CAR SERVICE BOOKING SYSTEM FOR DAIHATSU MOTOR MALAYSIA (DMM) SERVICE CENTRE

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CAR SERVICE BOOKING SYSTEM FOR DMM SERVICE CENTRE

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ABSTRAK

Prosedur tempahan semasa di DMM Sales Sdn Bhd adalah berdasarkan tempahan manual, di mana pelanggan mereka perlu membuat panggilan telefon hanya pada waktu perniagaan untuk menempah slot masa. Prosedur ini menyebabkan kesulitan kepada pelanggan dan kakitangan DMM. Oleh itu, Sistem Tempahan Penyelenggaraan Kereta (CSBS) dicadangkan dan dibangunkan yang bertujuan menyediakan kemudahan untuk sistem tempahan servis kereta berasaskan web. Para pelanggan dapat menguruskan proses tempahan mereka sendiri dengan memilih slot masa yang diperlukan di laman web. Ini boleh dilakukan pada bila-bila masa atau tempat selagi pelanggan mempunyai kemudahan internet untuk menyelesaikan proses tempahan. Mereka juga boleh mengemas kini atau membatalkan jika perubahan tempahan diperlukan melalui laman web CSBS tanpa membuat panggilan telefon kepada syarikat. Metodologi yang dilaksanakan untuk projek ini adalah Rapid Application Development (RAD) kerana ia mempercepatkan pembangunan dan mendapatkan maklum balas daripada pengguna pada peringkat awal. Sebaik sahaja aplikasi ini selesai, ia akan diuji kepada klien untuk ujian penerimaan pengguna (UAT) untuk memastikan bahawa semua fungsi berjalan mengikut keperluan yang diberikan. UAT mendedahkan bahawa sistem aplikasi yang dicadangkan telah mencapai matlamat dan dapat menyelesaikan masalah manual seperti yang dihadapi.

ABSTRACT

The current practice of booking procedure in DMM Sales Sdn Bhd is based on manual booking, where their customer needs to make a telephone call only in business hours to book for a time slot. This procedure caused difficulties to both DMM customer and staff. Therefore, Car Service Booking System (CSBS) is proposed and developed which aim to provide a facility for a web-based car servicing booking system. The customers able to manage their own booking process by selecting the required time slot at the website. This can be done at any time or place as long as the customer has internet facility to complete the booking process. They also able to update or cancel if changes of booking are required through CSBS website without making phone calls to the company. The methodology implemented for this project is Rapid Application Development (RAD) since it speeds up the development and obtain feedback from users at early stage. Once the application is completed, it is tested to the client for user acceptance test (UAT) to ensure that all function work according to the given requirements. The UAT disclosed that the proposed application system has achieved the objective and able to solve the problem of manual as faced.

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LIST OF ABBREVIATIONS

DMM	Daihatsu Motor Malaysia
RAD	Rapid Application Development
PHP	Hypertext Pre-processor
CSBS	Car Service Booking System
SRS	Software Requirement Specification
SDD	Software Design Document
ERD	Entity Relationship Diagram
MySQL	My Structured Query Language

CHAPTER 1

INTRODUCTION

1.1 Background of Study

Management systems are systematic structure designed to manage an organization's policies, procedures and processes and develop continuous improvement within. It widely used because it helps to perform all the tasks required to accomplish an objective. Most of the organization will have their own management system to help their task done easily.

In this project, it focuses on managing online booking. Online booking system is one of the important parts in the management system since it will help customer to manage a booking easily compared to manual booking. Besides, online booking can reduce the resources such as money and time.

This booking system is focuses on car service and it designed for DMM Sales Sdn Bhd. DMM is known as “The Largest Perodua Dealer in Malaysia” and this system is focus on DMM Service Centre since they still using manual booking either through phone call or walk-in. Other companies such as Proton or Toyota, they already have their own car service booking system to facilitate the user to manage the booking car service. In order to achieve the same standard, DMM company should have their own booking system for car services.

Manual management system that have been used by DMM Service which led to several issues such as work performance and efficiency. Due to lack of staff, the company will not able to manage booking for multiple customers and the same time and it will

affect the production of car services and customer's satisfaction. Therefore, a computerized car service booking system is developed.

The record in car service booking system can be used for data analysis. The user for customer of this system can view their yearly car services and the admin can view the profit or production of their company so that they can improve their performance in future.

1.2 Problem Statement

The current implementation of DMM booking for car maintenance service is done manually. Due to this implementation, customer need to book during office hour through phone call between 8.00am to 5.00pm which might turn for some customer are not able to book because they are very busy during that hour.

Next, sometimes staff of service company need to entertain many customers at their office and not able to pick up the phone call. So, most customer decide to walk-in if they not able to book through phone call without acknowledge the company. As the result, they need to wait for people that have book previously.

Lastly, staff may record an inaccurate information such as number plate or phone number during the conversation through phone call. So, when customer came for service, they find out that their car is not booking yet.

1.3 Objective

The objectives of this project are:

i. To study the process of existing car service booking system and propose suitable modules for web-based application.
ii. To develop a prototype of web-based car service booking system.
iii. To test the user acceptance for proposed prototype.

1.4 Scope

The scopes for this project are:

i. Car service booking system are developed as web-based application.
ii. The target area is in car service company which consist of customers and staff.
iii. Car service booking system is aimed for DMM service center where the users are administrator, DMM staff (service advisor) and customer (owner of the car).

1.5 Report

This report consists of the five chapters which are Introduction, Literature Review, Methodology, Result and Discussion and Conclusion. Chapter one discusses on the introduction of the project. It covers the background of the study, problem statement, objective of the project and scope.

Chapter 2 is discussing on the literature review for the project. Literature review contains the information about technique/method/hardware or technologies which suitable to be adapted into the project.

Chapter 3 is discussing on the overall approach and framework of the project. It covers method, techniques or approach to be used and include introduction, methodology, hardware or software, Gantt chart and testing plan.

Chapter 4 is discussing on result of finding based on the testing that have been done. It also includes the explanation of the discussion that shows the objectives of this project is fulfilled.

Lastly, Chapter 5 is discussing the conclusion of overall project. It includes the research constraints during the development and future work for system improvement.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter discusses on the existing car service booking system in Malaysia. Due to some problem of existing system such as unauthorized user inserts dummy data to book for car service that cause system database stored inappropriate data or sometimes null data, Car Service Booking System for DMM Service Centre is proposed a solution that helps to ease the users. It also discusses on the comparison between the existing system and proposed system.

2.2 Current System

In this subchapter, it explains about existing system that related to this project. CSBS is a system that used to manage booking for car service. The current system that have a same purpose is Proton Edar, Toyota Malaysia and HZN CARS.

