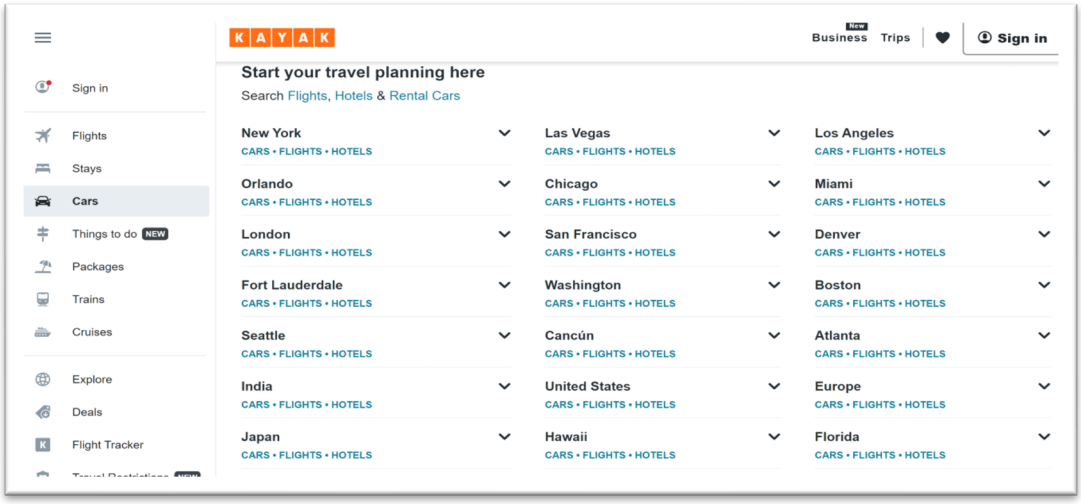


Figure 2-6 Travel Booking Page

2.4. Comparison

Most of rental system focus on booking process rather than the internal functionality of the customer like the exact position of the customer for booking a specific car , admin can view all available driver for a specific condition like event ,party or wading process , the proposed website try to increase interactivity among the website and the stakeholder for having better experience and amusement time for customer , the state us of the car while they booked they disappear, from the view

screen of the website , once it return it will be available in the screen, customer can choice the way of measuring booking either by km or per day and the user can return car before the deadline and they can get one hard copy which is invoice from the print button inside the website and one other comparison is windows application for Admin for log in because by this application admin can better manage for the system.

Table 2-1 Comparison

Features / Website	Booking	Rental Cars	Kayak	Landy Car Rental
Environment	Web-Based	Web-Based	Web-Based	Web-Based
Location	Netherlands	United Kingdom	Turkey	Kurdistan
Tool	Js,Html,Php, Mysql	Html	React-Native, Js,Html,Php,Mysql	Html-Js-Css-C#-Php-Framework
Release	1996	2004	2013	2022
Requires Registration	✓	×	×	✓
Works With Google Map	×	×	✓	✓
Notification	✓	✓	×	×

So in terms of the contribution of this project the Landy car rental project consists of many features that differentiated from the other existing systems for instance the other existing systems are specified for different countries but this one has been created especially for Kurdistan region which there's no system it's been implemented for this region And also that this system has an admin panel for a desktop application that allows the admin to manage all the data like your cars drivers rentals everything in a secure way, the system also consists of invoices for the rentals that are being made by the users so the user can get the invoice instantly after they rent a car The invoice will be downloaded as PDF to the websites Also the system has free returns which allows the user to return the rental vehicle whenever they want even if the deadline hasn't been met yet

2.5. Technologies Used

The main website has been developed by using HTML and CSS And JS for the frontend which is the interface the user interacts with, for the backend proposed system

used PHP to communicate with database with MYSQL for sending and receiving data which is hosted locale by using Xampp, an admin panel has developed for the admin to manage whole system include cars and driver and customer do some other stuff and the for this admin panel is C# and also windows form framework which is for windows application.

Chapter 3

Methodology

3.1. Introduction

The systems development methodology is marketed as a way to standardize development processes and products by improving the management and control of the software development process, structuring and simplifying the process, and defining the activities to be performed and how to apply them. It is often believed that applying a systems development methodology improves the productivity and quality of system development. However, actual evidence to support this claim is lacking. [development methodology,2017] It is generally assumed that the use of systems development methodologies increases the productivity and quality of systems development. However, this assumption is wrong. The methodology for building information systems is the basis for organizing, planning, and regulating the development process. Over time, many alternative frameworks have emerged, each with its own advantages and disadvantages. A single system development process may not be suitable for all projects. Many technical, organizational, design and team issues are being addressed. Each of the existing methodologies is best suited for a particular type of project and we use the methodology software development for our projects. We use the agile method at this stage of the website because it provides advantages to the website, which we will discuss in the next section.

3.2. Methodology Choice and Justification

Agile is a project management method that divides a project into milestones. This requires continuous collaboration with stakeholders and continuous improvement of the project at all levels. When work begins, the team goes through planning,

execution, and evaluation cycle. It is important to maintain constant communication with team members and project stakeholders.

- People and their relationships with procedures and tools.
- Working software over detailed documentation
- Customer collaboration over contract negotiation
- Adapting to change while sticking to a plan (Versatile and Robust Project Management Software. [9]

Agile software development enables teams to respond quickly to changing requirements without sacrificing delivery time. Agile also helps reduce technical debt, increase customer satisfaction and deliver better products. Here is some reason that is why I choose Agile:

1. Reduce Technical Debt
2. Easily and Quickly Adapt to Change
3. Agile SOFTWARE Development And Test Minimize Risk
4. Higher Quality Product
5. Predictable Delivery Dates
6. Improved Stakeholder Participation
7. User-focused Testing
8. Greater Customer Satisfaction
9. Better Project Control
10. Cheaper than other

Agile have some attribute like this 10 point is write before reduce technical debt is the result of prioritizing speedy delivery over perfect code and it's easy and quick to change anything developer want and it allows the developer to test minimize risk if the system has also agile have higher quality product than other methodology, developer can know how the system work in the point 5 which is predictable delivery dates, agile have a better connection to stakeholder than other, customer more

satisfaction with agile, the developer can control the system better for any change or any cancelation and agile need less money than other.

3.3. Phases within the methodology

The Agile software development life cycle contains six phases, which describe in this part, developer explains Examines each of these Agile phases in greater depth.

This are the activates that has been implemented during the development of the system one of the requirements that I get it from stakeholder is to do invoice part and one other is goggle map and all the requirement from stakeholder is manually by using the website on my computer.

1. Develop idea: The first level is to give you a notion. The scope of a product proprietor`s assignment can be described here. They will prioritize the maximum crucial chores if there are many. The product proprietor will meet with a patron to talk about vital necessities and report them, which includes which capabilities can be supplied and what effects ought to be expected. It's crucial to make the necessities as minimum as feasible due to the fact they may be improved later. The product proprietor may also estimate the duration and price of destiny tasks throughout the idea level. Before they start operating on an assignment, they'll behavior an intensive have a look at to assess whether or not it's miles feasible. Once the concept is defined, software development can begin. Users can check the readiness of their colleagues, choose the most talented people for their projects, and provide them with the tools and resources they need. After that, you can start the design process. The developer creates a mockup of the user interface and outlines the project architecture.
2. Get additional feedback from stakeholders to correctly specify the requirements in the diagram and ensure that the functionality of the product is part of the initial steps. During the design phase, regular inspections ensure that all requirements are met.

3. Repeat the following steps are called the design. This is usually the step of most time media because they need more work. The goal is to construct the first repetition or sprint that constructed the product function. The latest version may include more features and modifications. This step is very important in agile software development because developers can quickly build working software and change it to meet customer requirements.
4. Product launch: The product is about to be released. The QA team, on the other hand, must first run a series of tests to ensure that the program is fully functional. This member of the Agile team tests the system to make sure it is bug-free. If a potential bug or weakness is discovered, the developer will fix it as soon as possible. This step includes training users who need more documentation. Once all of this is done, the final iteration of the product can go into production.
5. Service: Customers may use the program after it has been fully shipped. Now the result of the work has entered the maintenance phase. During this time, the software development team will continue to provide support to ensure that the system is working properly and new defects are fixed. They will also provide additional training and make users comfortable using the product. New iterations may be created over time to provide updates and new features to existing products.
6. Retired Products may be disposed of for one of two reasons: It has been replaced with new software, or the system has become obsolete or incompatible with your organization over time. First, notify the user that the software has been disabled by the software development team. If a replacement is found, the user is transferred to the new system. Finally, the Program Developer fulfills all remaining responsibilities at the end of life and end of support for the current version.

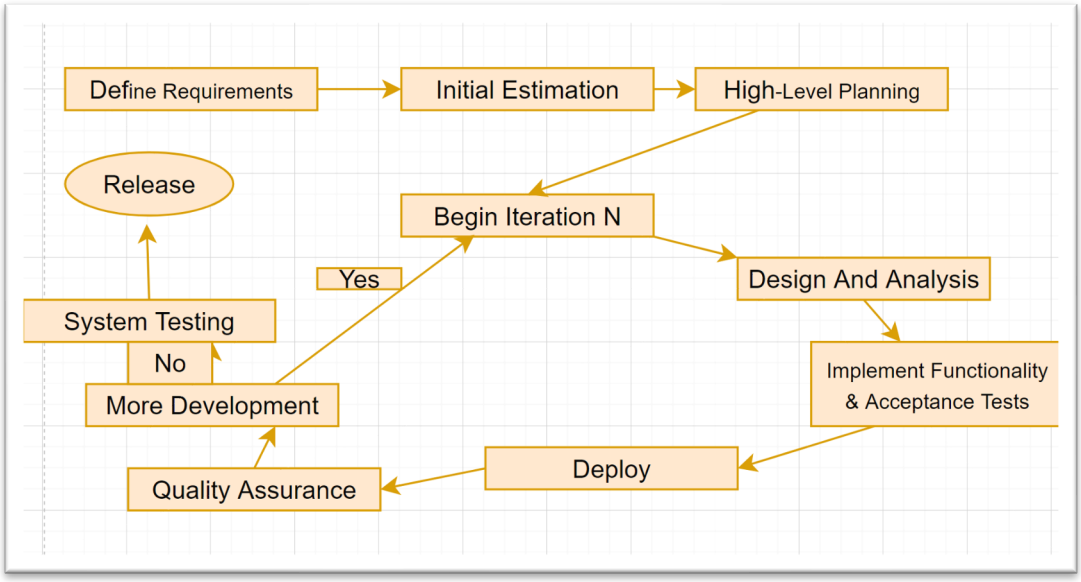


Figure 3-1 Methodology Flowchart

3.3.1. Design Modeling

1. The Unified Modeling Language (UML) is a graphical illustration layout for visualizing, defining, developing, and documenting software program structures. It consists of a fixed of standardized diagram codecs that make it simpler to arrange complicated data, processes, and structures in a clean and intelligible manner. [10] It is a set of standardized diagram codecs that make it easy to arrange complex data, processes, and structures in a clean, comprehensible manner. Here is the UML diagram for the auto condominium website. Booking has a reference to vehicle component and account with all characteristic that's Booking ID and Duration of reserve and the fee for the Time and Date for his or her reserve and the auto that consumer preference is.
2. Use Case Any scenario in which a system is used to achieve a specific goal for a specific user is called a scenario. With all the use cases put together, there are all practical ways to use the system. A use case is a series of steps the system takes to produce an observable outcome of value for a given user, and a rental car use case for users and administrators is: Users must log in and then select a car Category. They want and can view reservations with all details about users and rules on the website.

3. Activity Diagrams It shows the sequence of events in a process, including sequential and parallel operations, as well as decision making. Typically, task diagrams are created for a specific use case and can display many events. Below is an activity chart for a website that requires users to register on the website after they can book or leave feedback and car information. Alternatively, if a user has forgotten their password, the website can correct and restore it via email.
4. Gantt Chart Represents a time-related visual representation of activity. Timeline and project management tasks are converted to horizontal bar charts showing start and finish dates, dependencies, schedules, and due dates, as well as the number of tasks completed at each stage and task owners. Here is a Gantt chart that shows how a project is progressing over time and how the project is managed, in figure 3.2 is the schedule.

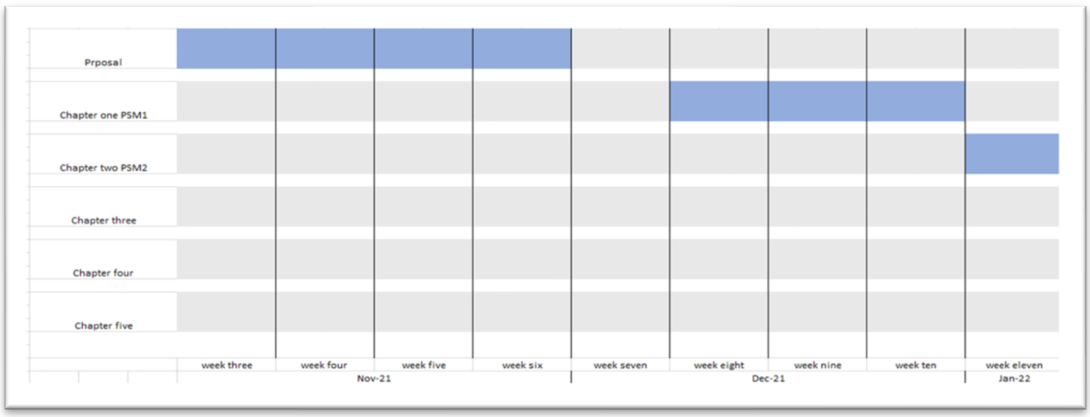


Figure 3-2 Gantt Chart

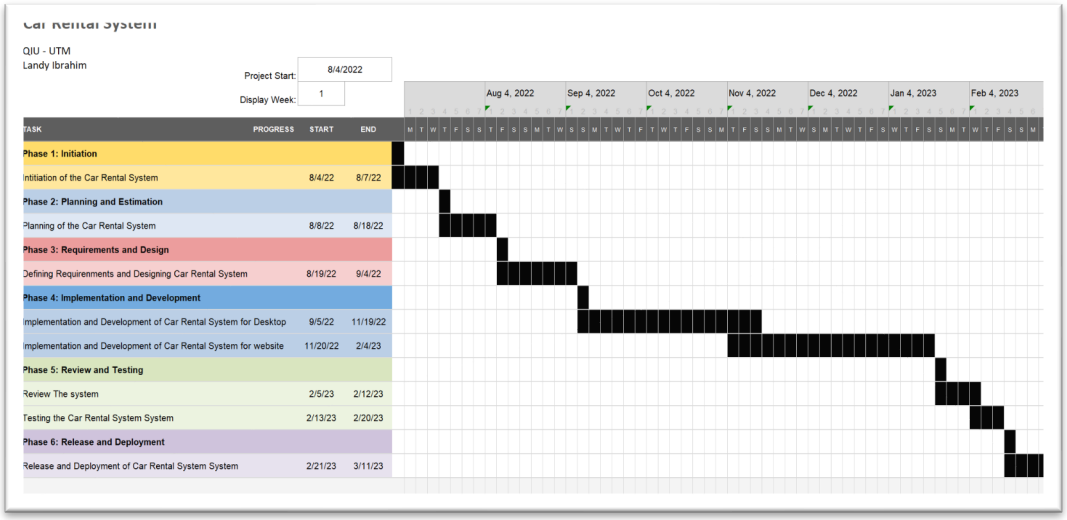


Figure 3-3 The Whole Gantt Chart

3.4. The Technology or Tools Used to Develop the System

In this section, the developer will provide what they use in the website and they work on how many languages of the computer to develop this system first one is database second one for the front-end Html and CSS and JavaScript and for the backend is PHP and for the windows application I have used C# for admin log in and full detail for admin.

- Database: MySQL is a relational database management system that is open-source, quick, and flexible, and is commonly used with PHP.
    - MySQL is a database management system that is used to create web-based software applications.
    - MySQL is a database that can be used for both small and large applications.
    - MySQL For relational databases, is a database management system.
    - MySQL is a fast, dependable, flexible, and user-friendly database.
    - MySQL supports standard SQL.[11]
- Frontend: HTML (Hyper Text Markup Language) is the most widely used language for organizing and formatting web pages and other content on the

Internet. It is often combined with Cascading Style Sheets (CSS) and JavaScript to create fully responsive web pages that look great on any device.

  - Body paragraphs, headings, hyperlinks, bulleted/numbered lists, blockquotes, italicized, bolded, and other text elements are identified by HTML, while CSS decides how those elements appear visually on the frontend. Pop-ups, animated graphics, scrolling banners, and other dynamic components can all be added to a page using JavaScript.[12]

- Design: Create a website or adapt an existing web template if you have a good understanding of HTML.
  - Become a web designer - You'll need to know HTML and CSS if you want to work as a professional web designer.
  - Understand the web - You must be knowledgeable with HTML if you want to improve the speed and performance of your website.
- CSS: CSS as if it were a computer dress code CSS is mostly used to describe how web pages should appear. Even better, CSS and HTML may be easily separated, making the dress code easier to access, amend, and change the complete design of your website quickly. You can modify your CSS, much like a get dressed code at school, and your kids` look will extrude as well. Style sheets assist you to speedy extrude complete web sites as you choose, just like how a style fad lets in humans to extrude with the instances at the same time as but closing the equal humans, CSS has the cap potential to cascade, that is a virtually cool feature. Each fashion you outline contributes to the general theme, however, you may override previous patterns with the maximum current fashion.[14]
- JavaScript is a cross-platform object-oriented programming language for creating dynamic web pages. With a more powerful server-side JavaScript version like Node.js, you can do more than just upload files to your website (i.e., real-time multi-computer collaboration). JavaScript can connect to native environment objects within the host environment (such as a web browser) and control objects programmatically.
- C sharp the computer language C# (pronounced "See Sharp") is modern, object-oriented, and type-safe. C# enables developers to create a wide range of safe and robust.NET applications. C# comes from the C family of languages, so C, C++, Java, and JavaScript programmers will be right at home. In C# 8

and before, this tour provides an overview of the language's major components. Try the introduction to C# tutorials if you wish to learn the language through interactive examples and from this one, I had created one windows application for the system.

- Backend: PHP is a server-side programming language that is commonly used in web development. PHP is used to create popular websites such as Facebook, Yahoo, Wikipedia, and our Study tonight.
    - Because PHP is so easy to understand, develop, and install on a server, it has been the preferred language for beginners for decades.

We will cover all of the main ideas of the Php language in this tutorial series, from elementary to advanced, as well as offer some ready-to-use, useful code snippets for beginners to get started with their web development project.

3.5. System Requirement Analysis

Requirements for Hardware and Software

The appropriate hardware and software requirements must be determined to successfully construct a decent quality application within the timetable that was established in the Gantt chart. Choosing appropriate hardware and software technologies can aid in making the Car Rental website creation process more efficient and adaptable.

The following are the hardware requirements' minimum specifications:

a) A personal computer having a 64-bit operating system and 2.00 GB of RAM.
b) A smartphone with 512MB of RAM and an Android operating system.
c) A 128kbps Internet connection is required.

The following are the Software requirements' minimum specifications:

- Ionic Framework is required for developing, compiling, debugging, and running the application.
- Microsoft Word 2016 is the most recent version of Microsoft Word. To keep track of the project report, SRS, and SDD.
- Microsoft PowerPoint 2016 is a presentation software program. To make the slide for the presentation.
- Microsoft Excel 2016 is a spreadsheet program. To create the Enterprise Architecture Gantt, Chart The UML diagram and system architecture must be designed and created.

3.6. Chapter Summary

Summary of the chapter this phase include methodology which is an important part of system development the first part introduced what is a methodology and which kind of method logy website provides it, second part developer choice agile methodology for the website and justify why it's better than other methodology, the third part about the phase of agile and attribute of agile the developer explains what is agile and why it's good for the website, part 3 related design modeling which developer make some design about (UML-Use Case-Activity Diagram-Gantt Chart), 4th part include the coding which kind of code or which language developer use to develop their project and what is used for front end and backend also for story information,5th part include that device that works on the website and here is the summary of the project.

Chapter 4

Requirements Analysis and Design

4.1. Introduction

System Analysis and Design is a word used in the business world to define the process of evaluating a business problem in order to improve it by implementing new procedures and methods. The purpose of system analysis and design is to reshape businesses, improve performance, and achieve profit and growth targets. The emphasis is on real-world systems, subsystem interactions, and their contributions to accomplishing a common goal. System Analysis and Design Overview, System analysis examines the system and determines how well the system is performing, the changes required and the quality of the results. [Dharminder Kumar, 2017], It is the process of collecting and analyzing information, identifying bugs, and breaking down a system into its component parts. Systems analysis is used to study a system or its components to discover its purposes. It is a problem-solving technique that improves a system and enables all system components to work together to achieve system goals. It is the process of collecting and analyzing data, looking for defects, and disassembling a system into parts. Systems analysis is a method of examining a system or its components to determine its objectives, A method of problem solving that improves the system and ensures that all system components work together to achieve system goals.

4.2. Requirements Analysis

This section explains about functional and non-functional requirements of the Car Rental website.

4.2.1. Functional Requirement

The functional requirements show the behavior of the system and it was analyzed from the conducted survey. Besides, the functional requirement was being constructed by using a UML diagram that includes use cases, sequence diagram, and activity diagram. There are several basic requirements for this system as shown below:

Customer:

a) The customer will be able to sign up for an account via the website.
b) The consumer will be able to access the application by entering a unique username and password.
c) Before hiring a car, the customer will be able to examine a list of available cars on the internet.
d) The system will be able to get feedback from the customer.
e) Customers will be able to see what cars are available.
f) Customer shall be able to search for specific car.
g) Customer able to decide driver for their booking.
h) Customer able to Booking a car.
i) Customer can return car before the deadline of the booking.
j) Customer can print the hardcopy of the rented process – Invoice.

Admin

a) Admin can login to the windows application.
b) The admin can view feedback regarding the issue in the admin panel.
c) The can view the rented car from customer.
d) The admin can Add-edit-delete a Driver from the admin panel.
e) Admin able to add-edit-delete a Car.
f) Admin can view customer Map inside Google framework and car GPS.
g) Static Admin can add-edit-delete new admin to the system.
h) Admin can view history of the customer and rented car.

4.2.2. Non-Functional Requirement

4.2.2.1. Security

a) Login requirement
b) Login requirement

4.2.2.2. Usability

a) Easy to understand

4.2.2.3. Performance

a) Responsive time

4.2.2.4. Reliability

a) Application availability: The application will be available for users 7 days of the week, 24 hours a day

4.3.Diagram

4.3.1. Use Case Diagram

The use case was used to show the interaction between system and actor, here are the use case that show connection between system and actor how they log in it and how the process is done.

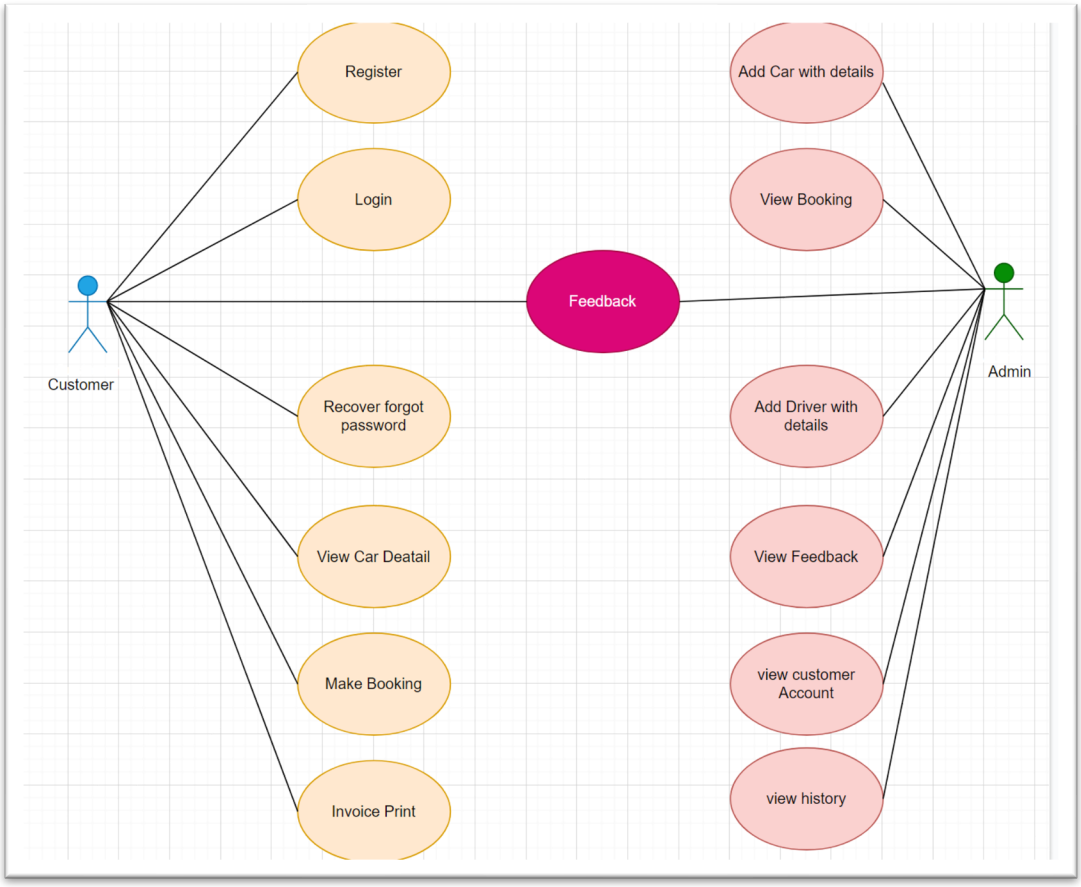


Figure 4-1 Use Case Diagram

This is a use case diagram of the proposed website that includes Stakeholders and the relation and functionality of each stakeholder.