2.2.1 Proton Edar

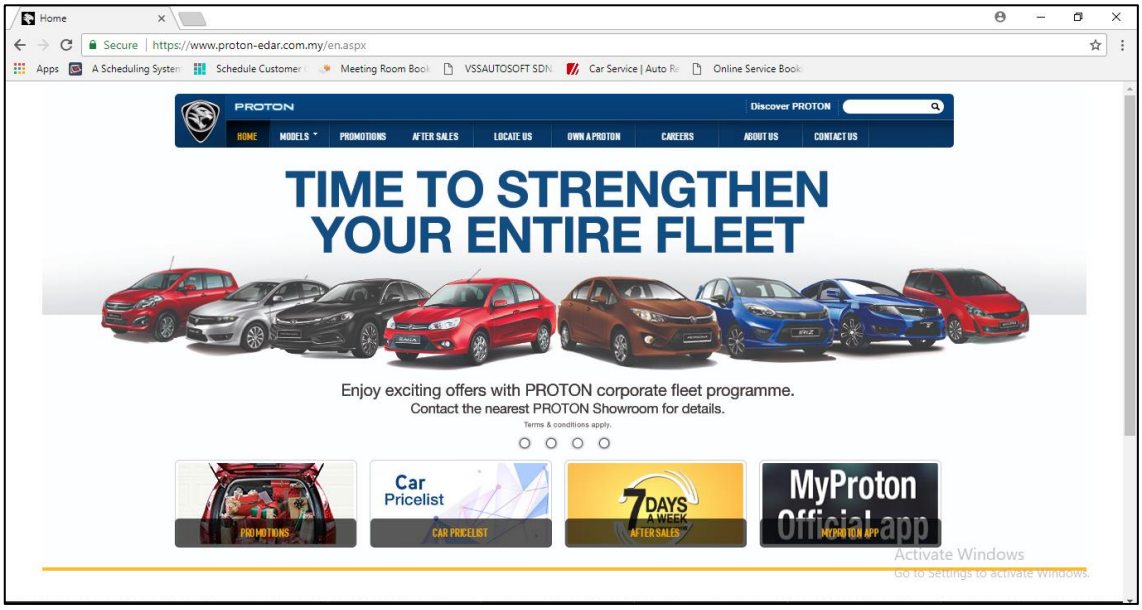

Figure 2.1: Main page of Proton-Edar.com.my

Proton Edar is a national brand that offers online booking for car servicing in their website. It also available in both web-based and mobile application. Figure 2.1 shows the main page of Proton Edar and it contains several functions such as register the vehicle to continue receiving important announcement, special offers, product and service information. Besides, this website also provides loan calculator to help customers the estimates their loan and plan for their financial. Other than that, this website provides latest promotions, list of car models, list of Proton outlet and careers where it shows job advertisement that Proton offer.

The advantage of this website is it use simple form field and divide according category. It helps to ease the user to fill in the form. The disadvantage of this system is less security. There is no verification of the users and it allows users to make a dummy data. Besides, the users need to book at least 3 days before the servicing date and it quite long time for the users to wait until the admin confirm their booking.

2.2.2 Toyota Drive

Figure 2.2: Main page of Toyota Drive Application

Toyota Drive offers online booking for car servicing via mobile application. As shown in Figure 2.2, this application offers several functions such as login and registration where customer need insert their identification number or car registration number to proceed this function. It is to avoid unauthorised user from using this application. Besides, ToyotaDrive application provide service appointment function and service package where it shows the estimate price for certain package of services. It also has an outlet location function where it able to detect our current location to find the nearest outlet to send for car servicing. Lastly, it provides catalogue of Toyota car models and pre-owned cars that available for sales.

The advantage of this application is the security. It only allows registered user to book for car maintenance. To register as customer, the users need to key in their IC number and car registration number so that only authorized user will use this function. The disadvantage of Toyota Drive application is it still has issue that not being fix such as the database. From the user's review, they cannot sign in after register into the website because it says that there is no record of the customer.

2.2.3 HZN CARS

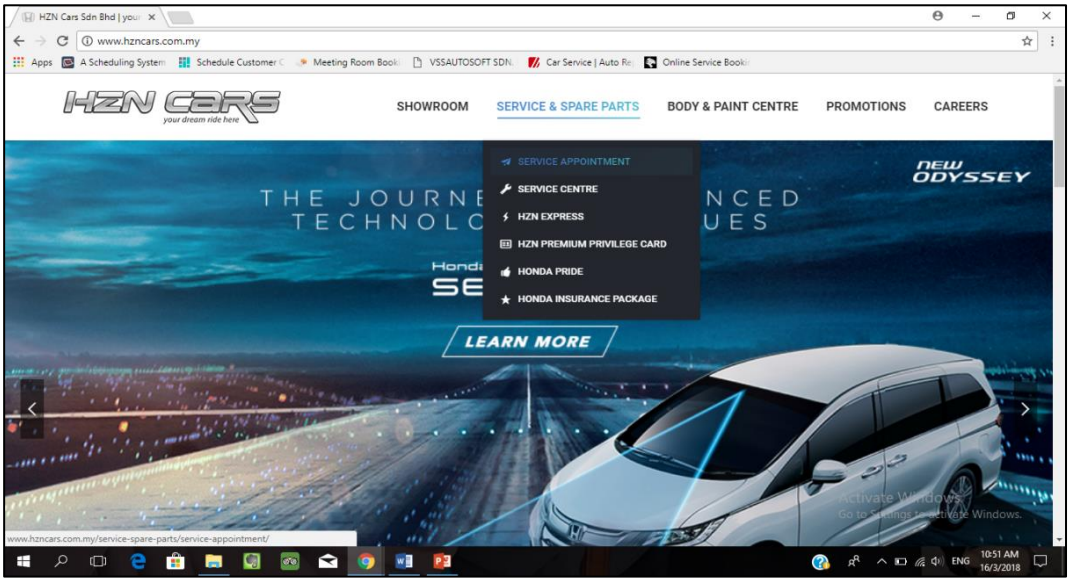

Figure 2.3: Main page of HZN CARS

HZN CARS SDN BHD is a company that offer Honda's brand which include sales, services and spare parts. HZN Cars is a web-based application and a one-stop centre for all Honda's maintenance needs. Figure 2.3 shows the main page of HZN CARS that contains several functions such as pre-booking where customer can insert details to book for car servicing but need to be approved by the company first. Besides, it also has the catalogue for car models and locations of Honda outlets. Other than that, HZN CARS provide the latest promotions and job advertisement that currently available.

The advantage of this webpage is easy to use because it less navigation. Besides, the users only need to input their information in one page. However, there is also a disadvantage which is the users need to book at least 24 hours before selected service time and waiting for the admin to respond the availability of selected time.

2.3 Comparison between The System

Table 2.1: Comparison Between Current System and Proposed System

	Proton Edar	**Toyota Drive**	**HZN Cars**	**Proposed Application**
Technology	Web-based	Mobile apps	Web-based	Web-based
Language used	JavaScript and PHP	Java	PHP	PHP
Module	-Booking	-User Registration -Booking -View Booking -Notification	-Booking	-User Registration -Manage booking -Manage customer's booking -Manage Inventory
Security	Does not required authorize user to book for service	Required authorize user to book for service	Does not required authorize user to book for service	Required authorize user to book for service

Table 2.1 shows the comparison between current system and proposed system. The proposed system of Car Service Booking System for DMM Service Centre are developed as a web-based application since it can be accessed in many platform not only mobile phone devices. Besides, web application can be use without requiring customers to download the application. This can save their memory space compare to mobile application where users need to download the application on their phone.

Next, this system contains several modules such as registration, manage booking, manage customer's booking and manage inventory. These modules are created to help customers and staff to manage their work systematically. A secure system needs to have registered users so that the users will not making false information during the booking process. In addition, manage inventory is proposed because it can facilitate the employees to update the stock in and stock out without using other system. Manage booking is

proposed to help customer to book for car servicing through online website, view the booking history and finally cancel the booking if necessary.