4.3.2. Activity Diagram

To show the workflow of a process from one activity to another, an activity diagram has been drawn. The activity diagrams drawn are the workflow of register, login, rent a car, report car problem, manage car rent detail, and view the rental report.

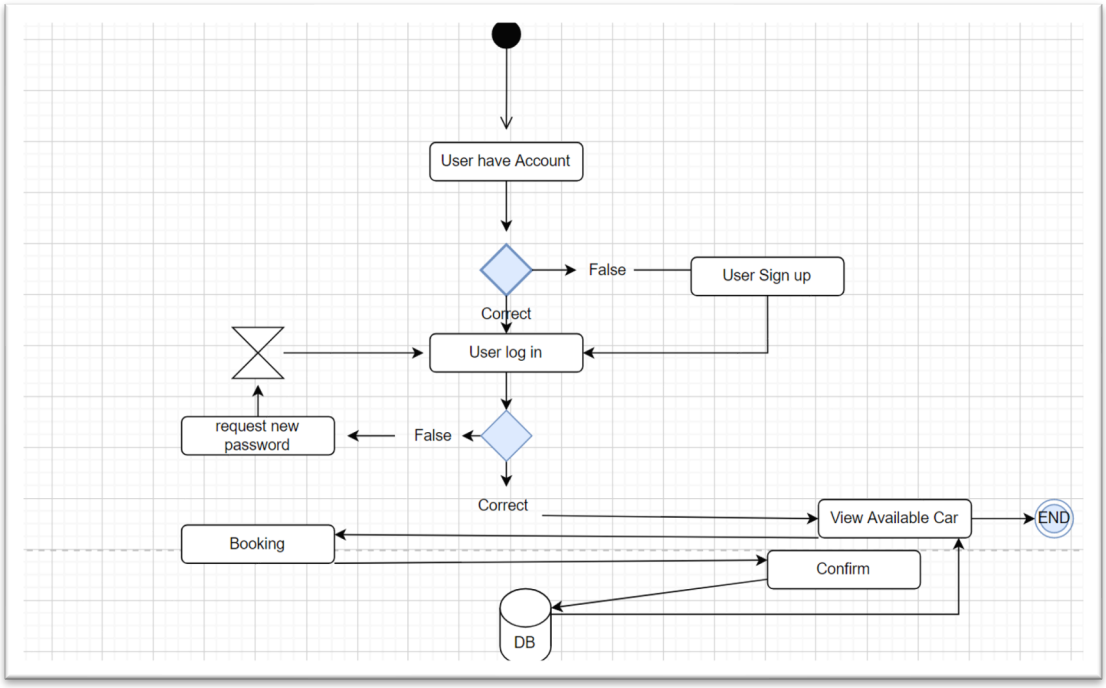


Figure 4-2 Activity Diagram 1

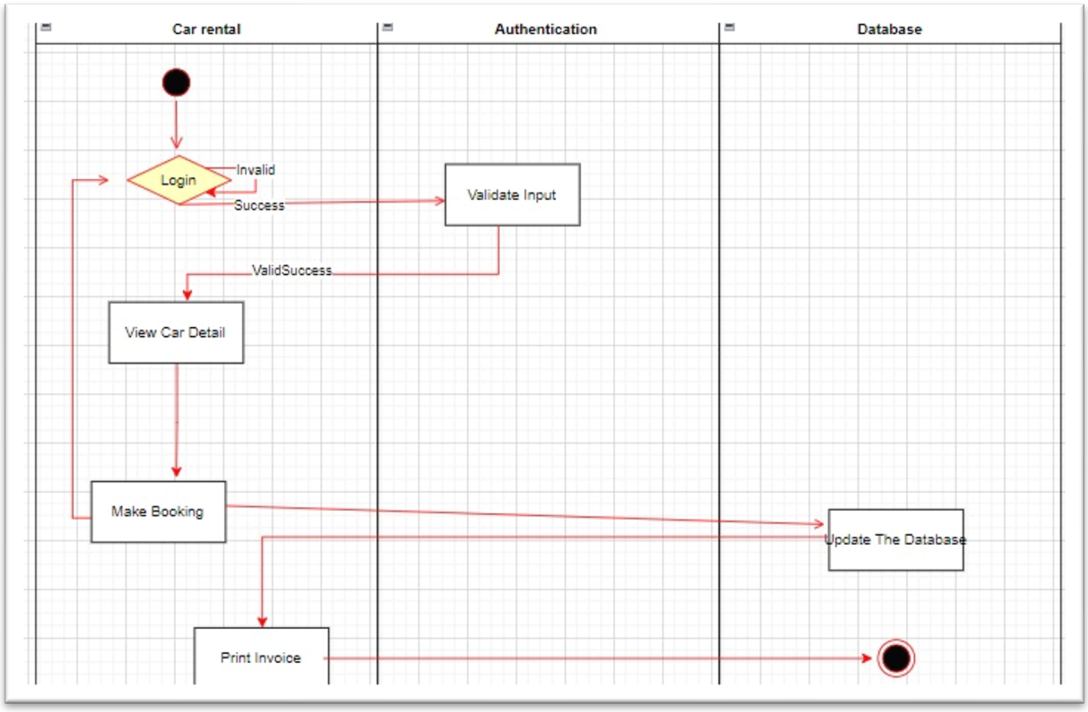


Figure 4-3 Activity Diagram 2

This is an activity diagram of the validation part of the website and exact process

4.3.3. Sequence Diagram

To show the behavior and the interaction among classes of admin and customer, a sequence diagram has been drawn.

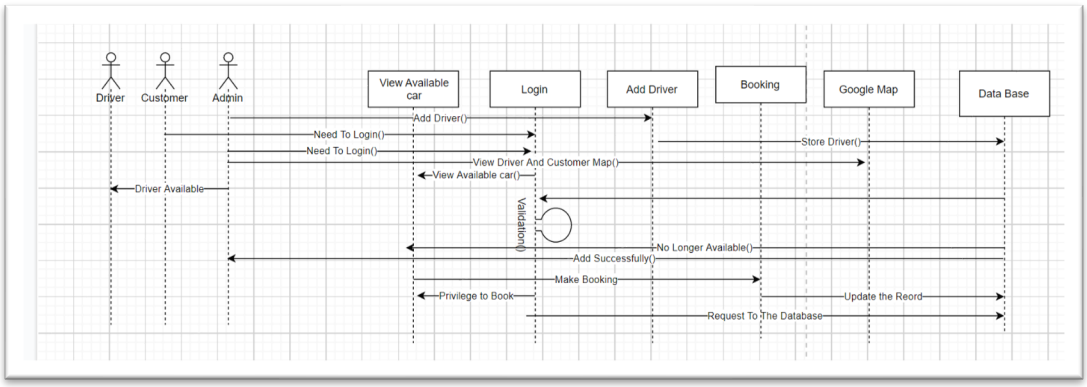


Figure 4-4 Sequence Diagram

This sequence diagram of the system for all stakeholders

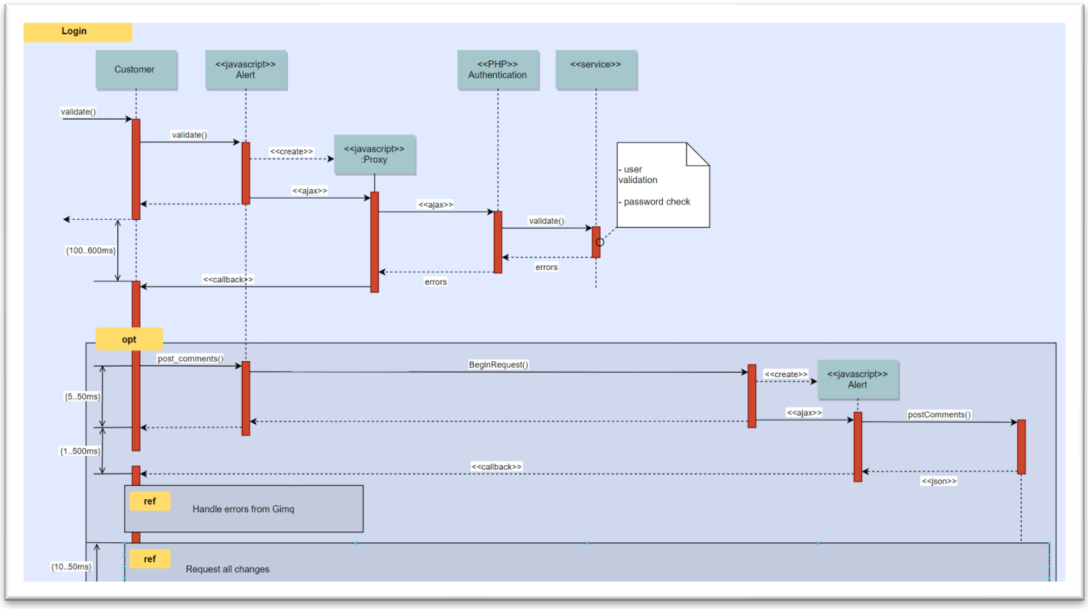


Figure 4-5 Customer Login Sequence

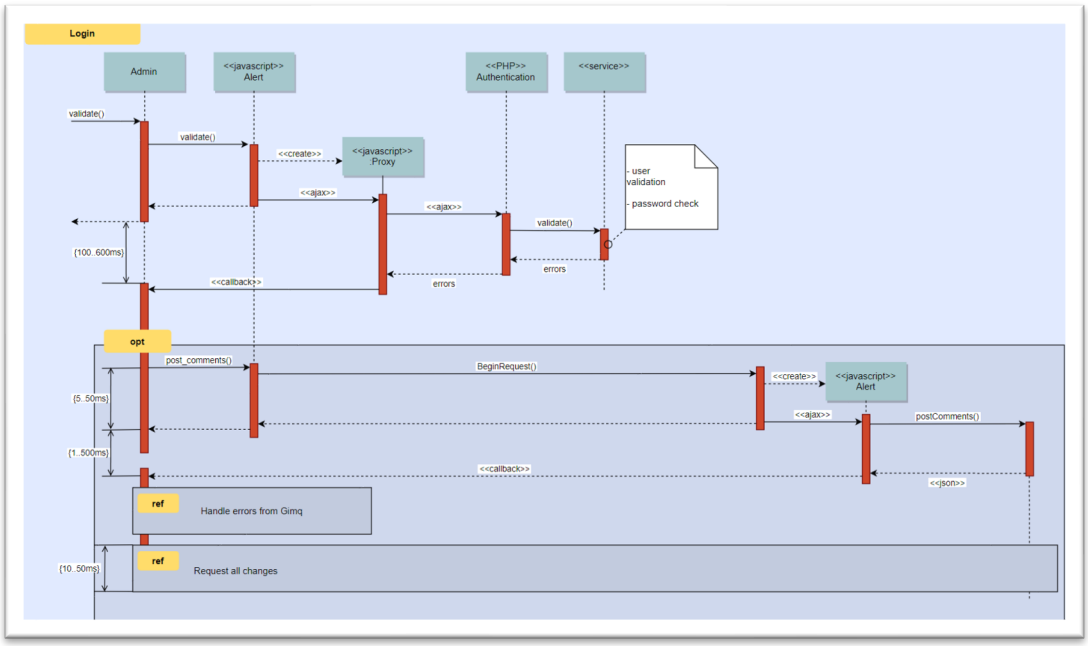


Figure 4-6 Admin Login Sequence

4.3.4. Class Diagram

Within the Unified Modeling Dialect, a lesson graph is a type of inactive structural chart that depicts the structure of a framework by displaying the system's classes, traits, operations, and connections among objects.

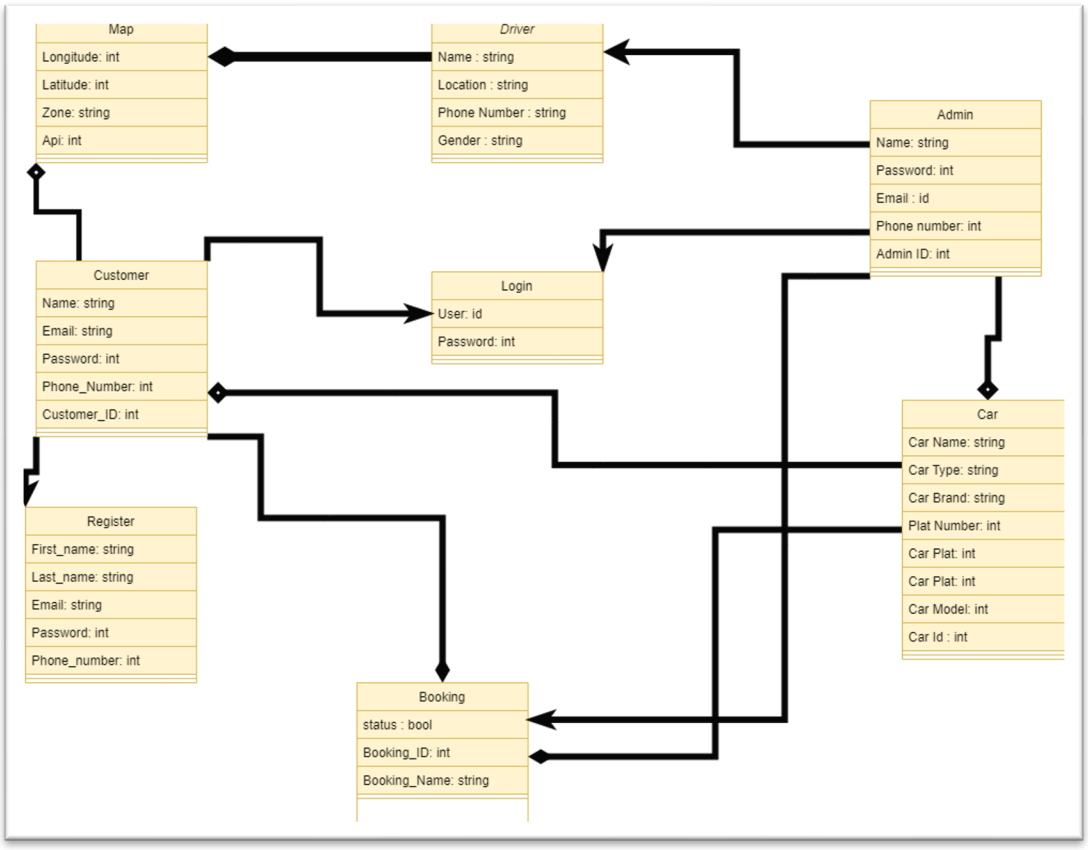


Figure 4-7 Class Diagram

4.4. Database Design

This section will focus on the UML class diagram and system architecture diagram. UML class diagram showcases how the data that belong to a different part of the system are connected and have relations to each other. However, the architecture diagram showcases how hardware and software are connected and works in real-time. Figure 4.11 shows the UML Diagram and 4.12 showcases the Architectural Design.

4.4.1. Entity relationship diagram

Database design for car rental system is created by Entity Relational Diagram (ERD)

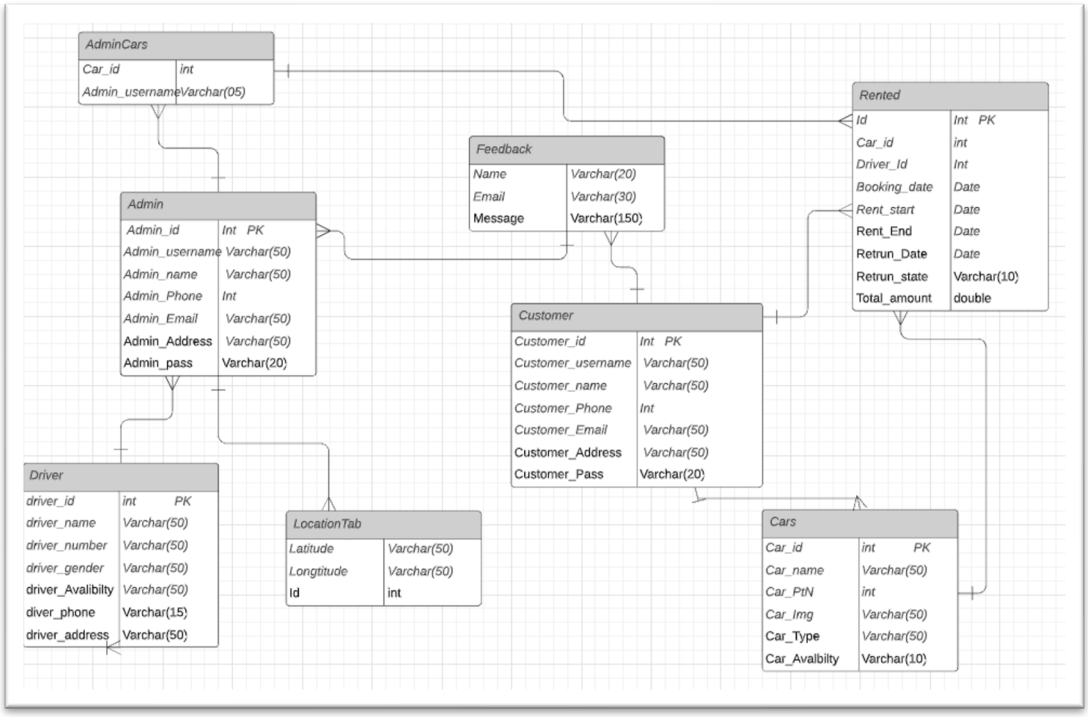


Figure 4-8 ERD Diagram

4.4.2. System Architecture

The system architecture is an art of modeling architecture for an overview of a system.

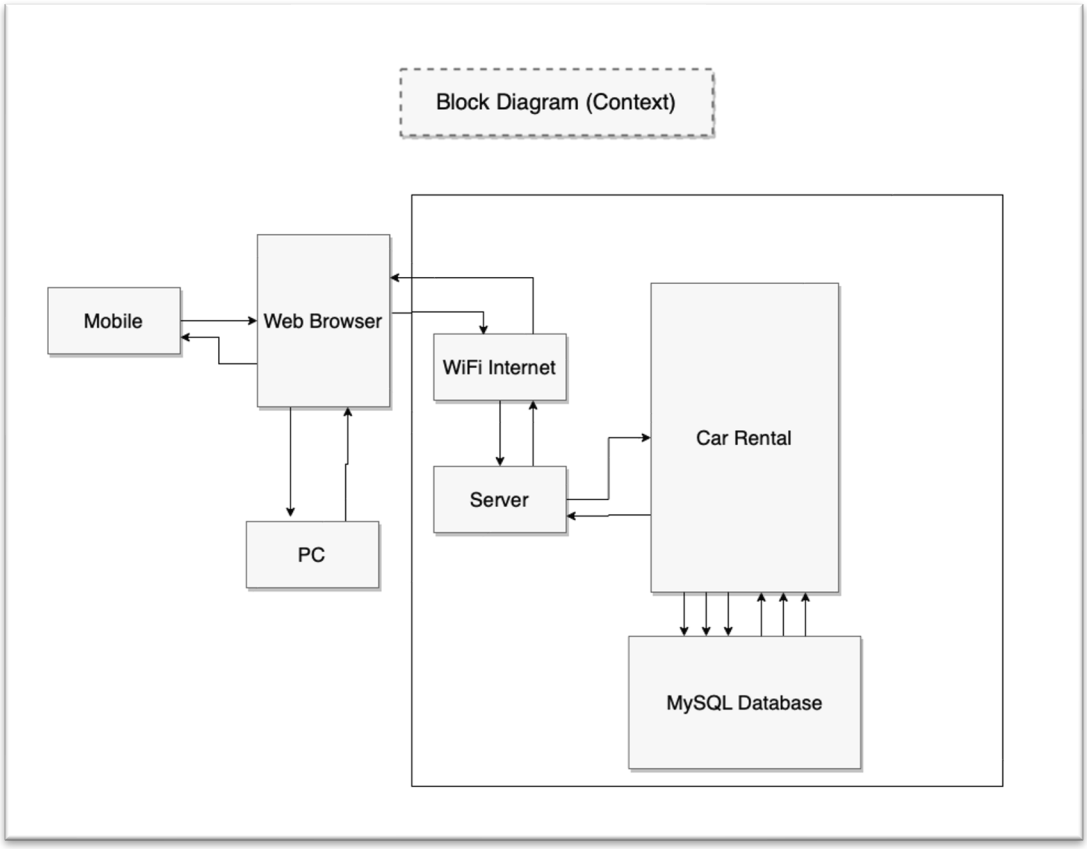


Figure 4-9 System Architecture

4.5. Interface Design

Here shows an example of a user interface for a Car rental system. The structure of the interface must be user-friendly and easy to understand. below is the home page for the interface which includes cars picture.