Lastly, this system is proposed to develop in PHP programming language because it is the most suitable language to develop a web application and dynamic web page.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter discusses on the methodology that has been selected to develop Car Service Booking System for DMM Service Centre including the phases involved. There are a lot of methodology that can be choose such as waterfall, agile, scrum, Rapid Application Development (RAD) and many more. Each of these methodologies have different function according the objective of the project and have its own advantages and disadvantages. Therefore, to choose a right methodology we need to consider several aspects such as budget and time constraints.

3.2 Methodology

3.2.1 Discussion on Rapid Application Development

For this project, Rapid Application Development (RAD) is identified as suitable methodology of the development because RAD helps to complete a project on time and reduces the cost (Idesis, 2017). RAD model depends on prototyping and rapid cycle of iterative development to speed up the development and obtain feedback from users at early stage. RAD involves in several phases as shown is Figure 3.1 to complete the process. Below is the list of phases that it takes out:

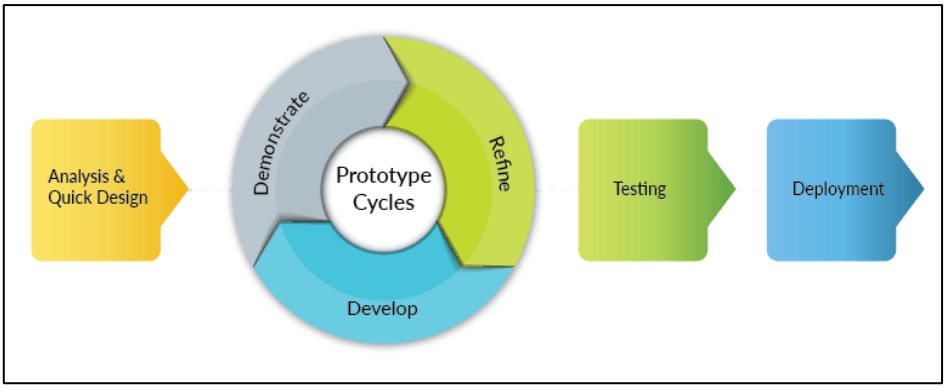

Figure 3.1: Steps in Rapid Application Development

3.2.2 Analysis and Quick Design

Project development begins during this phase which is analysis phase. At this phase some activities are carry out which includes:

i. Requirement gathering

Some requirement had been gathered such as service information, product information and booking process during a meeting with client, Miss Ummi Afifah, Service Advisor of DMM Sales Sdn Bhd. All requirement details have been included in SRS.

ii. Research on current system

Research on current system had been done by identifying some advantages and weaknesses between three different systems that available in market. These advantages and weaknesses are used to improve the proposed system.

iii. Final requirement

Documenting the requirement are being done and discussed with client to get the approval. Use case diagram and context diagram as displayed in Figure 3.2 and Figure 3.3 respectively were shown to the client to get the approval of the whole system. Use case diagram is needed during this phase to analyze the functionality of the system. Context diagram is used to explain the borderline between the system and its environment.

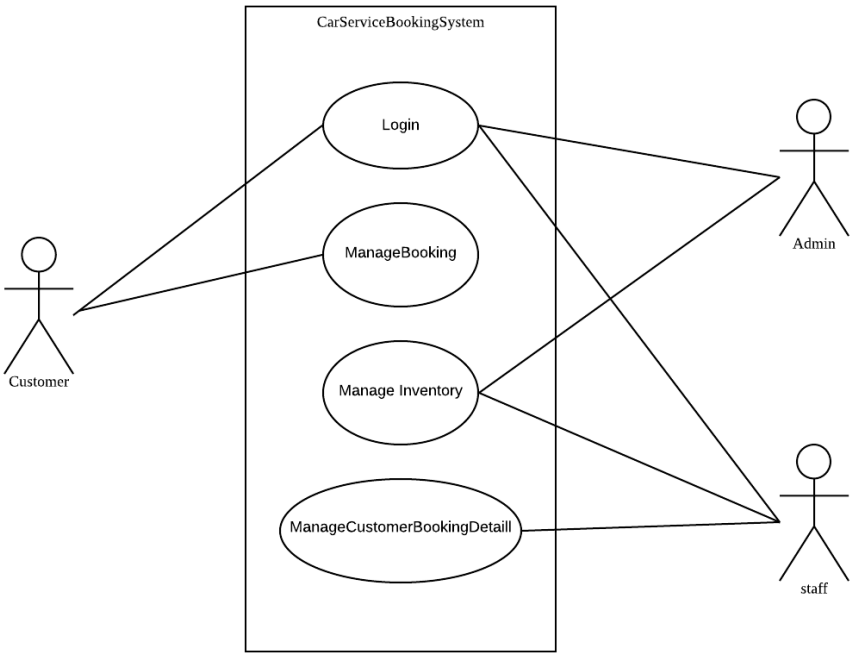

Figure 3.2: Use Case for CSBS

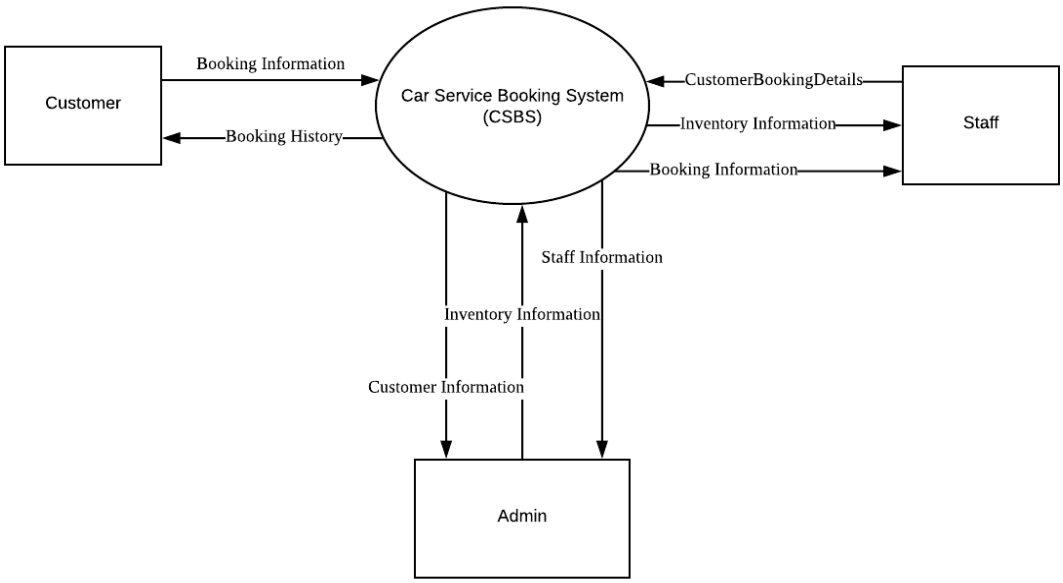

Figure 3.3: Context Diagram for CSBS

At this phase, a quick design is also being done by involving some activities such as:

i. Design the application
The structure of the system was design by transforming the requirement into structure design which include CSBS interfaces. This activity can be seen in Software Requirement Specifications (SRS).

ii. Design the data structure
A data structure was designed to identify the relationship between entities and their relationship to each other. This design is called Entity Relationship Diagram (ERD) as shown in Figure 3.4 below.

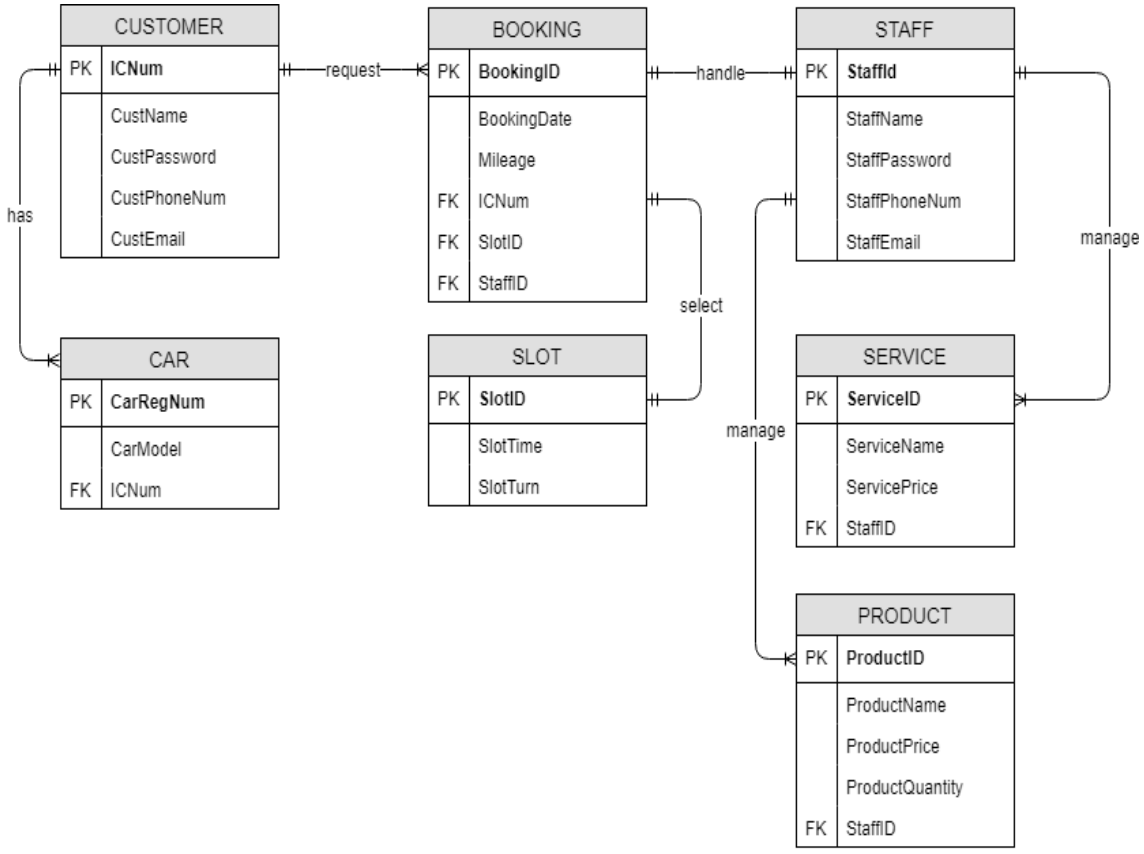

Figure 3.4: Entity Relationship Diagram for CSBS

3.2.3 Develop, Demonstrate, Refine

This phase is the cycle of developing, demonstrating and refining. This phase is conducted in Projek Sarjana Muda 2 (PSM2). The activities that involved during this phase are as follow:

i. Development of the system

   Develop is the process of transforming the prototype into programming code. PHP scripting language is used for the development of CSBS as it is the most suitable language for web development. The tool that being used to write the source code is Adobe Dreamweaver CC 2017 and it is connected with Xampp Server for hosting PHP website.

ii. Demonstrating the system

   CSBS is demonstrated to the client and make the client understand and familiar with the system.

iii. Refining the system

   Develop and demonstrate steps are repeated to refine the system until all of client's requirement are fulfilled.

3.2.4 Testing

Testing is to detect if there is any error occurs. For this project, CSBS is run in client side to test every module by using real data. Some categories are tested such as functionality, compatibility, performance, security and usability. Functionality is to check whether CSBS can be run smoothly or not. Compatibility is to test if CSBS can work for everyone in different scenario. Performance is to examine whether CSBS respond quickly. Security is to test whether the system secure against attack. Finally, usability is checking the ease of use of CSBS and did this system respond to the interaction from user.

3.2.5 Deployment

This is the final phase in RAD where CSBS is ready to be deployed to the client. CSBS is installed to client environment and ready to be used by the end user. All RAD phases are now completed until an updated is required.

3.3 Hardware and Software

Table 3.1 shows the hardware requirement specification required in the development of CSBS. The table describes the purpose of use of the hardware.

Table 3.1: Hardware Requirements for Car Service Booking System

Hardware	Purpose
Laptop	Use to prepare the documentation and development of the project
USB storage	Use to store documents as a backup

Table 3.2 shows the software requirement specification required in the development of CSBS. The table list out all software that has being used and describes the purpose of use of the software.

Table 3.2: Software Requirements for Car Service Booking System

Software	Purpose
Microsoft Word 2016	For preparing the document
Xampp Web Server -Apache -MySQL	To connect with server without access of internet and host the PHP website.
MySQL	As a database platform
Microsoft Project	To create a Gantt chart
Adobe Dreamweaver CC 2017	To write the code and design interface

3.4 Gantt Chart

Gantt chart describes the software development flow and it illustrate the project schedule throughout the whole project development. In this project, the Gantt chart is created based on SDLC model. (Refer Appendix A)

3.5 Implementation

In this subsection, it discussed on the implementation of Car Service Booking System. This system is developed in PHP programming language because it is the most suitable language to make a dynamic and interactive web pages. Besides, this system using Adobe Dreamweaver CC 2017 as the tools in writing the code. Next, Xampp is set up to connect with the server. It is a free open source cross-platform for web server and easy to use for creating local web server for testing and deployment purposes. Lastly, all the data related to CSBS are stored in MySQL. MySQL is fast, reliable and ideal for both small and large applications. Details of implementation are discussed on Chapter 4.

3.6 Testing

Testing is important during the development process because the result of testing can show whether the system is successfully developed or not based on the requirement provided. This system is using black-box testing where the tester is the client who test the system without knowing the internal structure of the code. This method is used to find error such as missing functions, interface errors, performance errors or errors in data structures. User acceptance is carried out during this testing. This testing is to get the feedback from users and to improve the prototype of the system.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

In this chapter, the implementation and result of Car Service Booking System will be explained which includes the codes of the system for every function created in this project and the flow on how the system works.

4.2 Implementation of CSBS

In this section, we are going to walk through the flow of the system based on the users that exist. CSBS consist of three types of user which are admin, staff and customer. All the users have different privilege in the system.

4.2.1 Development environment

This system is developed by using web language such as PHP, HTML, CSS and JavaScript. PHP is for dynamic changes in the webpages while HTML is for creating the basic structure and CSS is for the styling. JavaScript is used to add the responsiveness to the webpages. This system is using MySQL for database management and phpMyAdmin as shown in Figure 4.1 as a software tool to handle the administration of MySQL over the web. Other than that, this system uses XAMPP v3.2.2 to create a local web server for testing and deployment purposes as shown in Figure 4.2. This system consists of several functionality that will be discussed in the next section.