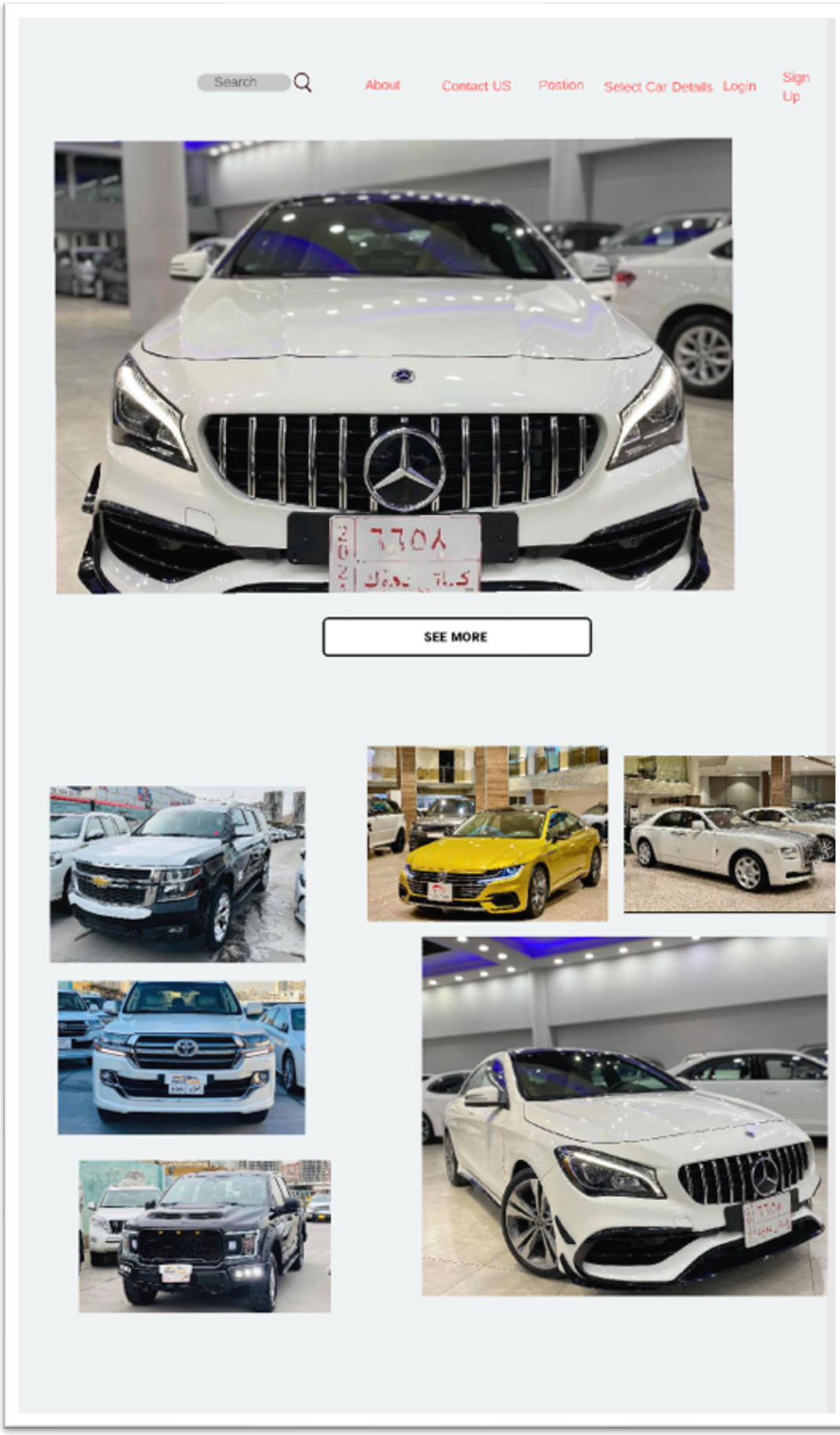

Search
About
Contact US
Postion
Select Car Details
Login
Sign Up
SEE MORE

Figure 4-10 interface of home website

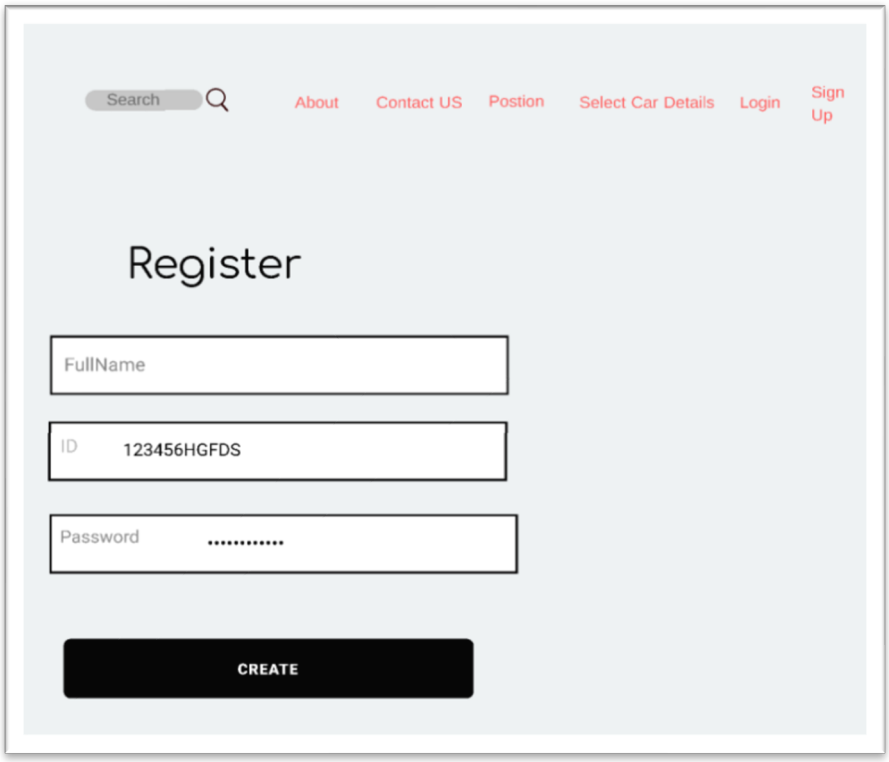


Figure 4-11 interface for register

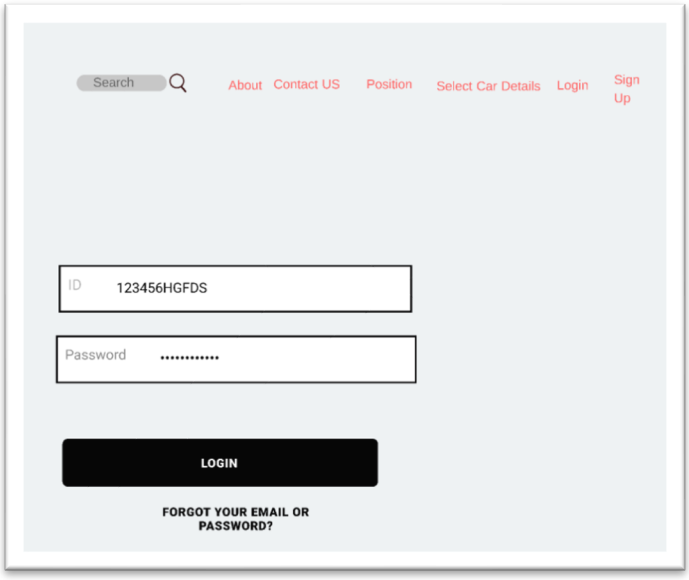


Figure 4-12 interface for Login

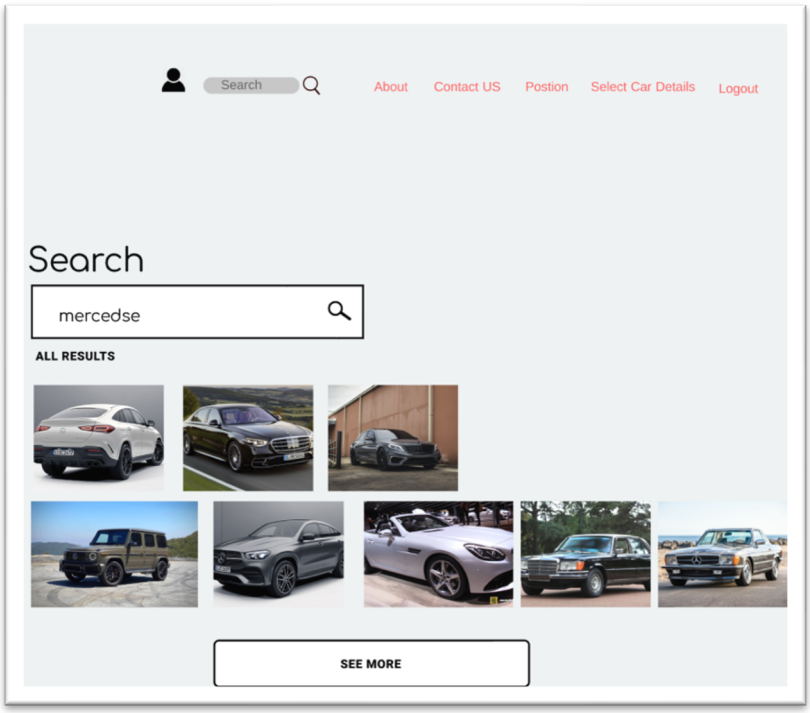


Figure 4-13 interface for Search Page

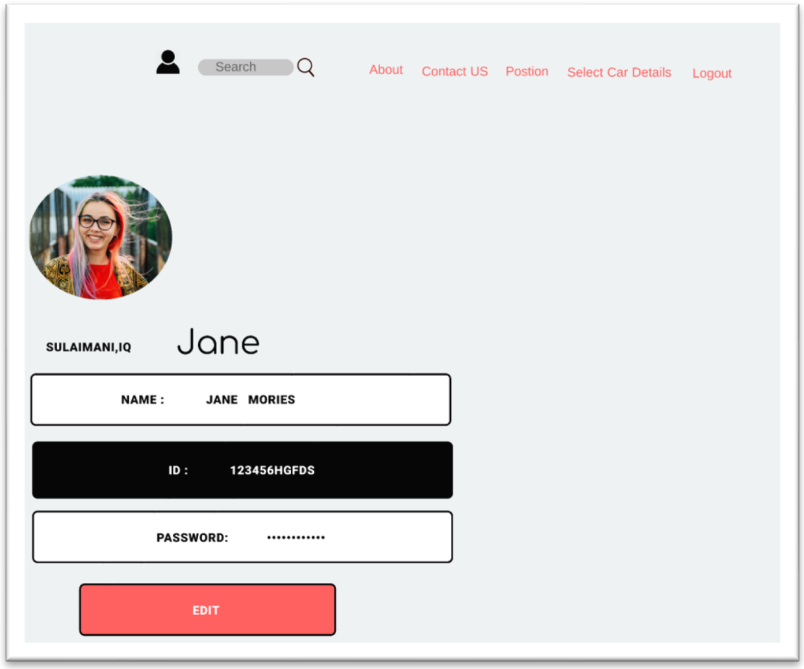


Figure 4-14 interface for Profile Page

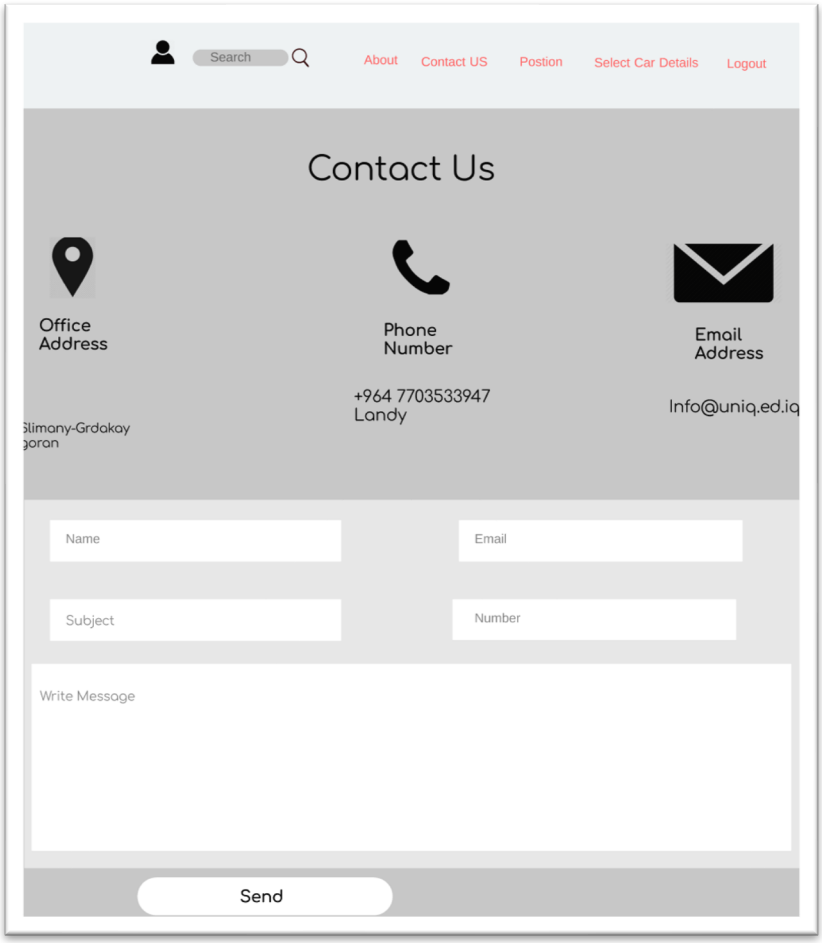


Figure 4-15 interface for Contact US Page

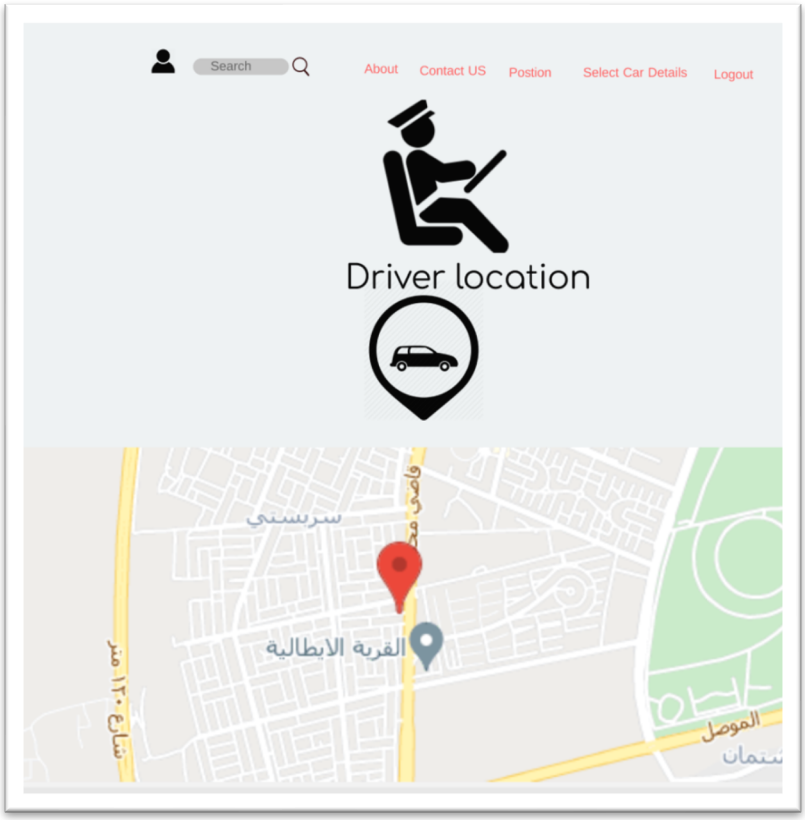


Figure 4-16 interface for Driver Map

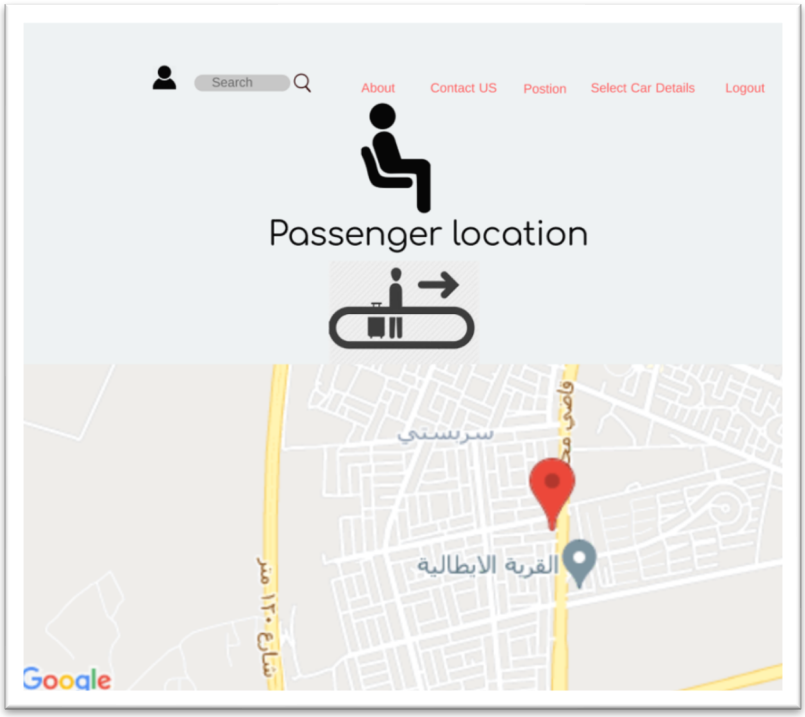


Figure 4-17 interface for Passenger Map

4.6. Chapter Summary

This chapter includes UML diagrams which divide by Use case which is for connecting between customer and admin how they work and another diagram is the Activity diagram which leads the user to the system how the system work and the ERD diagram for the database design which include id and email and other attribute and other one is a sequence which is the system manually how it works.

Chapter 5

Implementation, Testing, Results, and Discussion

5.1. Introduction

Testing and implementation is approach to handling defect inside the source code and the UI of the system for providing better quality and assuring the performance of the system and the functionality of the system working properly Car rental system for frontend this tools apply framework and template , the framework has been used for proposed system , bootstrap for designing UI of the application and we have used j Query for logic function of the input , and used template like angular JS and W3Css , for backend the proposed website has implemented PHP and for the database has used MySQL for the database C# ide has been used for admin panel, also apply testing principle for the use case of proposed website, testing principle starting from user acceptance testing and system testing such as white box and black box.

5.2. Coding of System Main Functions

Car rental system is web-based application has been implemented using HTML CSS JS PHP MySQL for the data base and C# ide for admin windows application.

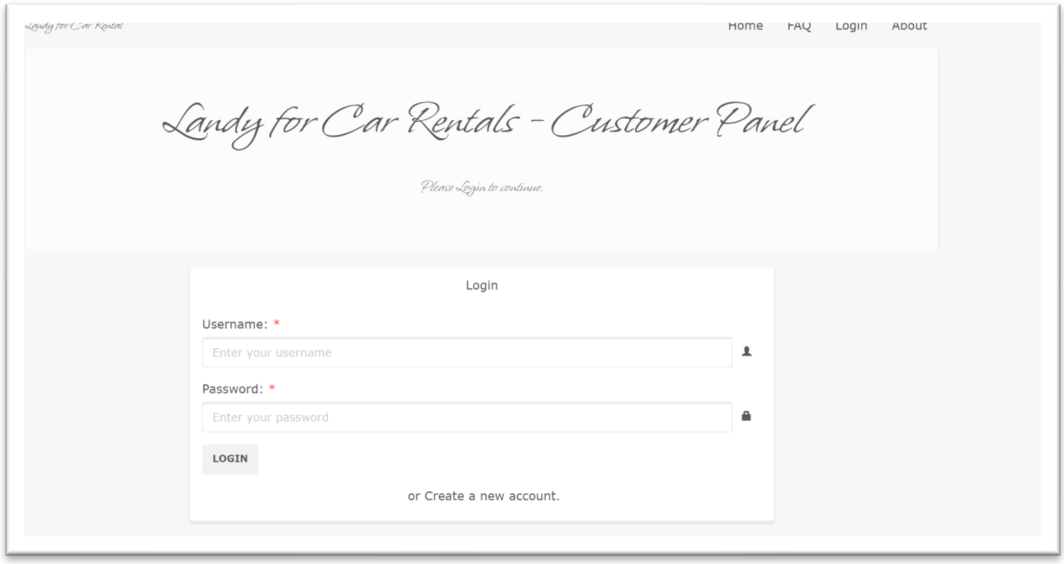


Figure 5-1 Login Interface

5.2.1. Login

Login functionality provide for customer and Admin they can access the system use the features of the system for their purpose, the data will be authenticated throw MySQL data base.

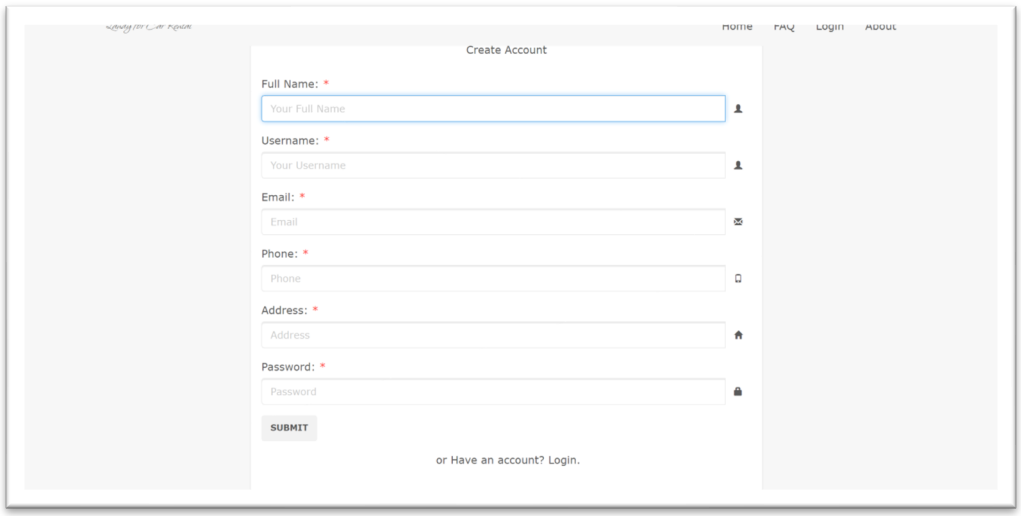


Figure 5-2 Register interface

5.2.2. Registration

The registration process is when a customer registers their account to access the system. You must fill in information such as username, password, name and phone number and address with full name. However, if the customer enters an existing username, the registration will not take place and he will have to re-enter the username.

5.2.3. Booking Cars

Booking functionality provide accessibility for the user make their intend car booking by filling up the requirements credentials such as start date and end date also car type and charge type with select driver when the booking went successfully user can have a copy of the booking for evidence by download it using PDF file.

5.2.4. Return Car

User can view the booked car and the starting date from ending date, user can view the credential of the booking such as plate number- name of car – model of the car and driver name also charge type user can return the car by clicking on the button if the deadline is past user penalty is about $100.

5.2.5. Google API GEO Location

API has been used for providing customer location for the driver they can easily pick up the customer and have a delightful time.

5.3. Interfaces of System's Main Functions

Interface design is important because it is the main interface between the user and the computer. Therefore, renting a Landy car rental requires a user-friendly interface for each system. User-friendly interfaces can be displayed as simple, clear, and interactive interfaces. Figure 5.1 above shows some terrestrial car interfaces.

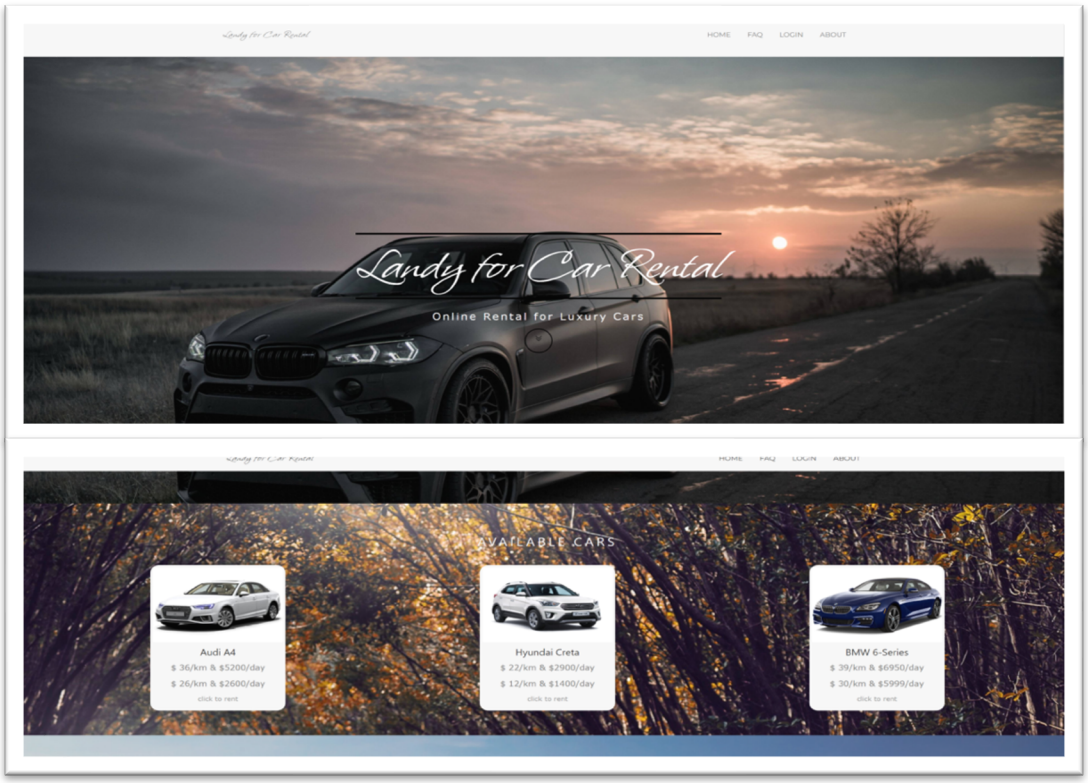


Figure 5-3 Home page of the website

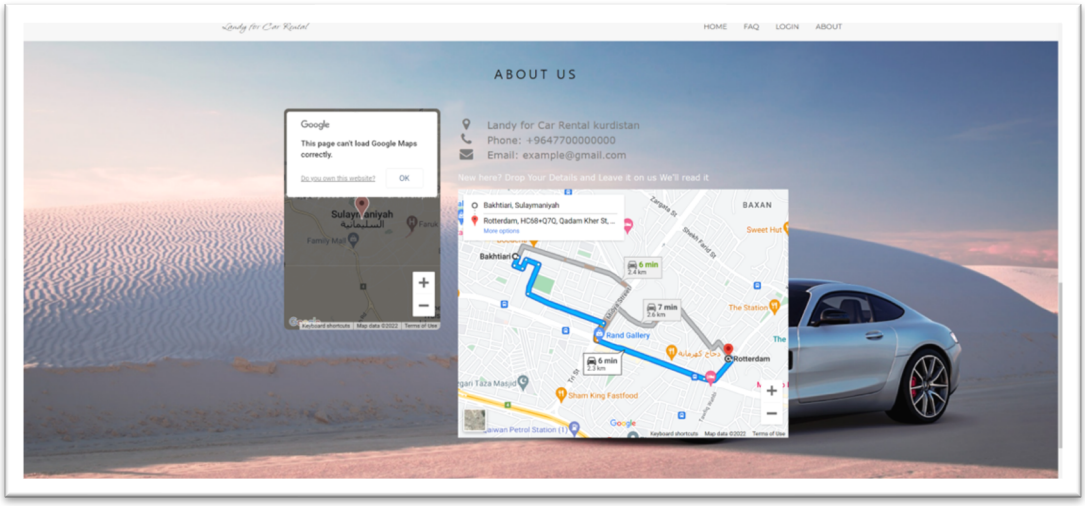


Figure 5-4 Google map Interface of Car Rental

5.4. Testing The System

Testing the system is important when designing a computer, as it can detect the initial signs of errors and allow the system to operate to its specifications. To test the system, it consists of three types of tests: the black box test, the white box test, and the user acceptance test.

5.4.1. Black-Box Testing

Black box testing, also called behavior, is an experimental method in which the experimenter does not know the structure or design of the interior. Used to monitor system performance. The test item contains the input and output data for each process to monitor the behavior of the functions. The table below shows a black box checkbox where users must enter their username and password to access the system.

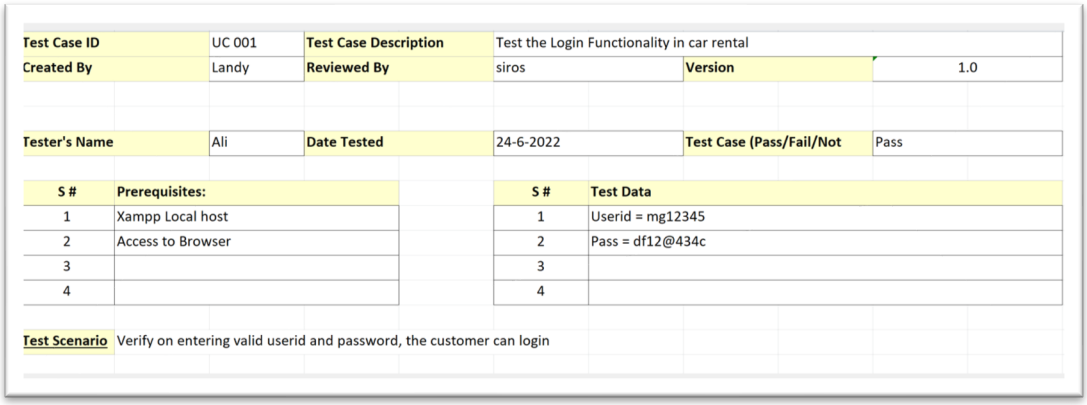
Table 5-1 Black Box Testing on Login Page

Input	Expected Results	Actual Results	Status
Valid username and password, click "Sign In" button	Successful alert message displayed and redirect to home page.	Successful alert message displayed and redirect to home page.	Pass
Invalid username and/or password, click "Sign In" button	Unsuccessful login alert message displayed.	Unsuccessful login alert message displayed.	fail

5.4.2. White Box Testing

White box testing is an experimental method that determines the structure or internal structure of a tester. The white box test for the log function is shown in the figure below, so the internal structure is checked using the cyclomatic complexity (CC) formula.

Table 5-2 Table of white box testing



Test Case ID	UC 001	Test Case Description	Test the Login Functionality in car rental		
Created By	Landy	Reviewed By	siros	Version	1.0
Tester's Name	Ali	Date Tested	24-6-2022	Test Case (Pass/Fail/Not	Pass

S #	Prerequisites:	S #	Test Data
1	Xampp Local host	1	Userid = mg12345
2	Access to Browser	2	Pass = df12@434c
3		3	
4		4	

Test Scenario Verify on entering valid userid and password, the customer can login

Node	Flows
1	Fill in login form
2	This. Authentication with User And Password (username, Password)
3	If (user)
4	This. Redirect to home page
5	This. Alert (invalid credential)
6	End

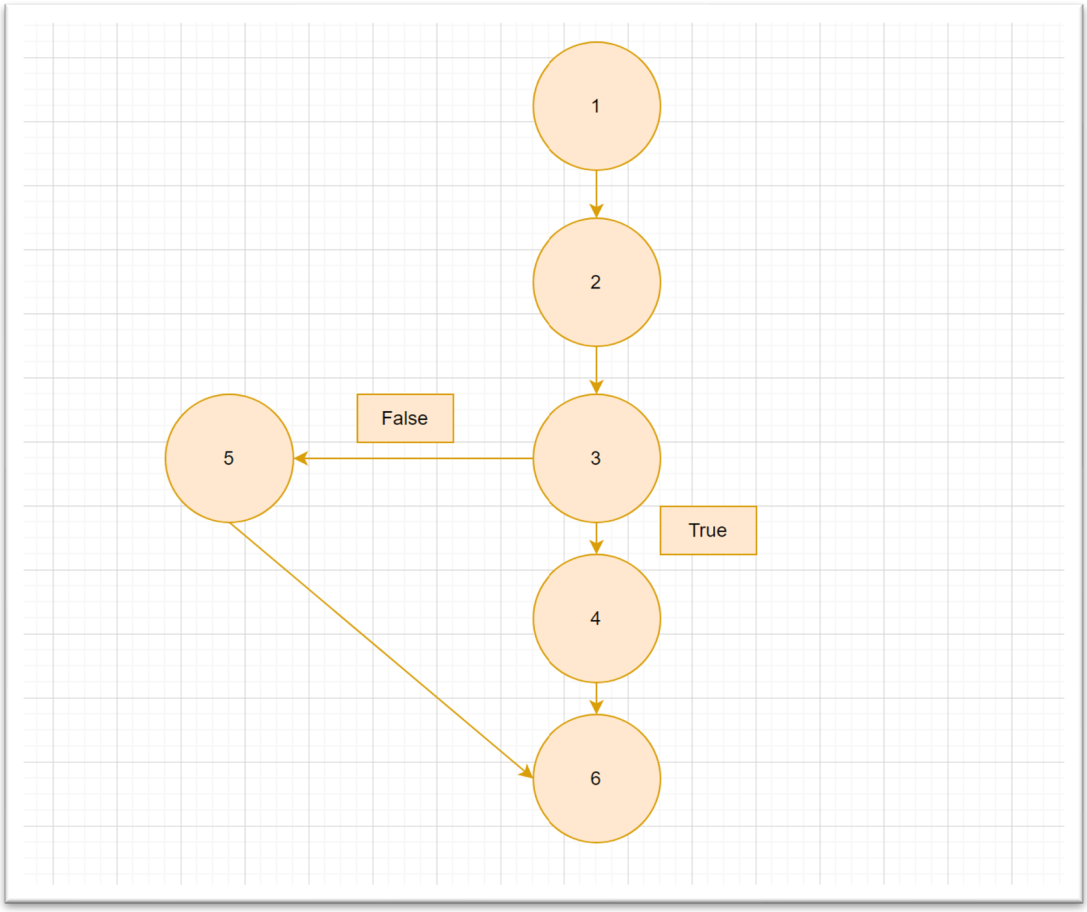


Figure 5-5 White Box Testing on Login Page

Table 5-3 White Box Testing 2

Input	Path	Excepted Output	Actual output
If (user)	1-2-3-4-6	Redirect to home page	Redirect to home page
If (user)	1-2-3-5-6	Invalid credential	Invalid credential

5.4.3. User Acceptance Testing

The last stage of software testing is a user test, where it determines whether the user's needs have been met. This test was done to make sure there were no errors or problems while working with the system. Early signs of errors can be corrected immediately, and other types of testing, such as modular testing, performance testing, and integration testing, can be continued. User Acceptance Testing (UAT) is a type of testing performed by end users or customers to validate/approve software systems

before moving them to production environments. UAT is performed in the final stage of testing after functional, integration and system testing. The main purpose of UAT is to ensure end-to-end business flow. It is not intended for cosmetic errors, typos, or system testing. User acceptance testing is performed in a separate test environment with a production-like data configuration. It is a kind of black box test involving two or more end users. User acceptance testing is necessary because after the software has undergone unit, integration, and system testing, the developers may have built the software based on what they believe to be a requirements document, and it is additional changes needed may not be effectively communicated to them during development. do. User acceptance testing is required when the final product is accepted by the customer/end user.

5.5. Chapter Summary

This chapter discussed the test method applied to the car rental system. There are three test methods: Black Box Test, White Box Test and User Test. All functions have been applied with the appropriate test method and the result can be shown in Appendix.

Chapter 6

Conclusion

6.1. Introduction

This chapter will discuss the results and achievements of Car rental. In this chapter system of Car Rental need to improve more and get better for a user to use it easily, The aim of the proposed project is to Design, Develop and implement a Car Rental system that Help visitor and normal people to rent a car with cheap price and trust easily and get benefits from it, like whenever someone needs to travel to someplace they don't know the location and they don't have to meet anyone before in this city, by this website user can book a car when they travel it to the city the car waits for them with driver or other option without Driver. Here are some objectives for the system.

The objective of this website is:

- to review the existing system
- to analyze all the requirement
- to design and implement a system
- to test the project

6.2. Achievement of Project Objectives

One of the achievements of this project is successfully developing a website of Car Rental website for Rent car shop. The implementations of this system are able to make the reservation process more efficient and systematic. This system successfully

allowed customers to perform reservations of car and payment in an organized way. Besides, the customer had the authority to report any issues regarding the car condition after renting. Moreover, the admin able to view the overall customer's reservation. Manage car inventory information also can be done by admin to ensure the information can be added, update, viewed and delete efficiently. After the development phase, Customer can decide if they want car with driver and without driver also, they can decide type of car and model, they can see all the detail with full information just by sign up and this way is more familiar and easier.

6.3. Suggestion for Future Improvement and Plan

A lesson graph is a sort of inactive structural chart in the Unified Modeling Dialect that displays the structure of a framework by exhibiting the system's classes, traits, operations, and connections among objects. system should improve it by some new way Like we create mobile application for the website for user to make the booking easier, and established more admin to record all the order at time, create more option for website and work on other part of tourism like create hotel booking and combine it with cars and other service, make offer for the system every week for the visitor. For the plan first create interface to understand what to do after that we write code about it and making data base for the system.

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Appendix A

FYP2 Gantt Chart

WEEK	1	2	3	4	5	6 (DEMO 1)	7	8	9	10	11 (DEMO 2)	12	13
Prototype 1: Login/Register													
• *UC01 Authentication/Authorization*													
• *UC07 Create Account*													
Prototype 2: Certificate													
• *UC02 Insert Participant (One by one and CSV file)*													
• *UC03 Custom design*													
• *UC04 Preview Certificate*													
• *UC05 Download in ZIP*													
Prototype 3: Approval													
• *UC08 Approve Certificate*													
Prototype 4: Receiving Certificate													
• *UC06 Email Certificate*													
• *UC09 Download Certificate*													
Prototype 5: Verification													
• *UC10 Verify Certificate*													
ENHANCEMENT ON UI/UX													
TESTING													
EVALUATION FROM USERS													
REPORTING													

Figure 33 FYP 2 Gantt Chart

Appendix B

Software Requirements Specification

Software Requirements Specification

Project Title

Landy for Car Rental

Version 1.0

Printing Date

21/6/2022

Department and Faculty

Software Engineer

Revision Page

a. Overview

This System requirement specification will explain everything about car rental system requirement starting from introduction, overall description, specific requirement and everything have been explained in detail.

b. Target Audience

In this system I have website and windows application and I have admin which manage the system with customer who can rent and view system and also driver that can see customer order and location.

c. Project Team Members

List the team members and respective assigned module.

d. Version Control History

Version	Primary Author(s)	Description of Version	Date Completed
1	**Landy**	**Finished all the section**	**22/6/2022**

Table of Contents

1. Introduction

1.1 Purpose

This SRS describe the basis to form the entire car rental project, this document includes all of the Car Rental System's functional and nonfunctional requirements as well as all other requirements-related information. The SRS document will serve as a reference and a guide for future design and development processes; this is its initial version. The development team, vehicle rental Admin, is advised to view this document. This is a technique used to ensure that every user of the system has a thorough awareness of the system's requirements.

1.2 Scope

The software product is for car rental system which is for renting car with full detail and good price with full of trust for user with driver and without driver this website have focus it on transition way and land way by renting car ,the website is official and have benefit for the visitor because they can book car in their nation for traveling by using website and the audience can return car if their traveling get fail

-This website work on all the devices because it is website and web-based which is work in all the devices like tablet-phone computer and they can use it easily because we design it for the user to work on it easily

-This website work in Sulaymaniyah-Iraq and it was useful for visitors and it was safe a visitor and they can trust it.

-Language of the website is web-based which is (JavaScript- Html - CSS – PHP-C#)

1.3 Definitions, Acronyms and Abbreviation

Acronyms and Abbreviation	Definition
SRS	System requirement specification
LCR	Landy Car Rental

1.4 Overview

This section's goal is to provide information on what users can anticipate from the car rental system. This will give a summary of the needs that were obtained. Give an overview of the content of this SRS document. The global financial crisis has only encouraged the use of rental automobiles. Car disinfection protocols are, nevertheless, strictly followed in the aftermath of the pandemic, when sanitation and safety are most essential than ever. Individual movement segregation norms will almost increase become business conditions. In recent years, the subscription model has become the face of the car rental industry. Because this model allows customers to experience temporary ownership of a vehicle while avoiding additional fees like as maintenance and insurance premiums,

Nowadays technology is very fast progress it and this progress have an effect all the factors and this progress have an important effect on the transportation which most of the car dealerships use technology to sell and rent their car and all over the world use it which developed by the programmers, technology had effect dealership and the world but Kurdistan not been relevant to that development the proposed application try to achieve requirement that new technology provided for the entire world.

2. Overall Description

Describe the general factors that affect the products and its requirements. Provides background for those requirements. The problem statement is Car dealerships now show new models of cars for sale all year, some of which are sold and others which are left or unsold, so most of the time they will park the car which is unsold from the other and suffer the consequences, here are the car dealership problem they face every year, and the other problem is that Sulaymaniyah city is very crowded because of taxi drivers.

They function without any structure or rule in place, and when the street is full of taxis, the environment suffers as a result of the increased number of taxis, and they cause some automobile accidents, as well as the customer's lack of trust in the taxi driver. Another issue that this approach will tackle is when one of the locations has a luxury party and guests are unable to obtain a luxury car. By using car dealerships and establish some taxi drivers and allowing users to choose taxi drivers and cars, the street becomes more deserted because the drivers follow the rules and can only get out when they have a booking or order, those who do not want a driver can simply book a car without driver for those who do not want a driver, they can simply book a car without driver for the luxury part of the website, users can choose a car with a driver to go to a party, visitors when they travel to here they can do same with luxury part.

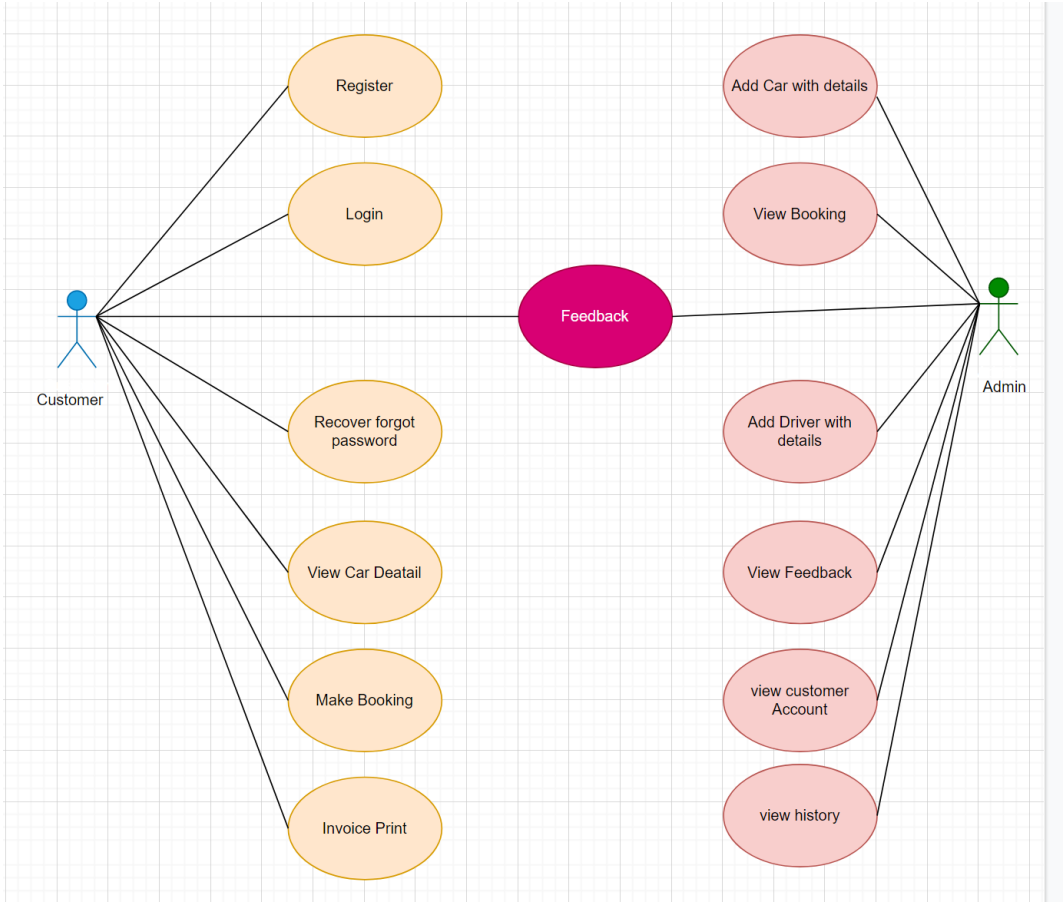

Figure 2.1: Use Case Diagram of <Car Rental System>

2.1 Product Perspective

Explain the perspective of the software product here. the manual car reservation process will be automated. It will be simple for the admin to handle reservations, present car information, and handle customer registrations. The brand-new system will be an enterprise system. All functions pertaining to the car rental will be handled by the system. It will have a much easier time evolving and will be better able to adapt to shifting systems. Future modifications will be anticipated, and the system will be built to adapt to those changes as they take place over time. The system has two different kinds of users. However, developers work with the system to maintain it and create new features as needed by stakeholders.

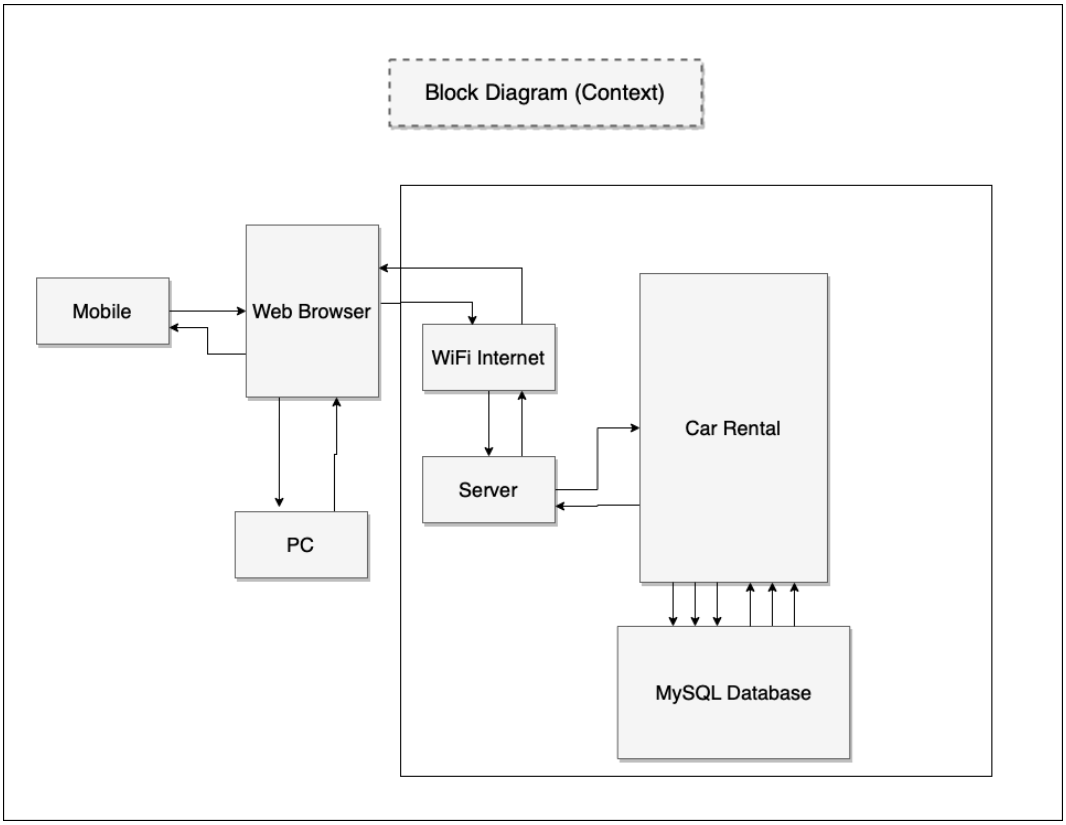

Figure 2.11 System Architecture

2.1.1 System Interfaces

List here... This subsection of the SRS defines the UI requirements for the Car rental system and system interface include customer and admin functionality and it will provides in chapter 3 full details

2.1.2 User Interfaces

Describe how the system will interact with its users.

- When a person enters this website, they all see the identical page.
- Users are prompted for a username and password on this page.

- The user will be redirected to their own profile where they can perform a variety of tasks after successfully authenticating with the proper username and password.

The user interface will be straightforward and consistent, utilizing language that the system's intended users are likely to understand. To avoid the requirement for user training for infrequent users, the system will have a simple interface that adheres to industry standards.

2.1.3 Hardware Interfaces

Specify the logical characteristic here…Server-class computers must be used to run all server-side components. Workstation-class and personal-class PCs must be used to run all client-side components. Additional hardware interfaces are not required.

-The hardware and data connectivity resources used by the system are standard.

-This includes, but is not limited to, network servers, network servers, and network management tools at the server/hosting location.

2.1.4 Software Interfaces

Specify here…the software interface should follow model-view controller for rendering and modeling data objects, the interface must be able to connect to a database to store all car and customer and driver table and software interface for Landy car rental include some programming language which is html and Css with java script to show easy style sheet or page interface to understand

2.1.5 Communication Interfaces

Specify here… This system makes use of a variety of communication tools, including the HTTP protocol and the TCP/IP network protocol, among others, to communicate with web browsers and web servers.

The database that contains all the booking information and this website will communicate. The HTTP Service function allows users to communicate with the server side using the HTTP protocol. With the aid of this function, the application is able to use information obtained from the server to complete a user request.

2.2 Product Functions

The following are the high level functionalities of the product. These functions are carefully broken down into specific functions and explained in the 3.1 section of the document

- -Reservation of vehicle and related function.
- -User Feedback Function.
- -User print invoice one hardcopy for process.
- -User can return the Car.
- -User Google APi-Map.
- -Admin have windows Application.
- -Admin can see feedback.
- -Admin can see History.
- -Admin can Add-Edit-Delete car.
- -Admin can Add-Edit-Delete Driver.
- -Admin can Add-Edit-Delete New Admin.

Summarize the major functions (by use case) of the system by referring to the use case diagram, Figure 2.1.

2.3 User Characteristics

Describe here... there are two types of users in the system. But developers use the system for maintenance and develop as stake holders requirements.
Admin (direct uses):Most probably new to the system. Do not require any technical expertise. They have to improve knowledge to use system.
Developers: High technical expertise. Experience and domain knowledge. Well aware of system functionalities

2.4 Constraints

- -3 months the total amount of time allocated for the system's development.
- -old browser can’t does not support our version browser.
- -2 user can’t decide one driver at the same time.

2.5 Assumption and Dependencies

Developers have access to the software tools needed for system development.

- -The demands gathered are accurate and achievable.
- -The project's final deliverable may be stored on a server.

2.6 Apportioning of Requirements

Identify and state here…the process didn't have any delayed requirement for next version everything is in this version maybe for future we would change it to application.