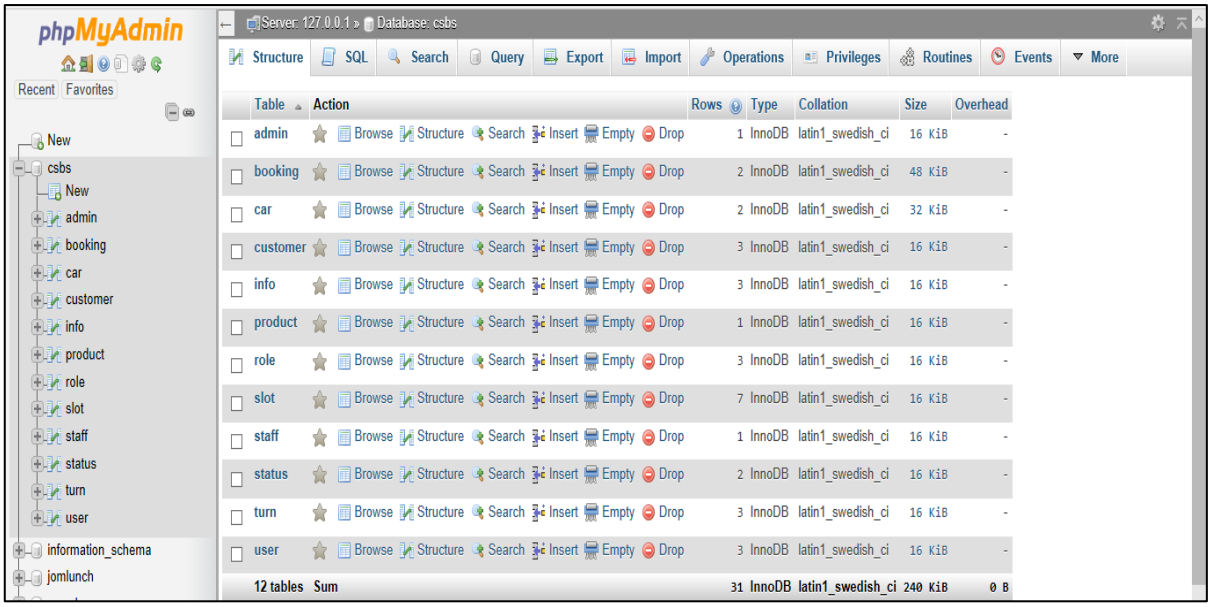

Figure 4.1: phpMyAdmin

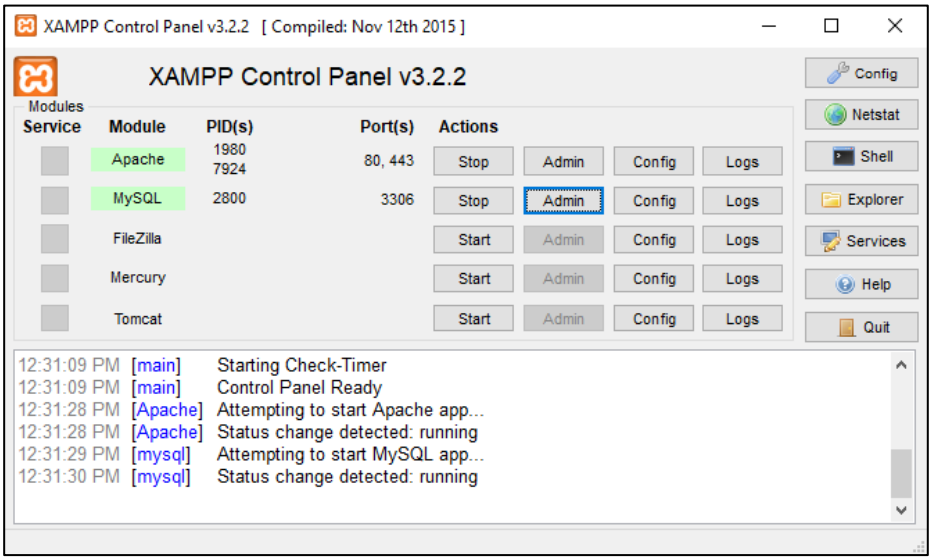

Figure 4.2: Xampp v3.2.2

4.2.2 System Functionality

Figure 4.3 shows a register page where the customers of car service will create an account before started to use this system. Each user can create only one account where it requires IC number and email. Existing IC number and email would not be able to create an account.

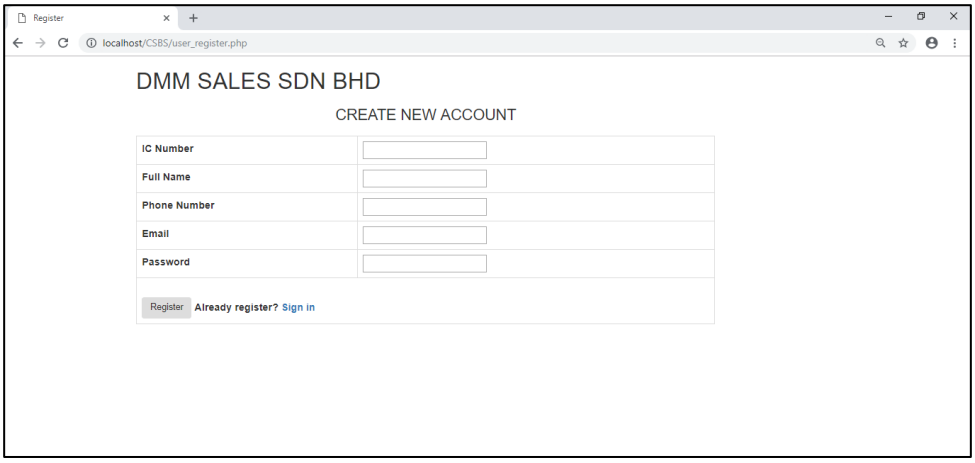

Figure 4.3: Register an Account

Figure 4.4 shows a login page for customers that require them to insert IC number and password. Wrong combination will display an error message.

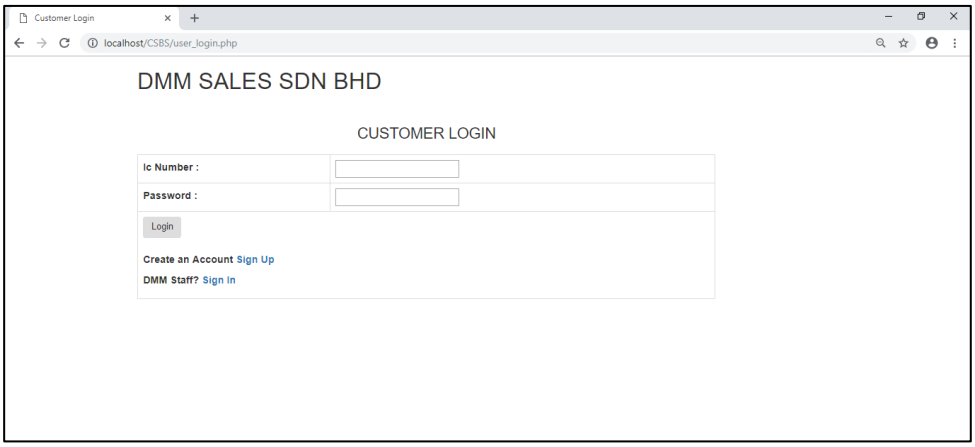

Figure 4.4: Login Page

Figure 4.5 shows booking page where the customers make their appointment. First, the customers need to check the availability slot by choosing the date and click *check* button. Then, they can choose date, time and slot that are still available as shown in Figure 4.6

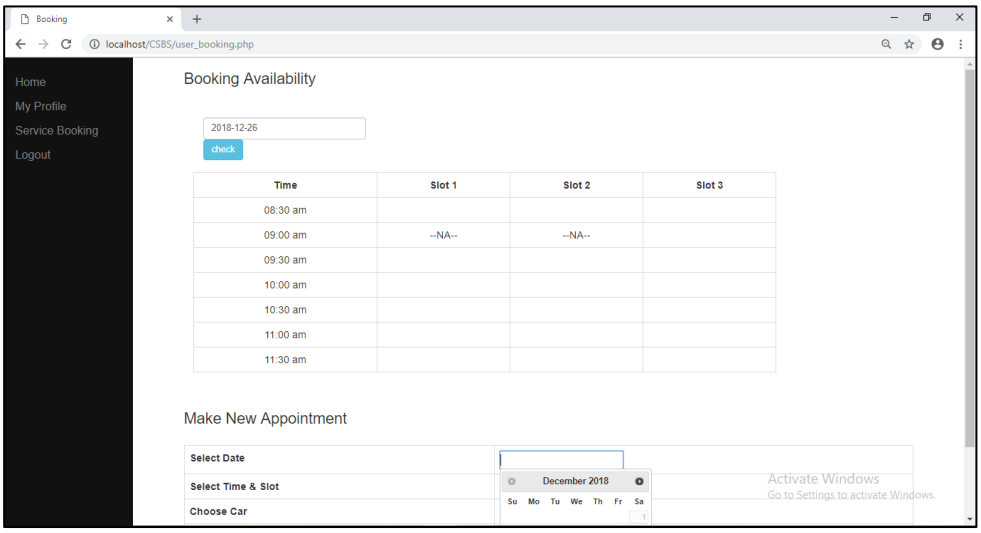

Figure 4.5: Booking Availability

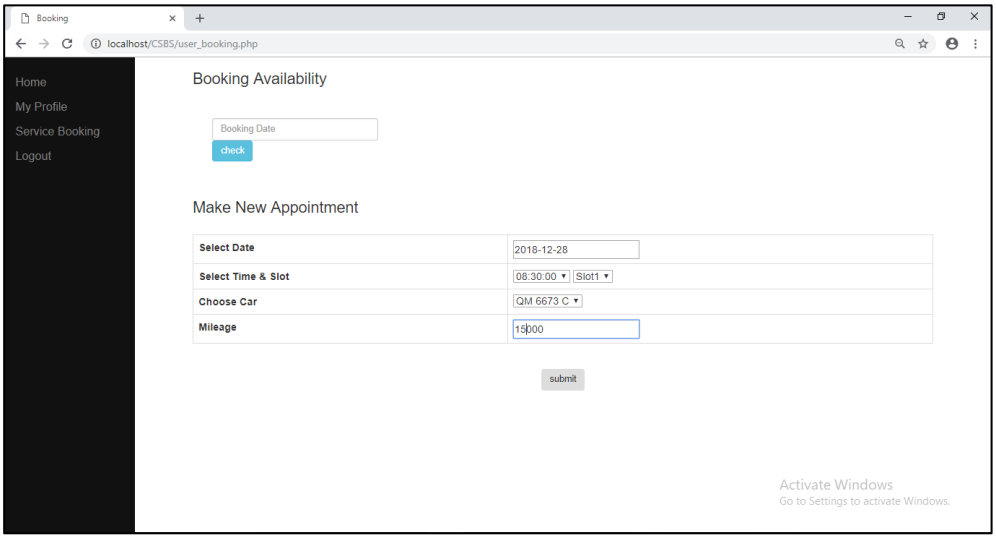

Figure 4.6: Make Service Booking

Figure 4.7 shows the list of booking that being used by staff and admin. They can edit this booking to insert the service details

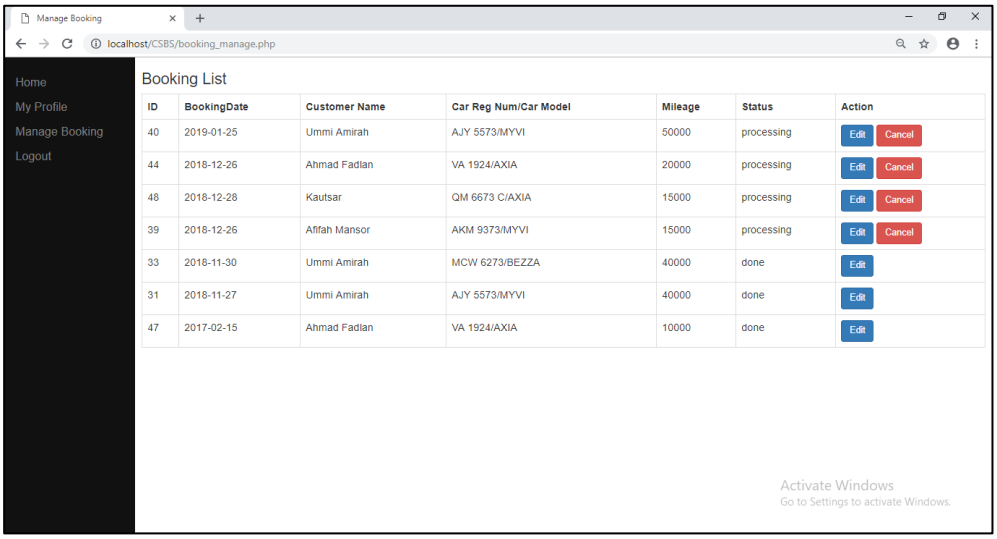

Figure 4.7: Manage Booking

4.3 Testing and Result Discussion

Testing is conducting to helps the developer to verify and validate the system. Any errors in the system can be detected during the testing. In this system, user acceptance test has been carried out. (Refer Appendix D)

4.3.1 Discussion on User Acceptance Test (UAT)

Based on the UAT that has been carried out, there are some comments from the user that measure the satisfaction of using Car Service Booking System. For customers, they suggested to have less navigation during booking process such as clicking button rather than inserting the information. Other than that, the customers understand on how the system works because the process flow is clear. For staff, they suggested that the list of customers can be separated according date so that the system will not display all list of booking in one page. Other than that, all functions work well, and alert message is displayed accordingly.

4.4 User Manual

User manual is a technical communication document intended to give guidelines to people using the system. CSBS provides a user manual for the user to refer before use the system. (Refer Appendix E)

CHAPTER 5

CONCLUSION

5.1 Introduction

The purpose of this chapter is to make an overall conclusion about the process required to develop the Car Service Booking System. It includes the achievements of the objective, effectiveness of methodology, timeline to ensure the project complete on time, research constraints and solution to overcome.