3. Specific Requirements

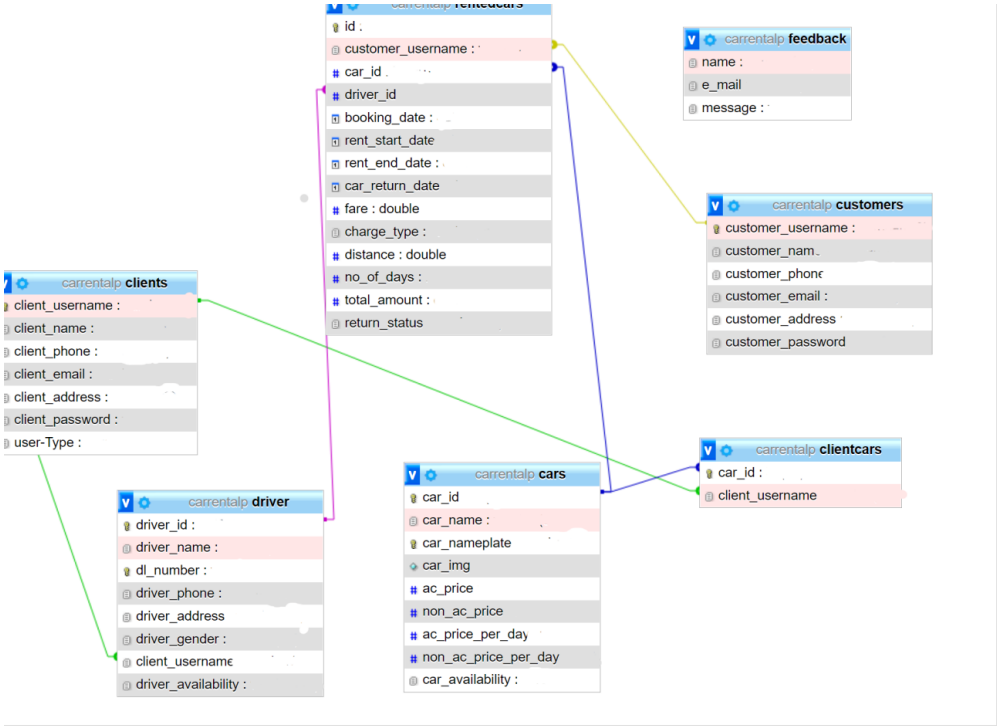

Figure 3.1: Domain Model of Car Rental System

3.1 External Interface Requirements

3.1.1 User Interfaces

3.1.1.1 Login for admin account

- **Introduction:** Admin can log into the system with existing Account.
- **Input:** Admin username and password.
- **Processing:** Admin login details AUTHENTICATING.
- **Output:** Admin can manage the system.

3.1.1.2 Customer create Account

- **Introduction:** Customer can create new Account
- **Input:** Customer name-username-email-password.
- **Processing:** Customer registration details authenticating.
- **Output:** Admin can see customer Account from windows application.
- **Else**
- **Introduction:** Admin can see detail of create account
- **Input:** view car detail.
- **Processing:** Customer profile details authentication.
- **Output:** Admin can view customer history Activities.

3.1.1.3 View Available Car

- **Introduction:** Customer will be able to view Available car**.**
- **Input:** view car picture and car name.
- **Processing:** all the available cars will be from database.
- **Output:** All possible result will be shown to the customer.

3.1.1.4 View cars with details:

- **Introduction:** Admin can view the detail of the cars selected
- **Input:** selecting of the car.
- **Processing:** all the details of selected car will be fetched from the database.
- **Output:** details of the car : Name – Picture –registrations number – per day or per km – with Ac or without Ac – with driver name- cost-available car – feedback.

3.1.1.5 Calculate Cost

Introduction: system can calculate an approximate cost for the renting Process After selecting cars.
Input: Time duration per day or per km**.**
Processing: the cost will be calculated using input and cost information in the system.
Output: Calculated cost.

3.1.1.6 Booking car for renting:

- **Introduction:** Admin can reserve the car after considering all the information by customer.
- **Input:** booking date and time duration for booking.
- **Processing:** the booking information will be added to the database, the availably of the cars will be changed.
- **Output:** customer can print their invoice like pdf.

3.1.1.7 Collect Feedback from customer

- **Introduction:** Customer can add feedback about car and booking process.
- **Input:** Feedback from Customers**.**
- **Processing:** the feedback will be added to windows application table for part feedback.
- **Output:** Admin can see the feedback from the windows application.

3.1.1.8 Add new Car

- **Introduction:** Admin can add new car for the system.
- **Input:** Car details.
- **Processing:** New Car Add to the database.
- **Output:** Admin can view new car details.

3.1.1.9 Update information

- **Introduction:** details of existing cars can be changed by admin.

- **Input:** changed details.
- **Processing:** previous details are replaced with new details in the database.
- **Output:** Admin can view updating details and share automatically in the system.

3.1.1.10 Remove Car

- **Introduction:** Admin can remove car or full detail of the car.
- **Input:** Car model / remove.
- **Processing:** Car model removed from database.
- **Output:** Admin can't see this car anymore from database.

3.1.1.11 View Reports

- **Introduction:** Admin can view reports of activates form the table of windows application
- **Input:** View reports selection.
- **Processing:** Relevant fields from database tables are acquired with respect to given parameters.
- **Output:** The requested report. System functionalities.

3.1.2 Hardware Interfaces

Provide the details for Section 2.1.3.

(a) A personal computer having a 64-bit operating system

(b) A smartphone with 512MB of RAM and an Android operating system.

(c) A 128kbps Internet connection is required.

3.2 System Features

We have some Use Cases to represent the major functions that is performed by Car Rental system and all the sequence with Activity diagram.

3.2.1 Module <Customer Login >

This part include customer login which include Register and login with forget password part. And admin login to the system.

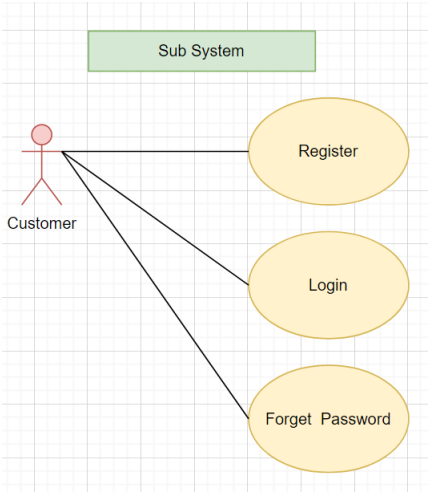

Figure 3.2.1 Sub System

3.2.1.1 UC001: Use Case < Customer Login >

Table 3.2.1: Use Case Description for <Name of Use Case>

Use Case ID:	**UC001**
Use Case Name:	Login

Description:	To let the users Login to the system by using their username/email and password in order to securely get access to the necessary functions.
Actors:	Customer
System:	Web-based
Pre-Conditions:	Customer should have their account before and log in with username and password.
Flow of Events:	1. The user opens the website 2. The login screen is shown 3. The user enters their respective data a. Username b. Password 4. The user clicks on Login button 5. The system checks their data and logs them in.
Exceptions:	If the username/email or/and password is wrong the system will show an appropriate message that tells them the credential are Invalid username or password.
Post-Condition:	The user will be logged in and they can use the system.

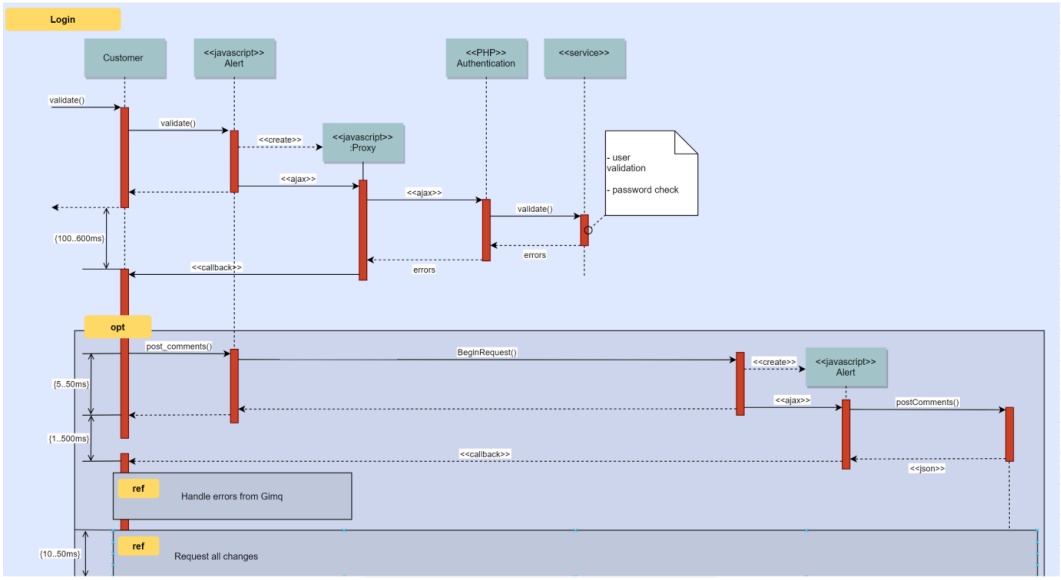

Figure 3.2.1.1: System Sequence Diagram of <Customer Login>

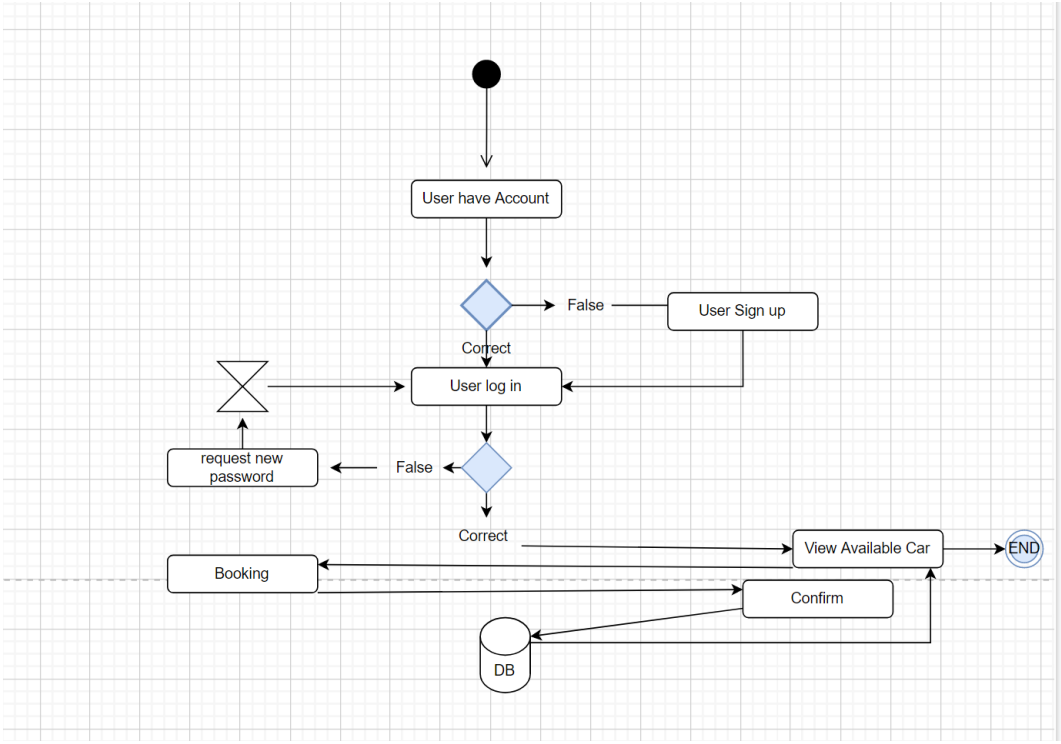

Figure 3.2.1.2.: Activity Diagram of <Login and sign-up >

3.2.1.2 UC002: Use Case <Customer registration >

Table 3.2: Use Case Description for <Customer registration>

Use Case ID:	**UC002**
Use Case Name:	Registration
Description:	To let the users Register to the website they should fill the blanks with full name and email with password and address.
Actors:	Customer
System:	Web-based
Pre-Conditions:	They should access the website before register after they can click to the login button then create new account.
Flow of Events:	1. The user opens the website 2. The login screen is shown 3. The user enters their respective data a. Username b. Full name c. Address d. Email e. Password The user clicks on create Customer account will be store it on the database.
Exceptions:	The input field must be fill up.
Post-Condition:	The user will be logged in and they can use the system.

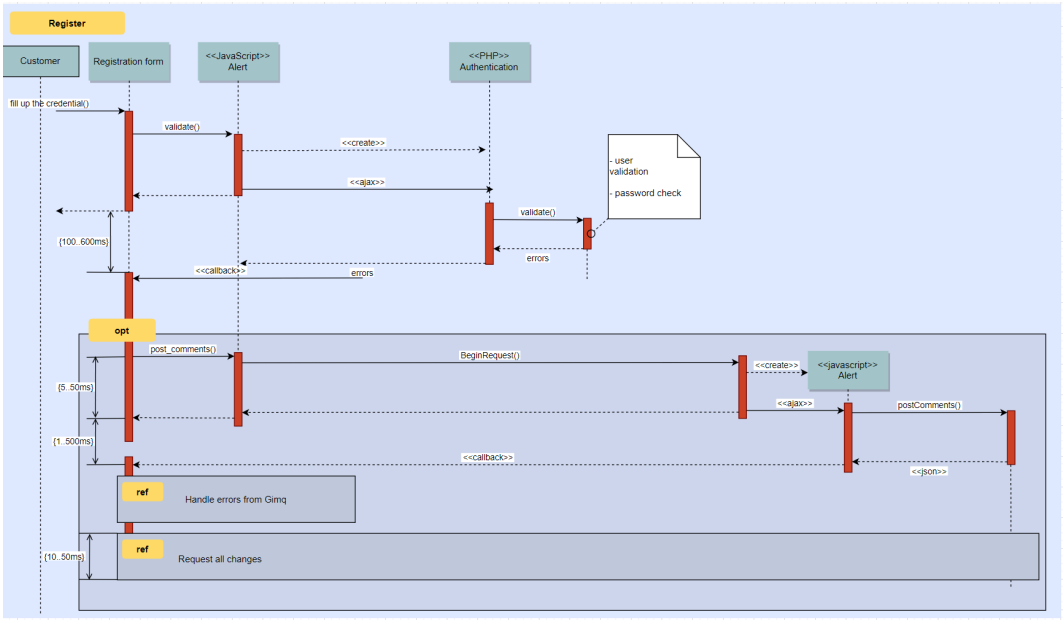

Figure 3.2.1.3: System Sequence Diagram of <Customer registration>

3.2.1.3 UC003: Use Case <Admin login>

Table 3.3: Use Case Description for <Name of Use Case>

Use Case ID:	**UC003**
Use Case Name:	Login
Description:	To let the Admin Login to the system by using their username and password in order to securely get access to the necessary functions.
Actors:	Admin
System:	Web-based- windows application.
Pre-Conditions:	System have one static admin to login.
Flow of Events:	1. The admin open windows application. 2. The login screen is shown 3. The Admin enters their respective data a. Username b. Password 4. The Admin clicks on Login button 5. The system checks their data and logs Admin in.
Exceptions:	If the username and password is wrong the system didn't excute.
Post-Condition:	The Admin will be logged he can manage the system.

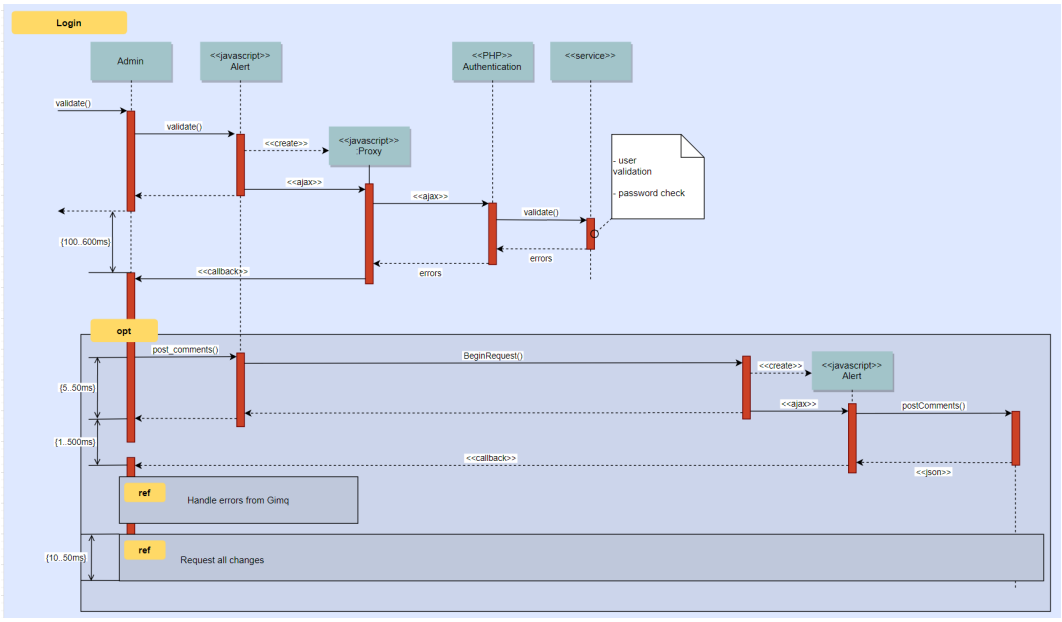

Figure 3.2.1.4.: System Sequence Diagram of <Admin login>

3.2.2 Module <view Car detail>

This module includes car detail by customer.

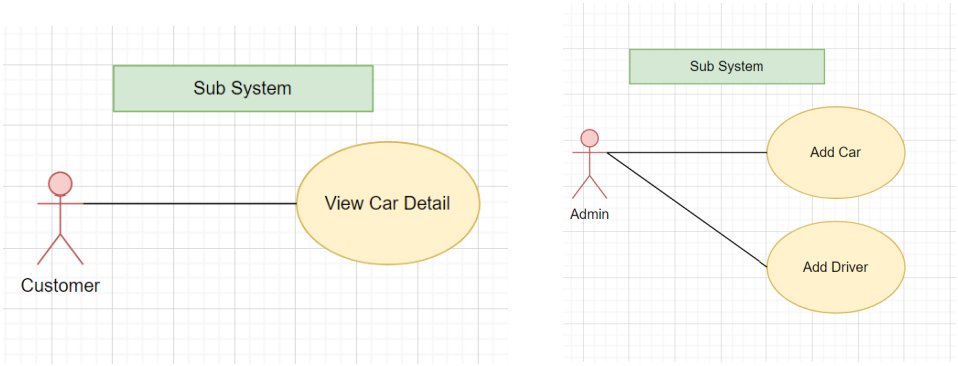

Figure 3.2.2 sub–System Module

3.2.2.1 UC004: Use Case <view Car detail >

Table 3.4: Use Case Description for <Name of Use Case>

Use Case ID:	**UC004**
Use Case Name:	View car detail

Description:	Customer after login they can see the website with all functionality and they can see car detail
Actors:	customer
System:	Web-based.
Pre-Conditions:	After the login display home page
Flow of Events:	Customer can see all the car inside website with full of details.
Exceptions:	If he click it on the car all information is given.
Post-Condition:	Then user can book their car.

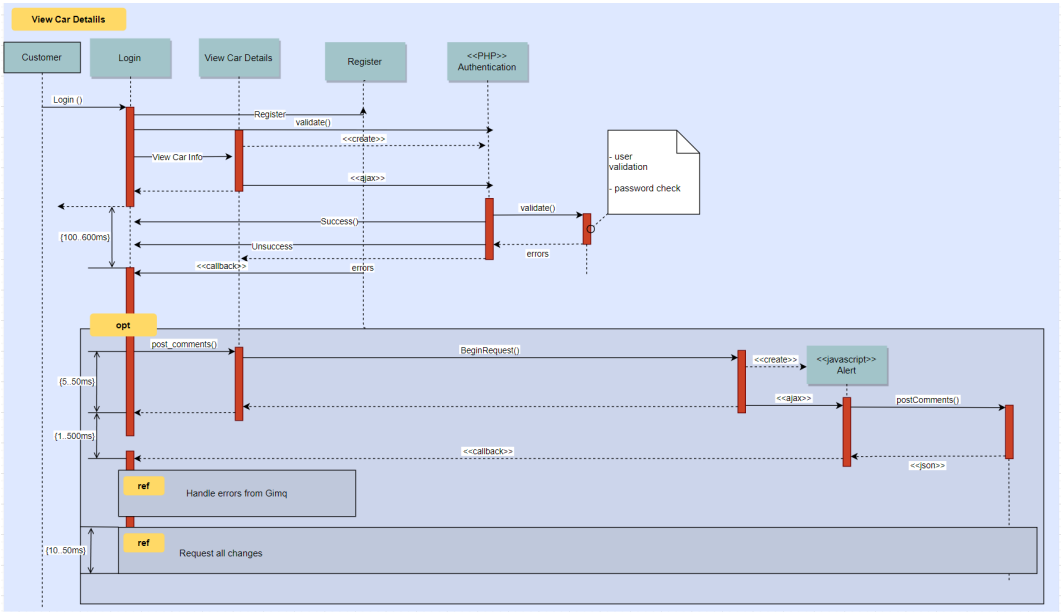

Figure 3.2.2.1: System Sequence Diagram of <View car detail>

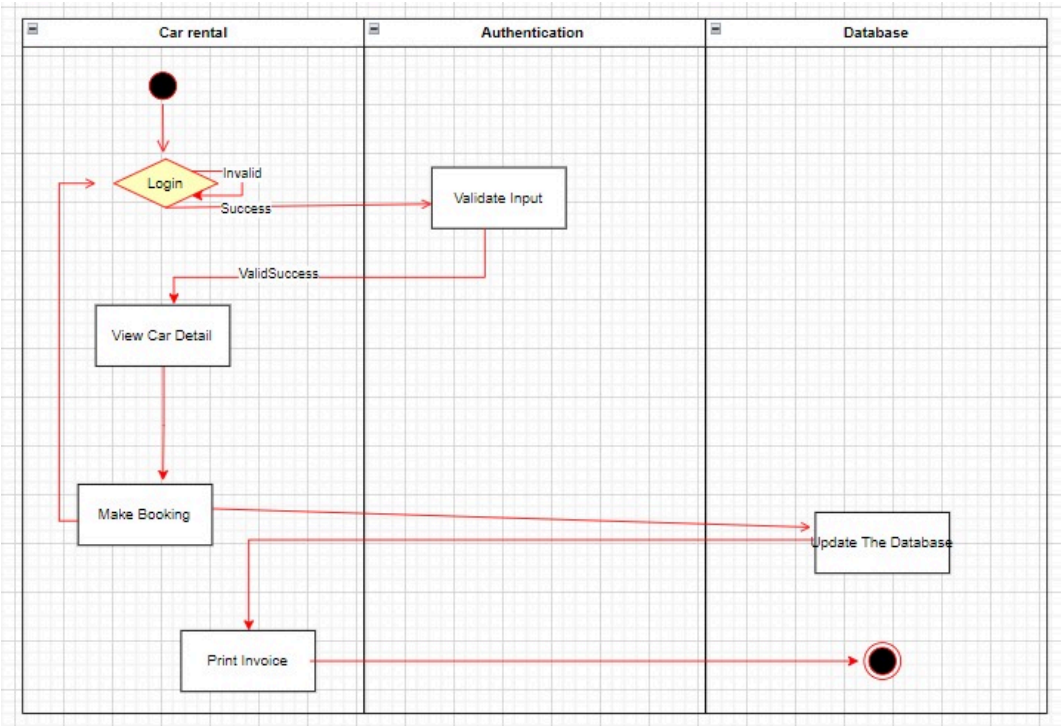

Figure 3.2.2.2: Activity Diagram of <View Car Detail >

3.2.2.2 UC005: Use Case <Add Car>

Table 3.5: Use Case Description for <Name of Use Case>

Use Case ID:	**UC005**
Use Case Name:	Add Car And driver
Description:	Admin After login he can add-edit-delete car and can add-delete-edit driver.
Actors:	Admin
System:	Web-based Windows application.
Pre-Conditions:	After the login Admin panel showing.
Flow of Events:	Admin can manage all the table in the admin panel like driver and cars.
Exceptions:	After opening the table process is on admin hand.
Post-Condition:	Admin can add driver and admin can add cars.

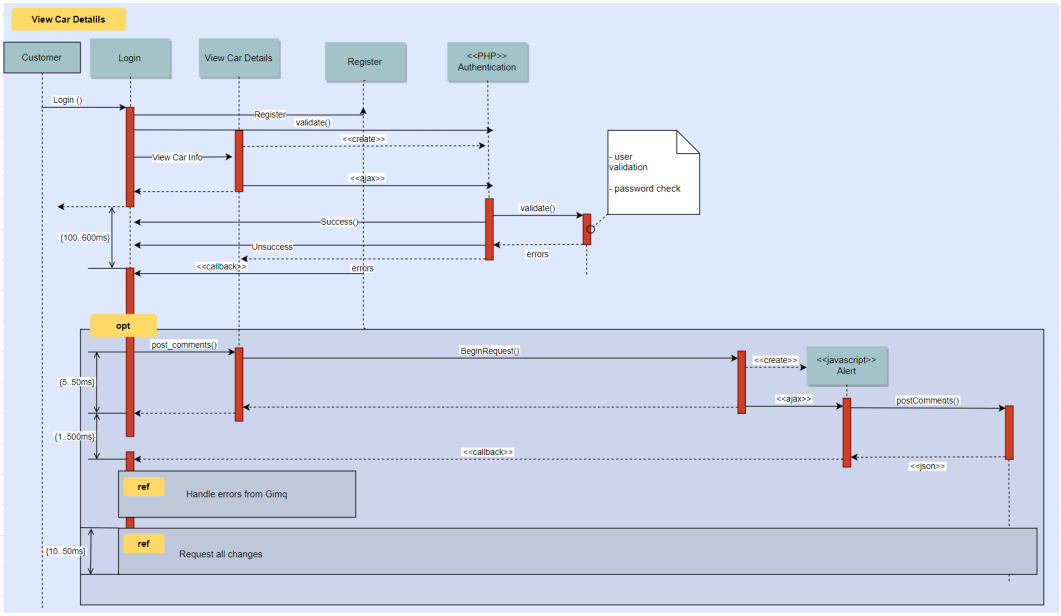

Figure 3.2.2.3: System Sequence Diagram of <View car detail>

3.2.3 Module <Booking>

This module include customer booking from the website

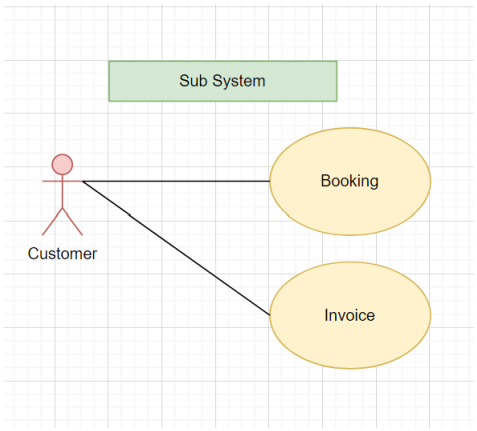

Figure 3.2.2.3 figure of invoice subsystem

3.2.3.1 UC006: Use Case <view booking detail>

Table 3.6: Use Case Description for <make booking >

Use Case ID:	**UC006**
Use Case Name:	View Booking car
Description:	Customer can view booking detail
Actors:	customer
System:	Web-based.
Pre-Conditions:	After the login user can see home page with car detail
Flow of Events:	Customer can see the price with model of the car and plate number and detail about air condition.
Exceptions:	Click on the car the next page is open with ful detail
Post-Condition:	After the click they can see driver name and all the process. Then booking page.

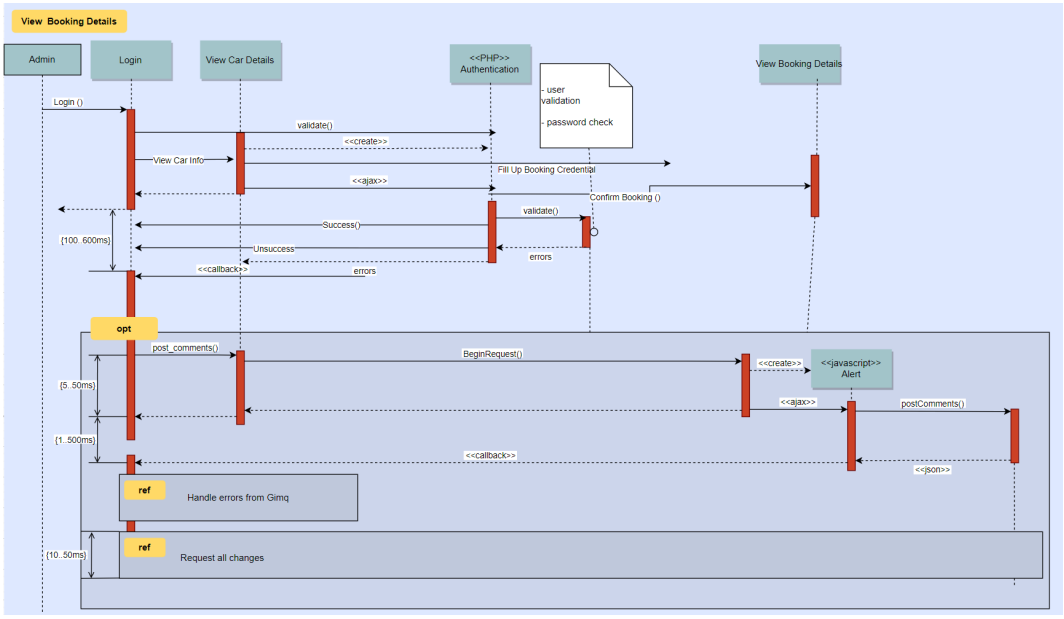

Figure 3.2.3.1: System Sequence Diagram of <view booking detail>

3.2.3.2 UC007: Use Case <make booking>

Table 3.7: Use Case Description for <make booking >

Use Case ID:	**UC007**
Use Case Name:	Booking car
Description:	Customer can booking car.
Actors:	customer
System:	Web-based.
Pre-Conditions:	After the login user can book their car with full of the details.
Flow of Events:	Customer can decide start date and end date with charge type and decide driver.
Exceptions:	After the booking reservation car is not available for other one.
Post-Condition:	After the booking customer can print their invoice and download it as pdf.

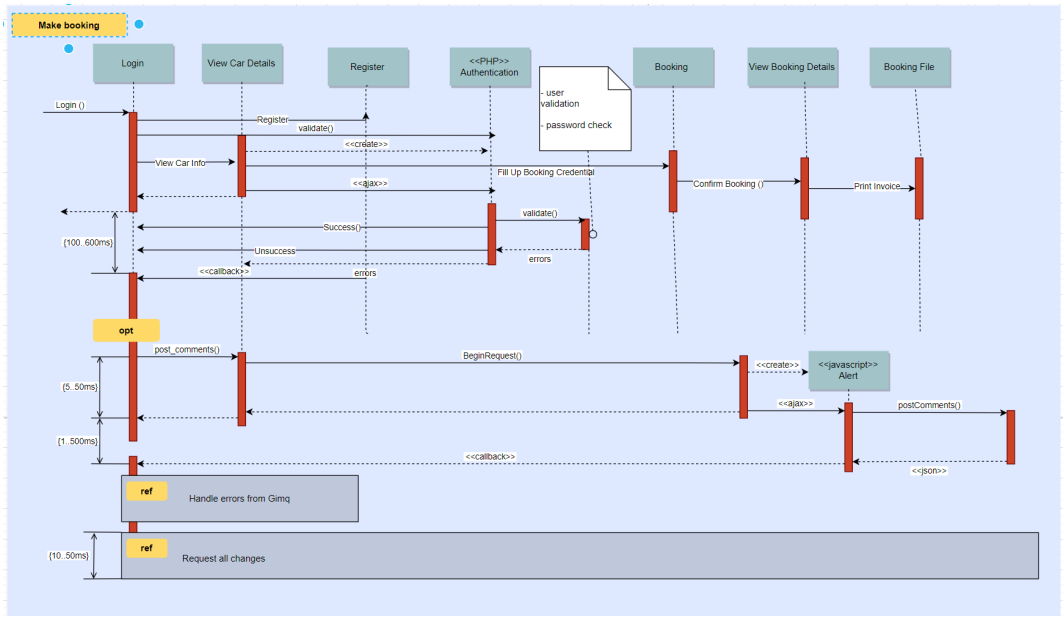

Figure 3.2.3.2: System Sequence Diagram of <make booking>

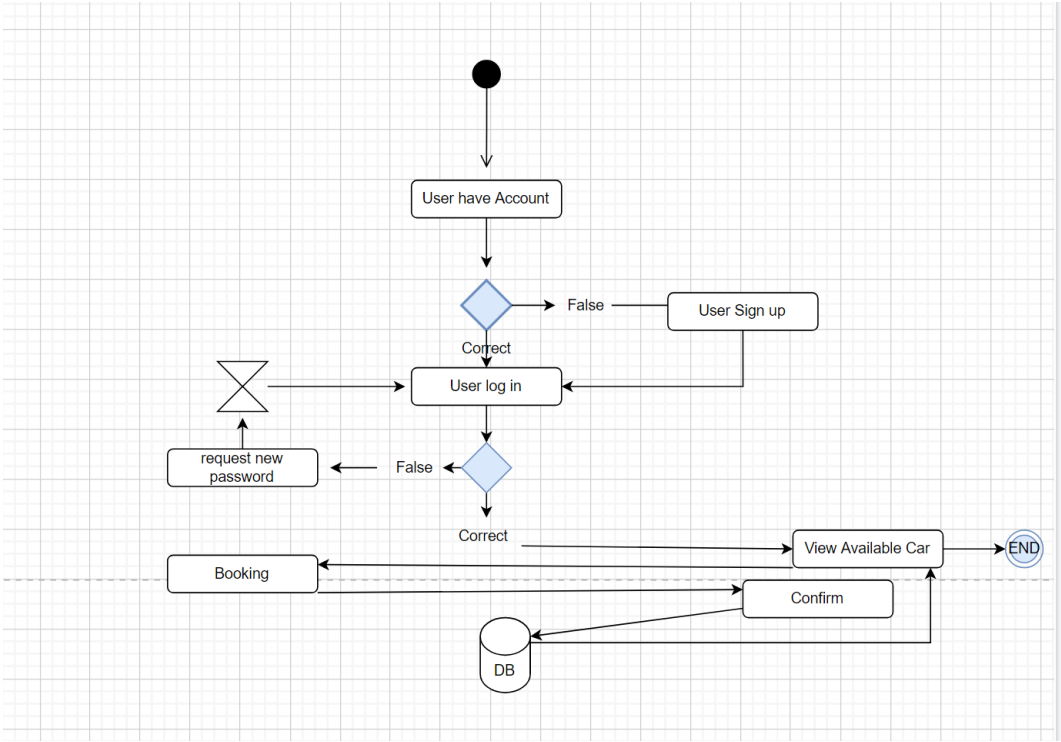

Figure 3.2.3.3.: Activity Diagram of <login-booking process >

3.2.3.3 UC008: Use Case <feedback>

Table 3.7: Use Case Description for <make booking >

Use Case ID:	**UC008**
Use Case Name:	View Feedback
Description:	Admin can view feedback page and customer can add feedback
Actors:	Customer Admin
System:	Web-based – windows application
Pre-Conditions:	After the login and using our car customer can add feedback and admin can view feedback from the windows application.
Flow of Events:	Customer can write whatever they want in feedback part.
Exceptions:	After the user feedback admin can view it and work on it.
Post-Condition:	After the process feedback is store in the table of feedback.

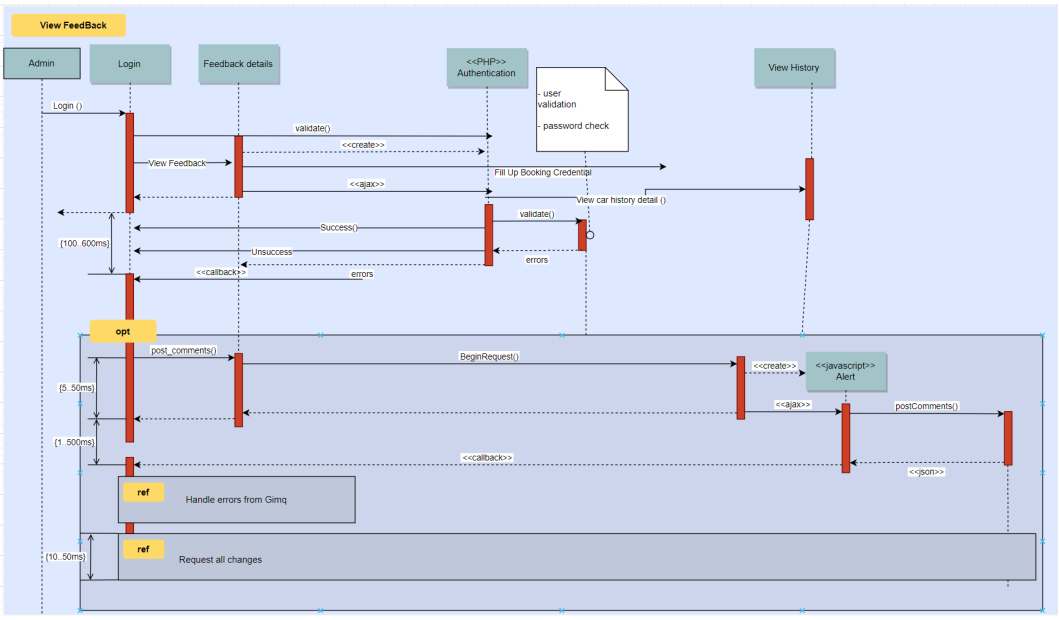

Figure 3.2.3.4: System Sequence Diagram of <view feedback >

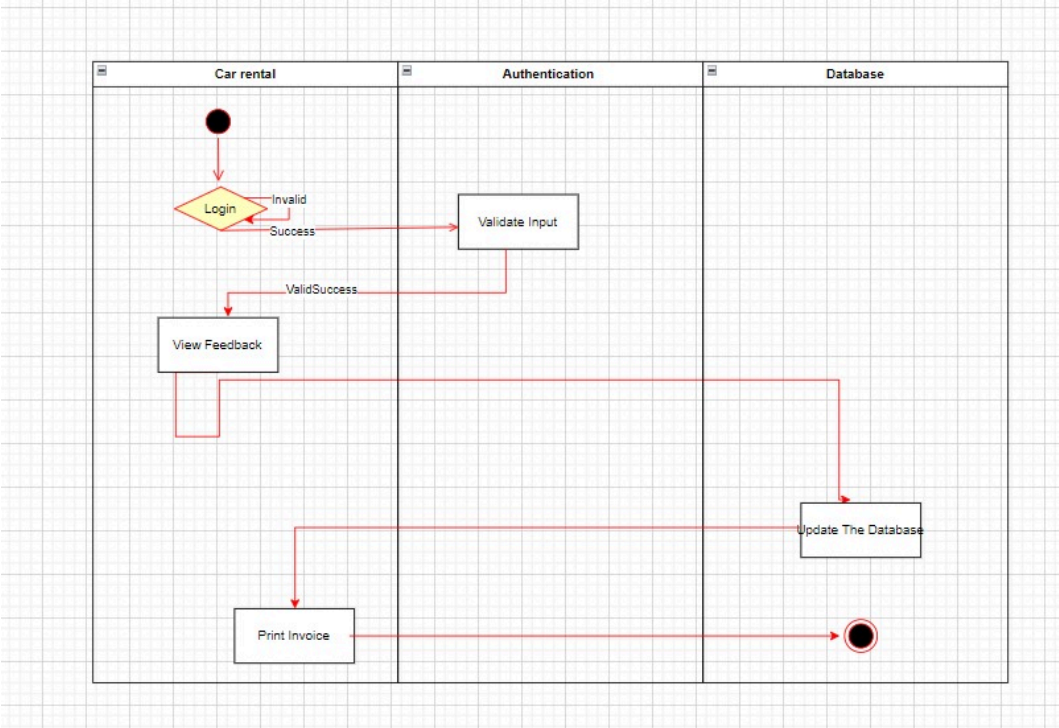

Figure 3.2.3.5.: Activity Diagram of <View Feedback >

3.3 Performance Requirements

- **Admin Usability:** -A maximum of 3 days will be allotted for the system administrator's training. The system's features should all be obvious.
- **Response Time:** The system's response time Should be very low. 3-6 seconds is the typical response time. 15 to 20 seconds is the maximum response time.
- **Throughput:** The system's throughput should be more than sufficient to deliver a continuous service to the consumer.
- **Capacity:** Up to 5000 users should be able to use the system.

3.4 Design Constraints

Explain any constraints imposed by the organization where the software product will be used such as the system must adhere to certain organizational standard and other related non-functional requirements.

3.5 Software System Attributes

- Maintain a user friendly environment that is visually appealing.
- Easy to see and use navigation.
- Maintain readable content. It’s important to trainee workers.
- Print hard copy is accessibly for the user after booking.
- Booking driver is accessibly for all the user.
- Customer can decide AC or without Ac accessibly for booking.
- Return car is available before deadline.

3.6 Other Requirements

- External interface Requirement:
- -User interface for login.
- -interfaces in scenario of Landy for car rental.
- -Customer Feedback
- -Customer History.

Appendix C
Software Design and Architecture

SCSJ3323: Software Design and Architecture

Software Design Document

Project Title: Car Rental System

Version 1.0

Printing Date: 19/6/2022

Department and Faculty: Software engineer

Prepared by: Landy Ibrahim Ahmed

Revision Page

e. Overview

In this document, the project will be further explained with more diagrams to briefly describe the system and understand how the system is divided.

f. Target Audience

This website proposed for customer for using easily and admin who can manage the website.

g. Version Control History

Version	Primary Author(s)	Description of Version	Date Completed
1.0	**Landy Ibrahim Ahmed**	**Completed all the necessary sections**	**19/6/2022**

Table of Contents

1.Introduction

This subsection should explain the purpose of the SDD and indicate the audience for which it is intended. SDD the software structure, software components, interfaces and data required for implementation are described Phase. Each requirement in the SRS must be traceable to one or more design entities in the SDD.

1.2 Purpose

The purpose of the SDD software design documentation is to provide a clear overview of how the car rental system is built and a description of the architectural style, database description and system design interface. All of these topics are explained in this document.

1.3 Scope

The software product is… a high quality of car rental system which focused on the visitor and as mentioned before what is important in the project to rent a car with full of detail and guarantee and this website can archive the main goal of the system.

This website work on all the devices because it is website and web-based which is work in all the devices like tablet-phone computer and they can use it easily because we design it for the user to work on it easily.

- -this system published for the customer inside country and outside country who desire car for renting.
- -this system will use HTML – CSS – JS – PHP- MYSQL and for windows Application this website used C#.

- -This system consist Car with detail and professional Driver with international driver license and print invoice of hardcopy.

1.4 Definitions, Acronyms and Abbreviation

Abbreviation	Definition
SDD	Software Design Documentation
JS	Java Script
C#	C sharp

Definitions of all terms, acronyms and abbreviation used are to be defined here.

1.5 Overview

This document explains the car rental system software design documentation, this documentation explains the software created to facilitate analysis, planning, implementation and decision making. This documentation is organized as follows.

a- System Architectural Design
b- Detailed Description of Components
c- Data Design
d- User Interface Design

System Architectural Design

1.6 Architecture Style and Rationale

As it was mentioned previously, Model View Controller (MVC) was chosen as a system architectural design pattern as a structure of our code organization. The MVC consists of Three types of coding sections for each module. First, we have the Model. Which is a part which serves a temporary local storage that stores a particular data for a specific amount of time that serves with the other parts. The following figure shows a sample code that is the model part in our admin panel.

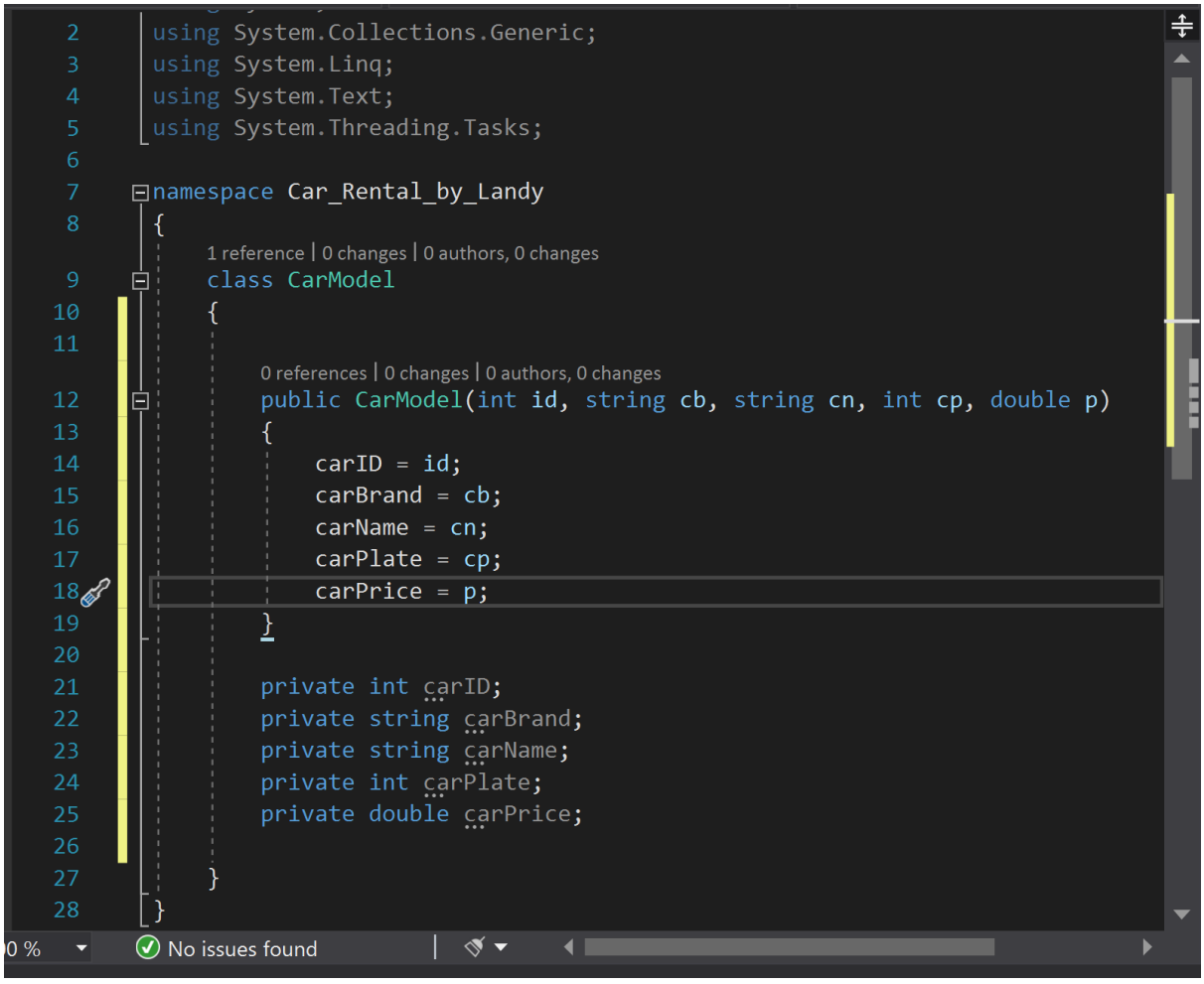

Figure 1 MVC code

Next, there is the View part of the architecture style. The view part consists of the codes that make up the interface design which the end user sees and interacts with. The view section is the main part that triggers the controller to start and calls its functions.

The figure below shows a sample code for the view part in our admin panel desktop app.

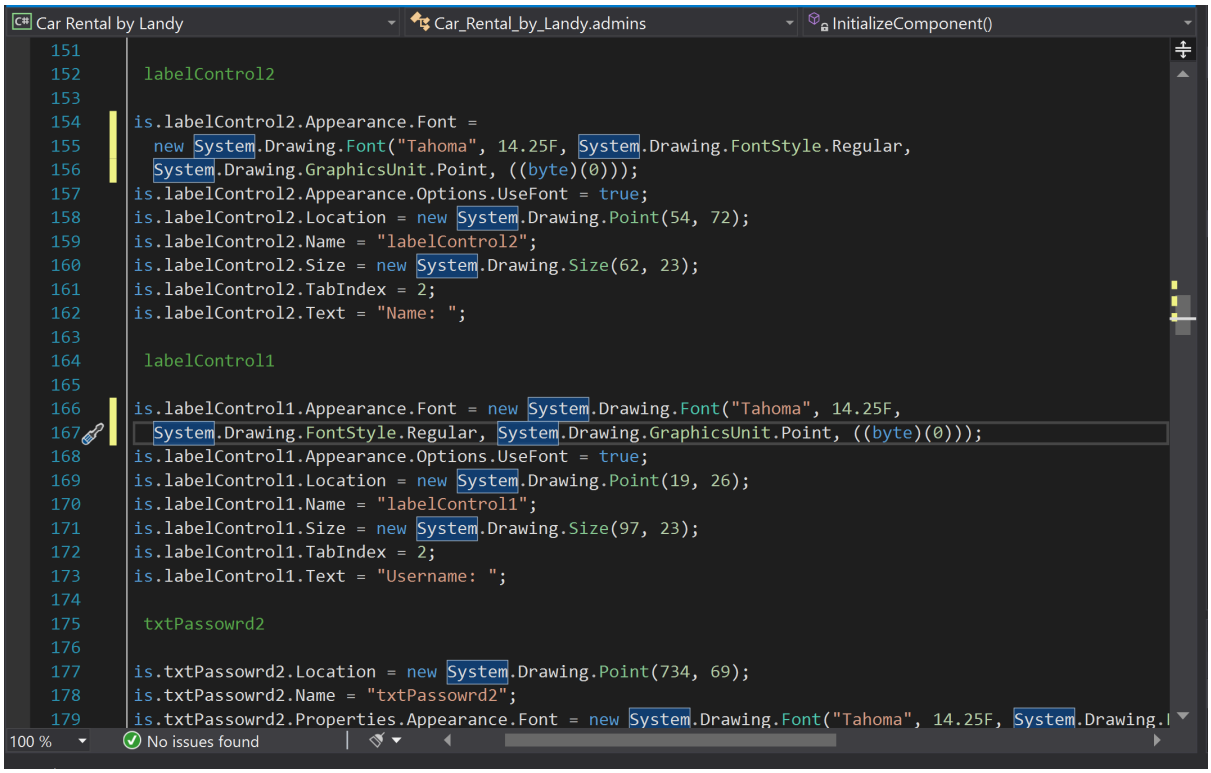

Figure 2 Label Controler

Finally, we have the controller section. This is the essential part which is responsible for what the users asks and views in the view section. Data that is retrieved from the database will be processed here and saved in the models which can be later used in sending to the view part or for later purposes. The figure below shows a sample code of the controller part in our admin panel desktop app.