This booking system consists of three users which are customer, staff and admin. Each of the user will perform different functionality and the users are from DMM Service Centre. Admin of this system basically the manager of the company who can control all the functionality in the system. Staff is the service advisor in the company who will manage the customer's booking and car services. Customer is the owner of the Perodua's car who has register an account in the system. The system can only being use by these three users who have an account of this system.

5.2 Research Constraint

There are several constraints upon completing this project. One of them is to gather the requirement from client. It is hard to meet the client and most of the requirement are gather through mobile phone and it is difficult to communicate or discussing about the requirement through mobile phone. Other than that, there are some changes need to be corrected as the main plan is to send notification through customer's phone, but it is not able to be implemented.

5.2.1 System Constraint

There are several limitations of this system such as the view for web application. This system is designed for web-based application so users who open the system from mobile devices will having less user experience. Other than that, this system will only be operated if there are an internet connection and server connection to store data into database.

5.3 Future Work

Although the objectives of this system have been achieved, some improvement are still necessary. There is some enhancement can be carried out for future improvement of CSBS. Below is the list of improvement that can be done:

- The system needs to be improvised to become more user-friendly and less navigation such as during the booking process, the users just click the empty slot without having to insert or choose from dropdown menu.
- The system will be available for mobile application, so it can ease the customer to access the system.
- The system will able to accept payment for the car service, so the customer will not bring many cash during the services.

5.3.1 Commercial Value

Although this system is designed for DMM Service Centre, it can also be used by other car service company or workshop such as Proton, Toyota, Honda or other dealers who wanted to improve their current booking system. The functionality of this system can be used by other company, but some modification needs to be done such as time interval between each booking slot and quantity of car taken on each time slot.

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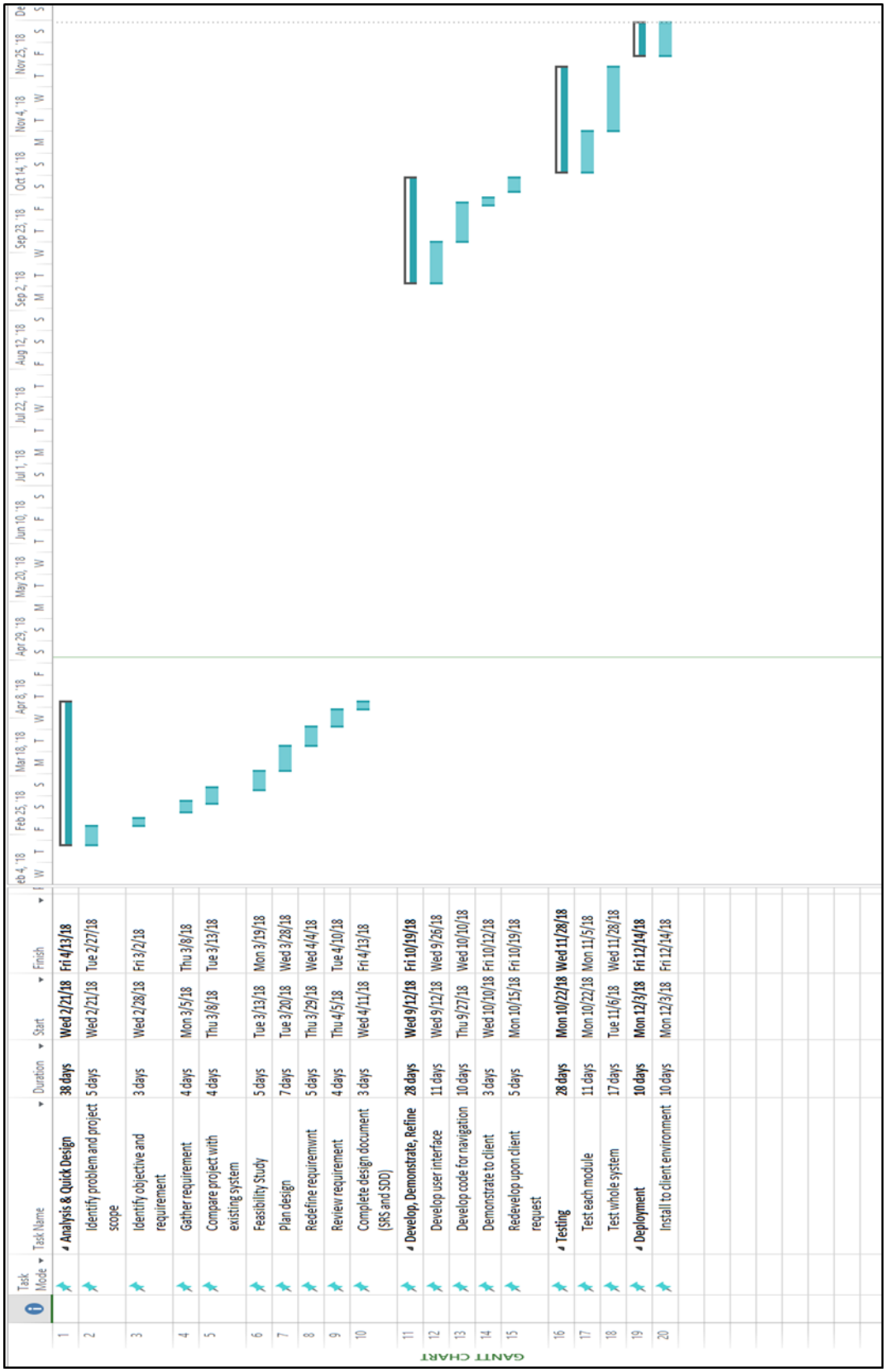
APPENDIX A

GANTT CHART



	Task Mode	Task Name	Duration	Start	Finish
1		**Analysis & Quick Design**	**38 days**	**Wed 2/21/18**	**Fri 4/13/18**
2		Identify problem and project scope	5 days	Wed 2/21/18	Tue 2/27/18
3		Identify objective and requirement	3 days	Wed 2/28/18	Fri 3/2/18
4		Gather requirement	4 days	Mon 3/5/18	Thu 3/8/18
5		Compare project with existing system	4 days	Thu 3/8/18	Tue 3/13/18
6		Feasibility Study	5 days	Tue 3/13/18	Mon 3/19/18
7		Plan design	7 days	Tue 3/20/18	Wed 3/28/18
8		Redefine requiremvnt	5 days	Thu 3/29/18	Wed 4/4/18
9		Review requirement	4 days	Thu 4/5/18	Tue 4/10/18
10		Complete design document (SRS and SDD)	3 days	Wed 4/11/18	Fri 4/13/18
11		**Develop, Demonstrate, Refine**	**28 days**	**Wed 9/12/18**	**Fri 10/19/18**
12		Develop user interface	11 days	Wed 9/12/18	Wed 9/26/18
13		Develop code for navigation	10 days	Thu 9/27/18	Wed 10/10/18
14		Demonstrate to client	3 days	Wed 10/10/18	Fri 10/12/18
15		Redevelop upon client request	5 days	Mon 10/15/18	Fri 10/19/18
16		**Testing**	**28 days**	**Mon 10/22/18**	**Wed 11/28/18**
17		Test each module	11 days	Mon 10/22/18	Mon 11/5/18
18		Test whole system	17 days	Tue 11/6/18	Wed 11/28/18
19		**Deployment**	**10 days**	**Mon 12/3/18**	**Fri 12/14/18**
20		Install to client environment	10 days	Mon 12/3/18	Fri 12/14/18

APPENDIX B SOFTWARE REQUIREMENT SPECIFICATIONS (SRS)

CAR SERVICE BOOKING SYSTEM FOR DMM SERVICE CENTRE

Faculty of Computer Systems & Software Engineering

SOFTWARE REQUIREMENT SPECIFICATION (SRS)

TABLE OF CONTENTS

1.0 PRODUCT DESCRIPTION

1.1 User Characteristics

In this section, it will discuss on the users of Car Service Booking System and its characteristics including requirement and background experience. Table 1.1 shows the list of system users and theirs characteristic.