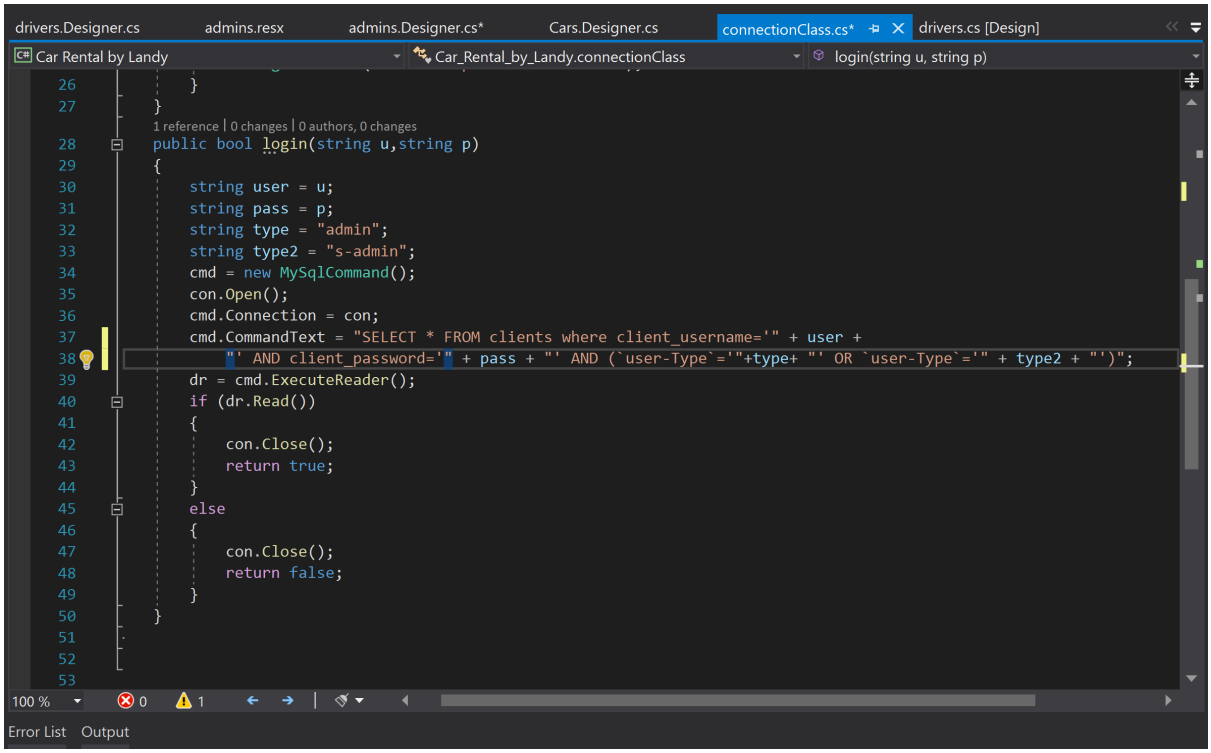

Figure 3 Connection class code

1.7 Architecture Model

In the architecture model below, the architecture has two sides, the frontend and the backend, in the frontend, as we mentioned before, we can see the view layer in the MVC, the view layer is the interface layer that the user sees and interacts with from this Therefore we place the application interface at the view level. The user then requests data and information or actions to interact with the controller page. As an example sentence, the user can request the reservation from the controller and the controller retrieves the reservation details from the user, the controller itself interacts with the model who is the data collector and who is responsible From the logical part, the model is connected to the database to transmit and receive the necessary data or information.

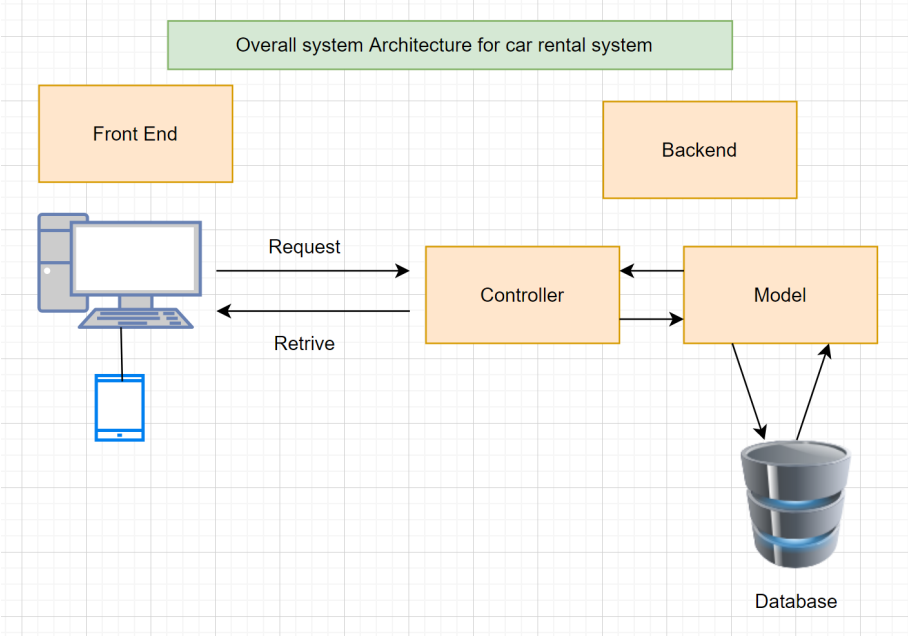

Figure 4 Frontend and backend Process

1.8 Use Case Diagram

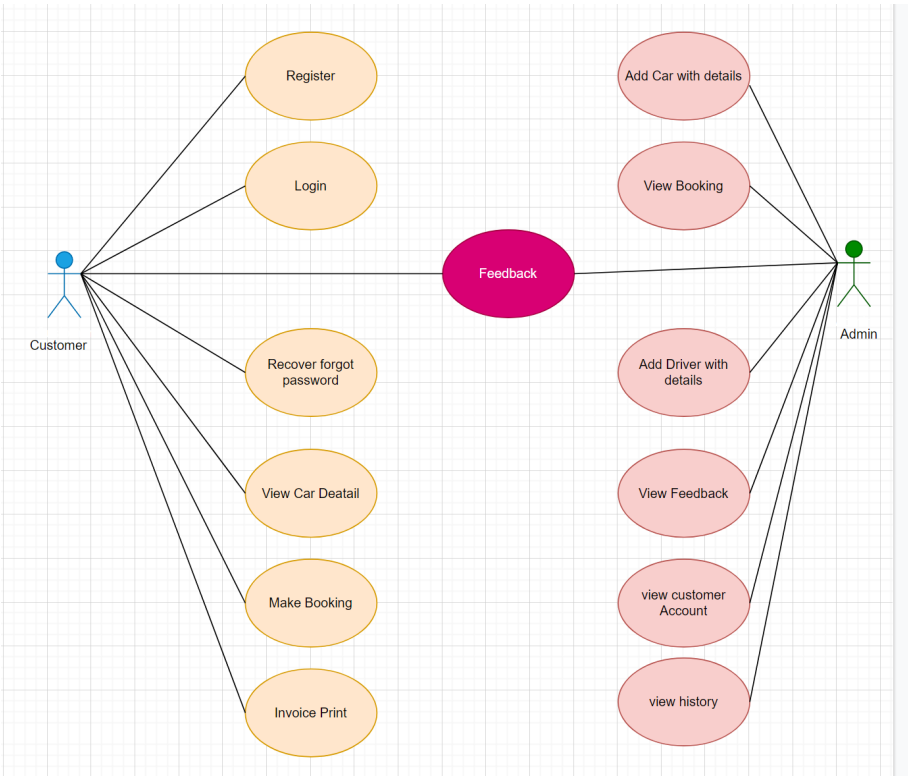

Figure 5: Use Case Diagram of <Car Rental System >

Detailed Description of Components

In this section, the car rental system component is explained, a package diagram is created for the system to make an overview of the system component.

1.9 Complete Package Diagram

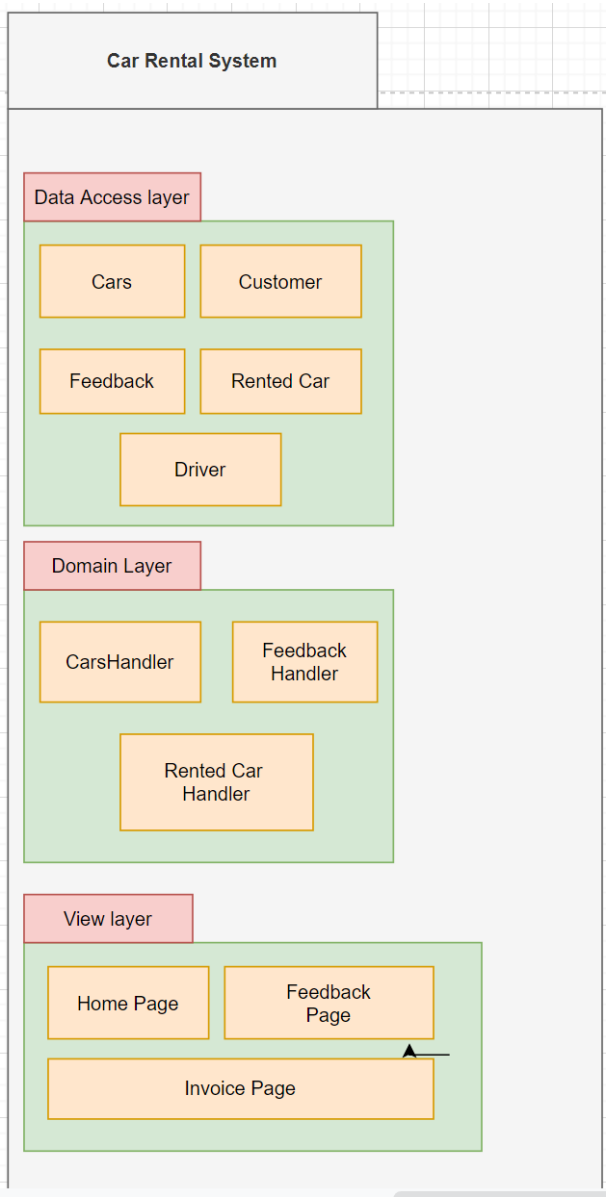

Figure 6 Package diagram

1.10 Component Model

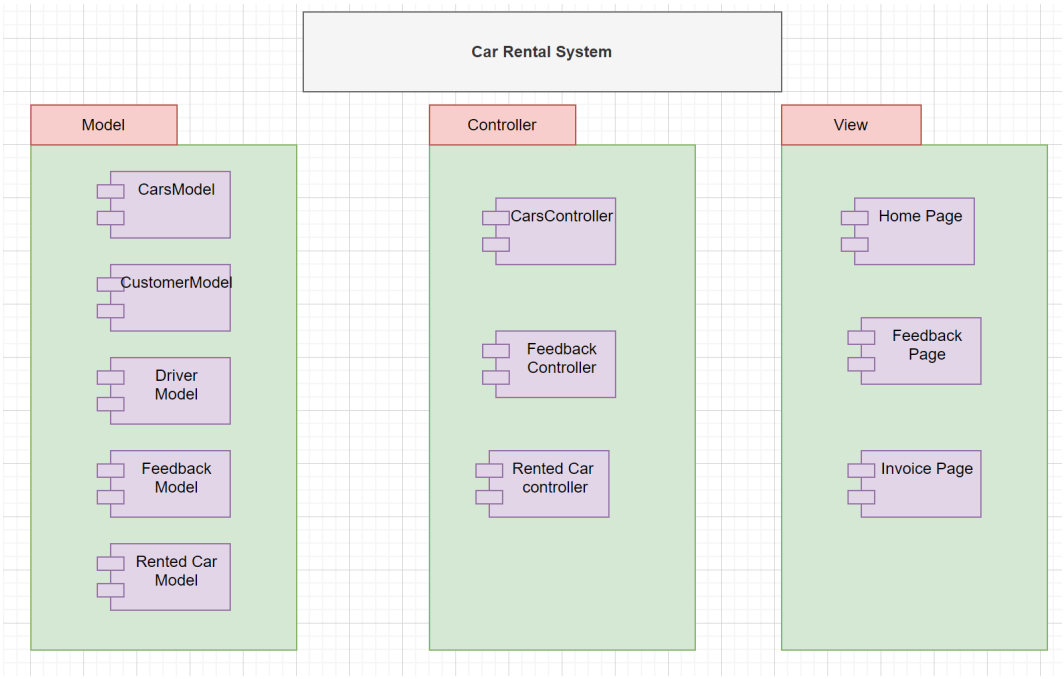

Figure 7 Component Diagram

1.11 Detailed Description

In this section the modules will be provided with their sequence, class, and packages subsystems. For viewing all these information, and for this section please refer to the SRS 3.2 we give it full detail.

1.11.1 Class Diagram

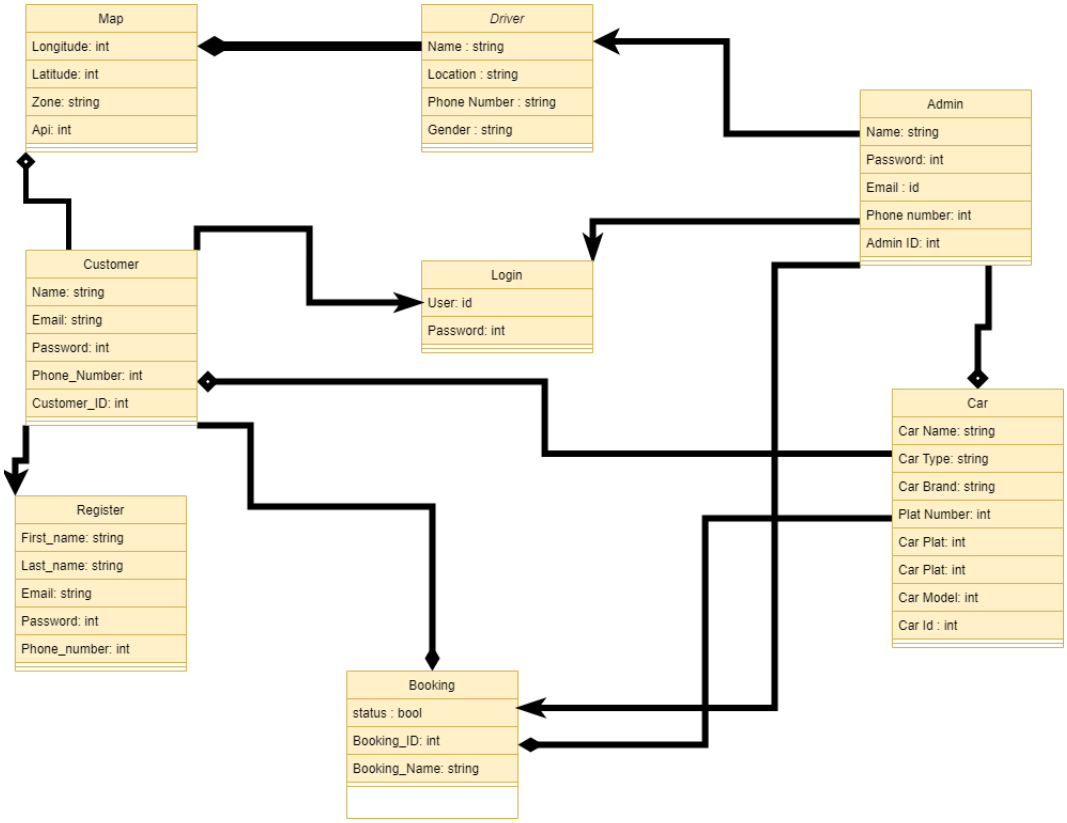

Figure 7 Class Diagram

1.11.1.1 Sequence Diagrams

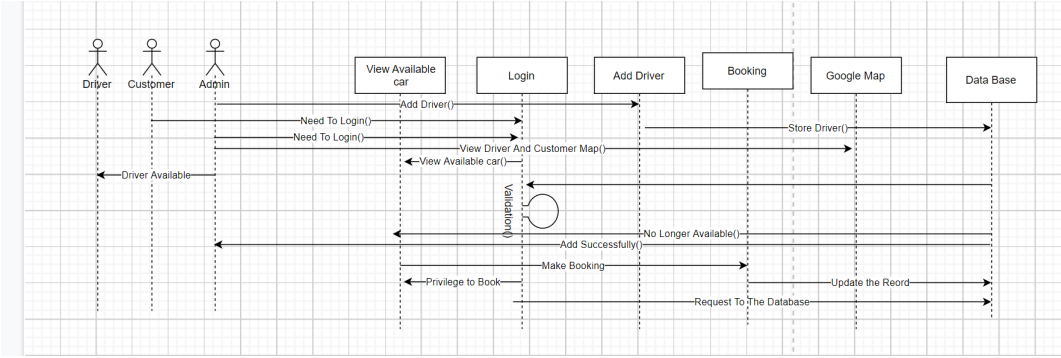

Figure 8 Sequence Diagram

a) SD001: Sequence diagram for view Car detail by customer

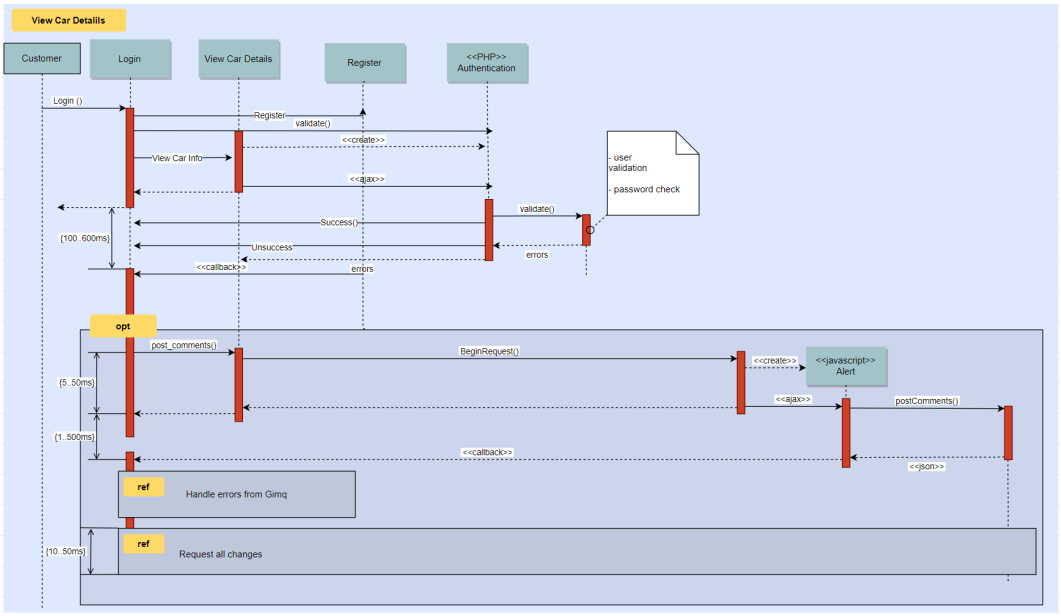

Figure 9 sequence for customer login and register

b) SD002: Sequence diagram for Booking

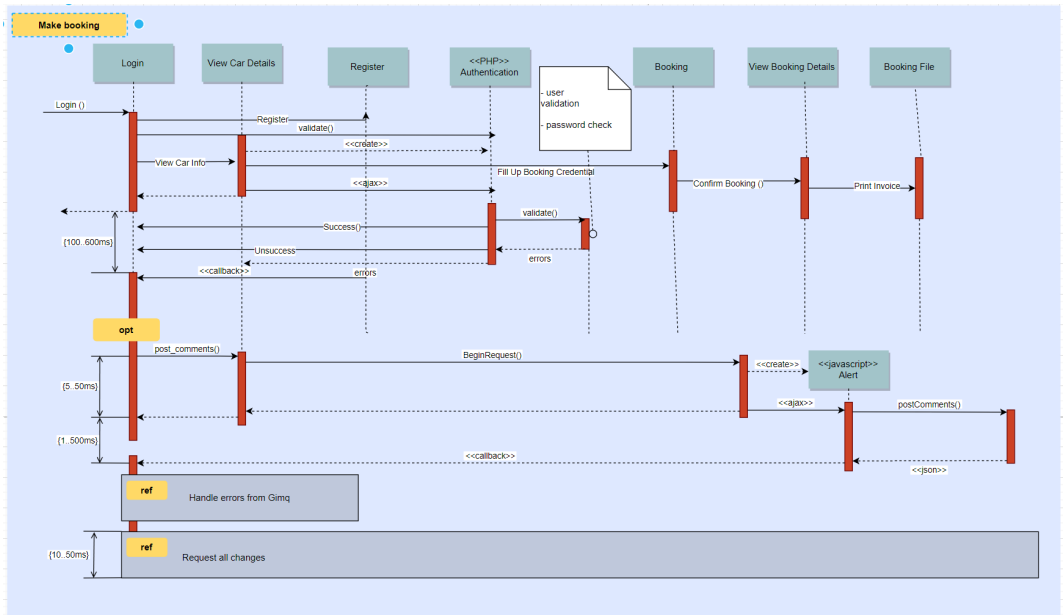

Figure 10 sequence of booking

2 Data Design

2.3 Data Description

the data of this project is organized by MYSQL, this data base consist of 8 table which is Cars table and customer table with driver table and feedback table also we have rented car table, this tables consist of many data to be stored such as car table which include car id and car name plate car image and car name.

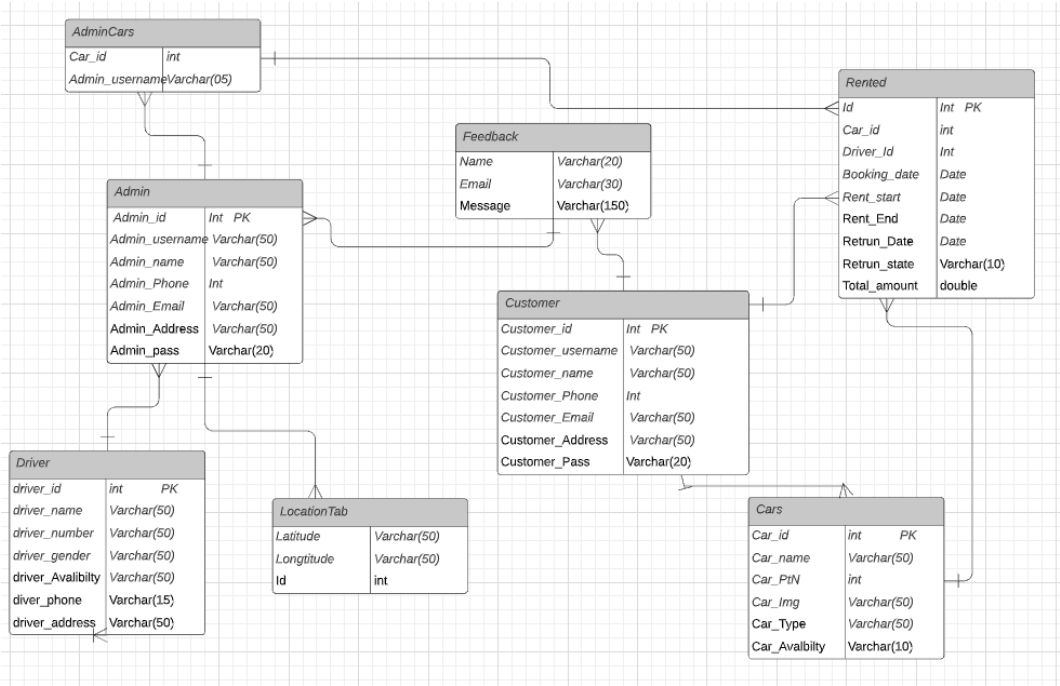

Figure 11 ERD for Car rental system

2.4 Data Dictionary

Below is the description of the data dictionary in the DCMS database system.

Database Table for customer

Attribute	Data Type	Description
Customer_id	Integer	Primary key
Customer_username	Varchar	Approve 50 letter
Customer_name	Varchar	Approve 50 letter
Customer_phone	int	Approve integer number
Customer_email	Varchar	All the email can did the process
Customer_Address	Varchar	Approve 50 letter
Customer_pass	Varchar	Approve 20 letter

Database Table for Admin

Attribute	Data Type	Description
Admin_id	Integer	Primary key
Admin_username	Varchar	Approve 50 letter
Admin_name	Varchar	Approve 50 letter
Admin_phone	int	Approve integer number
Admin_email	Varchar	All the email can did the process
Admin_Address	Varchar	Approve 50 letter
Admin_pass	Varchar	Approve 20 letter

Database Table for Cars

Attribute	Data Type	Description
Car_id	Integer	Primary key
Car_name	Varchar	Approve 50 letter
Car_ptn	integer	Approve Plate number of the cars.
Car_image	Varchar	Approve the picture with Varchar 50 letter.
Car_type	Varchar	Approve 50 letter
Car_Available	Varchar	Approve 10 letter

Database Table for Rented

Attribute	Data Type	Description
ID	Integer	Primary key
Car_ID	Integer	Approve id of the car-real number.
Driver_ID	integer	Approve id from the driver –real number
Booking_date	date	After booking decide stat date and end date
Rent_start	Date	Rent start from decide day
Rent_end	Date	Rent end after the time
Total_Amount	Double	Approve every proximity number.

3 User Interface Design

3.3 Overview of User Interface

The user interface of this system focuses on the web-based system, the user interface is easy to operate and very friendly for each user, so that all users no matter what difference will be able to operate and understand the system. user interface, what they should do at each step.

3.4 Screen Images

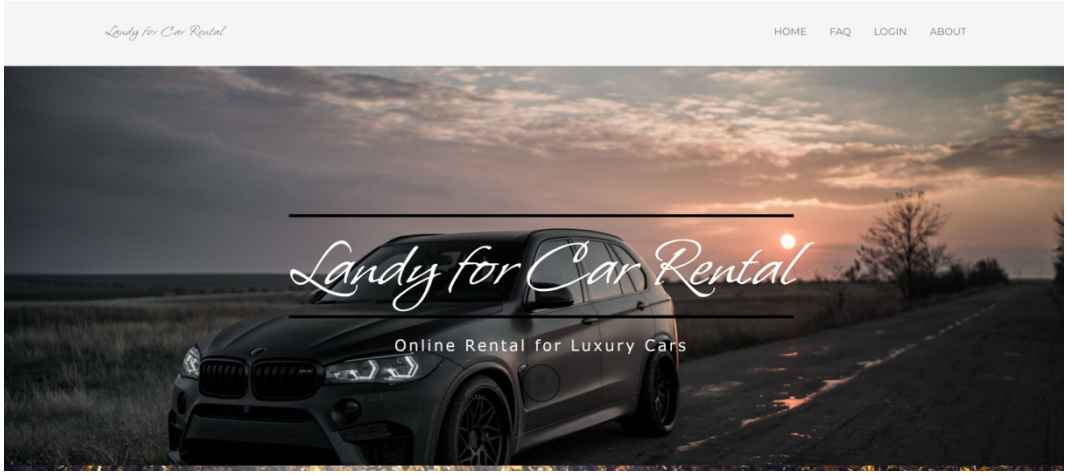

Figure 12 Home Page

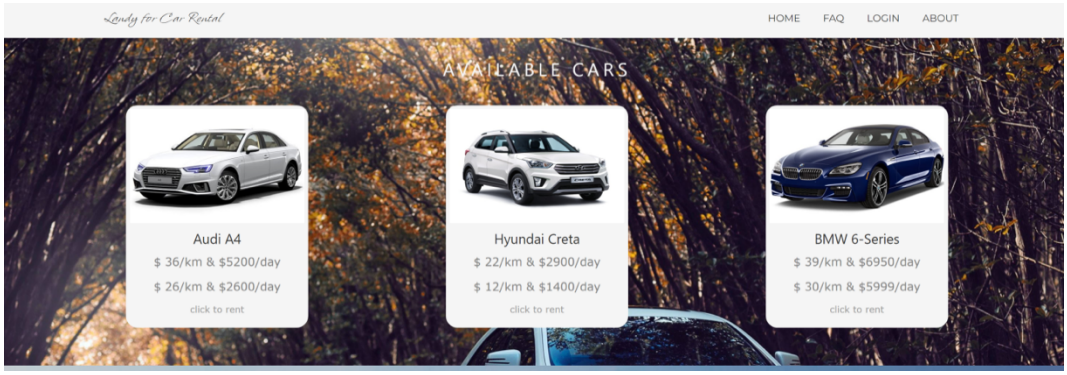

Figure 13 Available cars

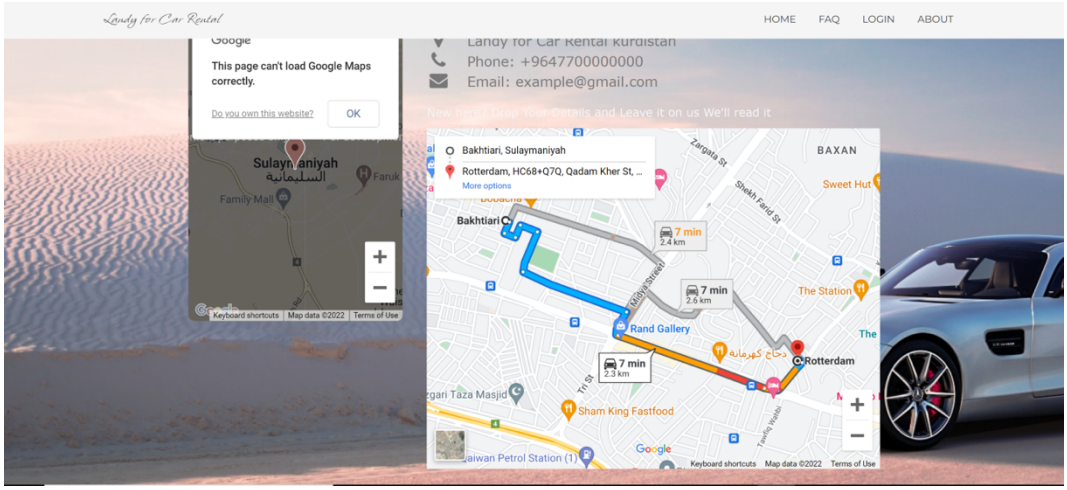

Figure 14 Google Api in the home page

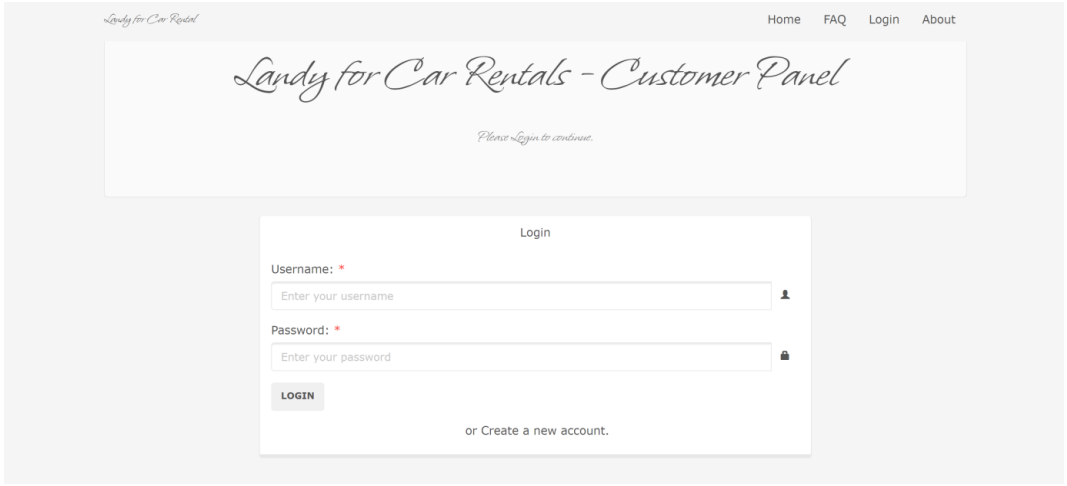

Figure15 Login Page

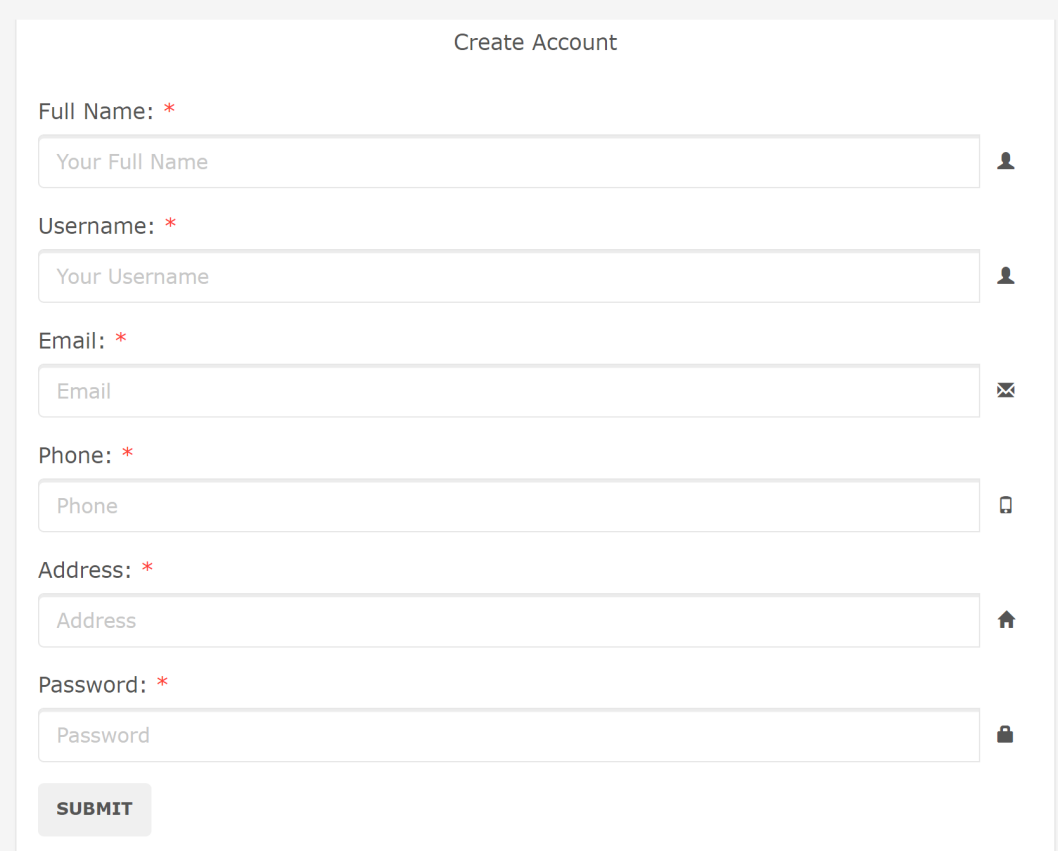

Figure 16 Register page

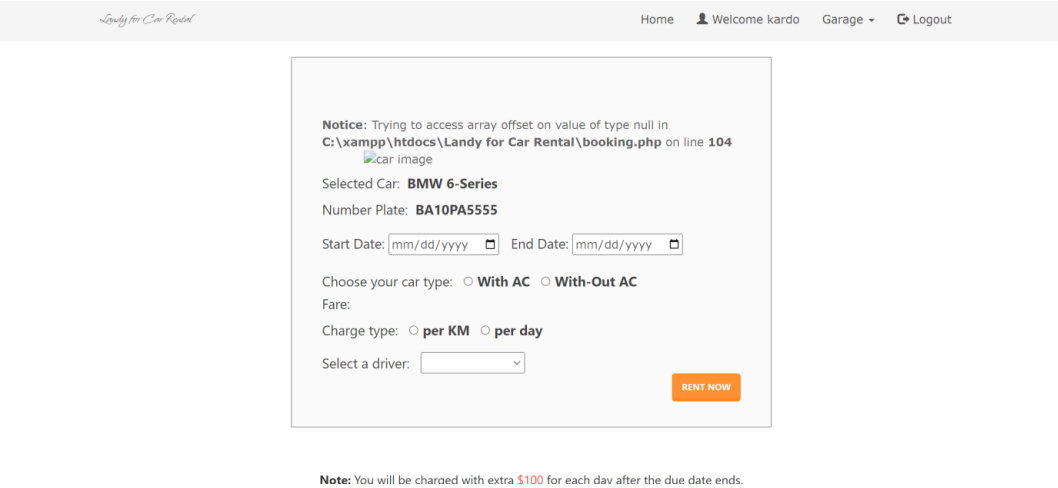

Figure 17 car details

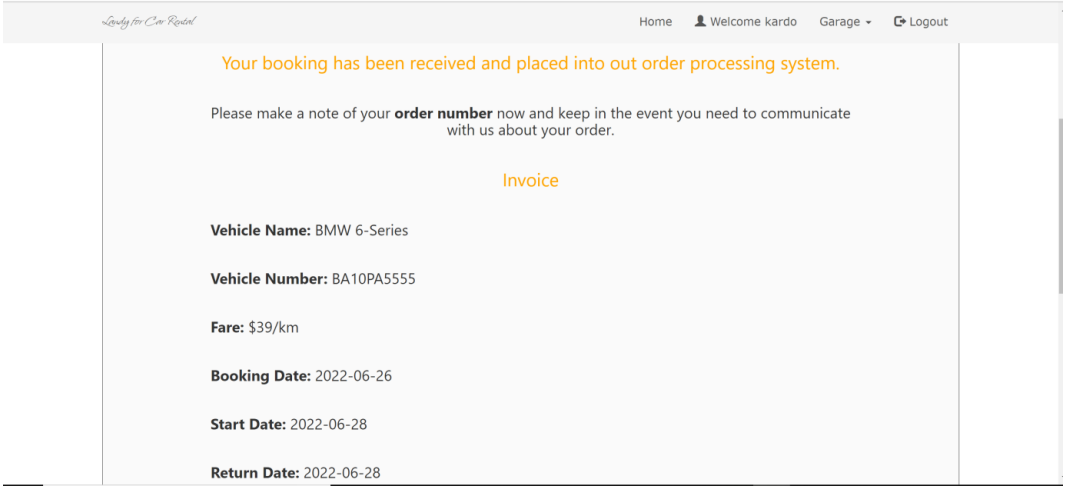

Figure 18 Booking Details

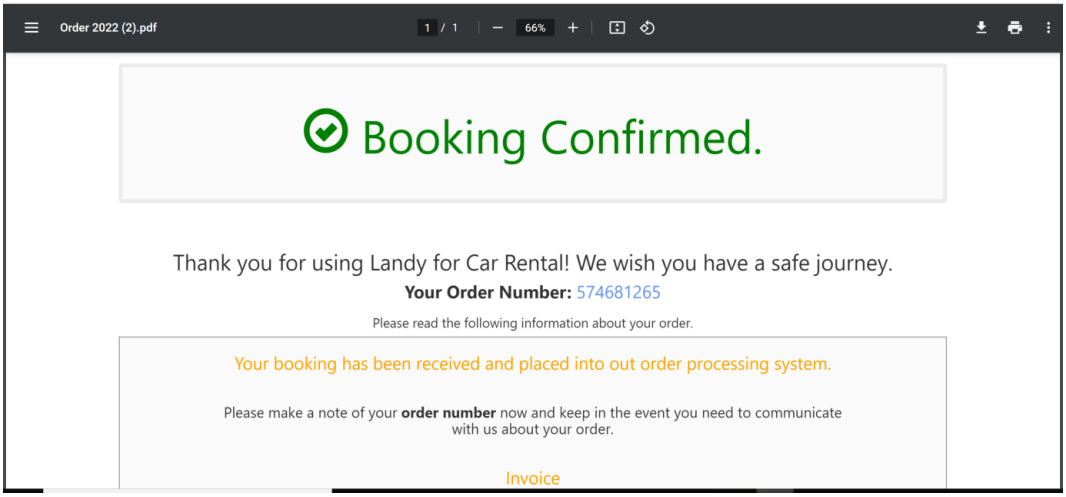

Figure 19 Print Invoice page

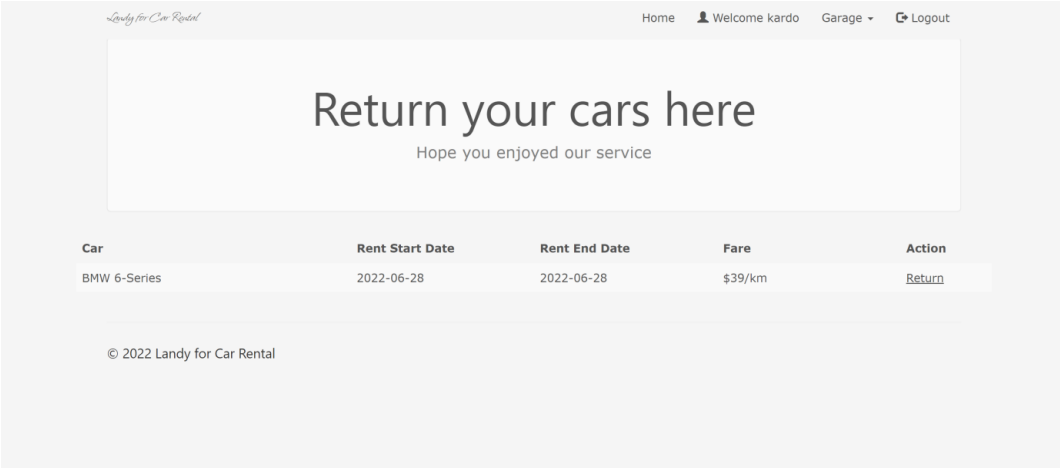

figure 20 Return car Page

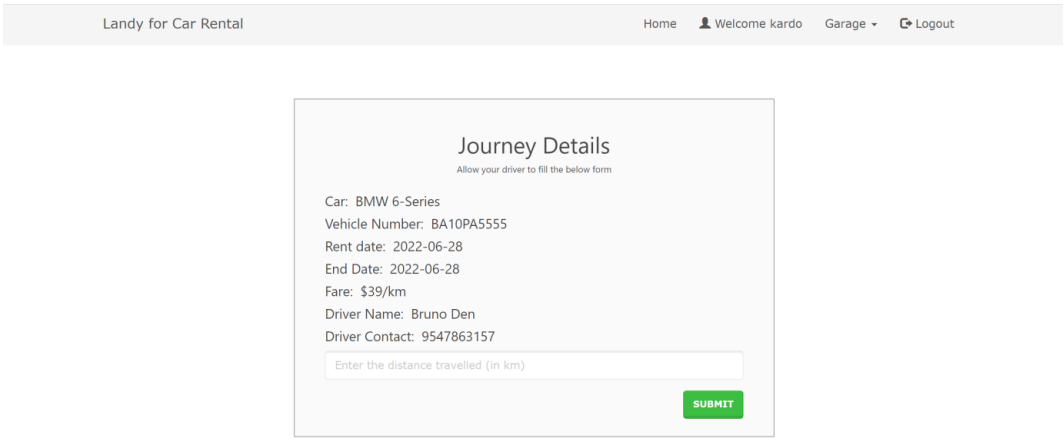

Figure 21 car detail with driver

Appendix D
Software Testing Documentation

Software Testing Documentation

Project Title Car Rental System

Version 1.0

Printing Date:16/6/2022

Department and Faculty

Prepared by: Landy Ibrahim Ahmed

Revision Page

h. Overview

In this document, the project will be further explained with more Testing of the system and understand how the system is test it.

i. Target Audience

This website proposed for customer for using easily and admin who can manage the website and we will test them.

j. Project Team Members

List the team members and respective assigned module.

k. Version Control History

Version	Primary Author(s)	Description of Version	Date Completed
1.0	Landy Ibrahim	Completed all the necessary sections	16/6/2022

Table of Contents

1.Introduction

Documentation of artifacts produced during or for testing a software program is called test documentation. The value of the processes for the customer, the individual and the company is reflected in the documentation.

1.1 Purpose

This STD provides… Unit testing is performed on each class in the proposed project in addition to system testing, which is essential to ensure that constructors and methods work as expected. There are three types of testing for the system including acceptance testing, white box testing, and black box testing.

1.2 Scope

The software product is… The scope of a test specifies which components of a customer's product to evaluate, which features to focus on, which types of bugs the customer is interested in, and which components or features should not be checked at all.

1.3 Definitions, Acronyms and Abbreviation

Definitions of all terms, acronyms and abbreviation used are to be defined here.

Abbreviation	Definitions
STD	SOFTWARE TESTING DOCUMENT

1.4 System Overview

Software testing compares software against user and system requirements. In the software development life cycle, testing takes place at the phase level or at the module level of the program code. Validation and verification are part of software testing.

2 Test Cases, Data and Expected Results

2.2 Test TC001 for Module <Registration and login >: <Login (UC001)>

This test contains the following test cases:

UC001_01: e.g. Login (username)

Test Case ID	Input data	Expected result	Actual result	Pass / Fail
TC001_01_01	5	Username is too short, try again	Unsuccessful	pass
TC001_01_02	6	Go to password field	successful	pass
TC001_01_03	10	Go to password field	successful	pass
TC001_01_04	11	Username is too long, try again	Unsuccessful	Pass

UC001_02: e.g. Login (password)

Test Case ID	Input data	Expected result	Actual result	Pass / Fail
TC001_02_01	5	Password is too short, try again	successful	pass
TC001_02_02	6	Password OK	successful	pass
TC001_02_03	10	Password OK	successful	pass
TC001_02_04	11	Password is too long, try again	successful	pass
TC001_02_05	ab12!@	Password OK	successful	pass
TC001_02_06	abc123	Password missing symbol	Un successful	pass
TC001_02_07	abc!@#	Password missing number	Unsuccessful	pass
TC001_02_08	123!@#	Password missing character	Unsuccessful	pass
TC001_02_09	abc123	Password missing symbol	Unsuccessful	pass
TC001_02_10	abcdef	Password missing numbers and symbol	successful	pass

TC001_02_11	123456	Password missing characters and symbol	successful	pass
TC001_02_12	!@#$%^	Password missing numbers and characters	Un successful	Fail
TC001_02_13	(empty)	Password other than character, number and symbol	Un successful	fail

3 Test Approach Analysis

Black box testing is a technique for testing the functionality of software applications without accessing the underlying code structure, implementation specifications, or internal paths. Black Box Testing is based entirely on software requirements and standards and focuses primarily on the input and output of software programs. Behavioral testing is another name for it.For our system, we have selected black box tests because testers do not need to learn the details of implementing the system and it has a low probability of false positives and, finally, this technique is less complex because it simply models the behavior of the system. common user.

UC001: Login

- Username must have at least 6 characters and at maximum 10
- Password must have at least 1 character, 1 number and 1 symbol
- Password length must be between 6 to 10

Username

EP class 1 (valid): 5 < username < 15

EP class 2 (invalid): username < 6

EP class 3 (invalid): username > 20

BVA values for username: 5, 6, 10, 11

Password

EP class 1 (valid): 5 < password < 16

EP class 2 (invalid): password < 6

EP class 3 (invalid): password > 16

EP class 4 (valid): password {character, number, symbol}

EP class 5 (invalid): password {character, number}

EP class 6 (invalid): password {character, symbol}

EP class 7 (invalid): password {number, symbol}

EP class 8 (invalid): password {character} | password {number} | password {symbol}

EP class 9 (invalid): password other than {character, number, symbol}

BVA values for password: 5, 6, 10, 11

Boolean values: {character, number, symbol}, {character, number}, {character, symbol}, {number, symbol}, password {character} | password {number} | password {symbol}, password other than {character, number, symbol}

Additional Material

Provide appendices if any.

A.*n* Log for test *n*

A.*n*.1 Test Results

A.*n*.2 Incident Report

APPENDIX A. TRACEABILITY MATRIX

Test Case ID	**Use Case ID/ Sequence Diagram ID**	**Package ID**
TC001 for <Name of Module1> • TC001_01 • TC001_02	UC001 • SD001 • SD002	P001
TC002 for <Name of Module1> • TC002_01 • TC002_02	UC002 • SD004 • SD005	P001
TC003 for <Name of Module2> • TC003_01 • TC003_02	UC003 • SD006 • SD007	P002