Table 1.1: User Characteristics

User	Requirement	Background experience
System Administrator	DMM staff only	Have experience in managing large database
Staff	DMM staff (manager, service advisor)	Have knowledge in using a web application
Customer	All registered customer	Have knowledge in using a web application

1.2 Constraints

A system may have any constraints that will limit the developer's option including CSBS. It also has some constraints to consider. Below are the constraints that cannot be avoided during the development of this project and the constraints will limit the use of this system. These constraints are:

- This system cannot be access without internet connection or if the connection is slow because this system needs to fetch data from database through internet.
- The users can only register one time as customer because this system use identification number as primary key.
- Only registered user can use the system.

2.0 INTERFACES REQUIREMENT

2.1 User Interface

In this subsection, it will explain the user interface and its characteristic for each interface. There will be three different interfaces for different users such as admin, staff and customer. Customer will have login interface and booking interface which include add, view, cancel and update booking. For staff, they will have login interface, list of booking record interface, manage service details interface and order stock interface. Lastly, admin will have inventory management interface.

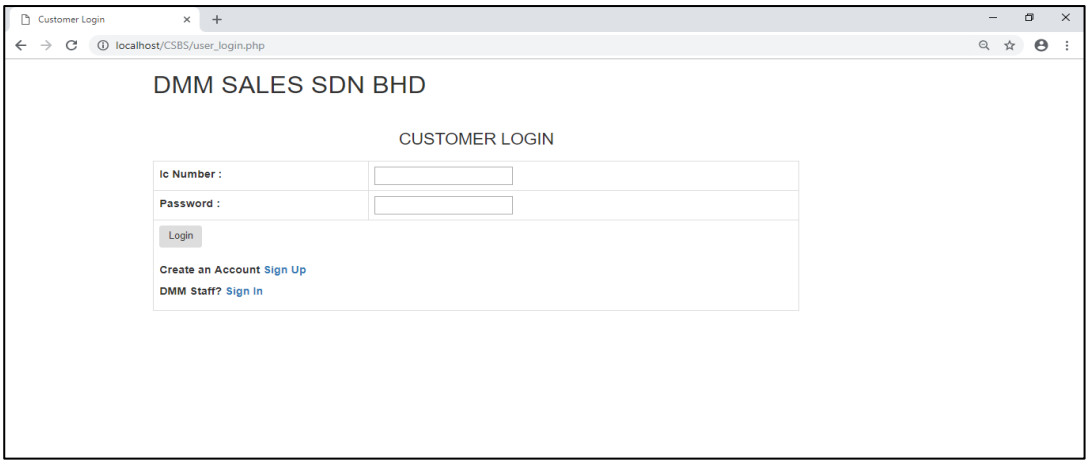


Figure 2.1: Login page

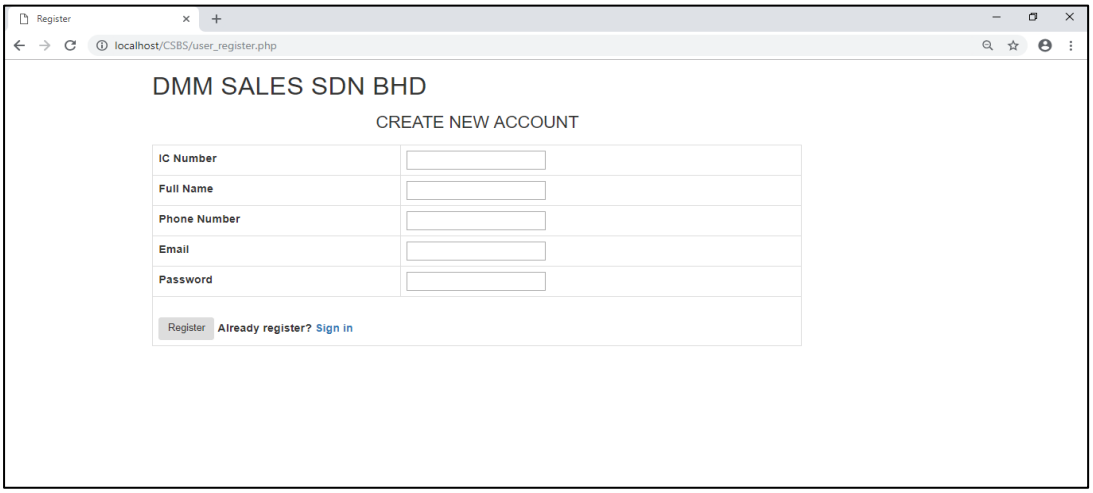


Figure 2.2: Register page

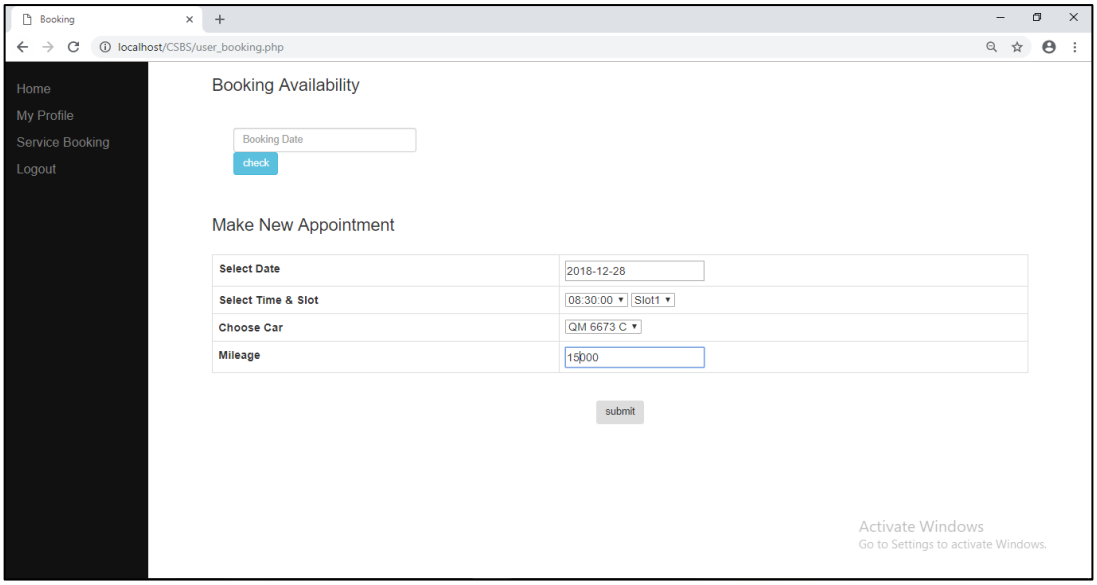


Figure 2.3: Customer Booking Page

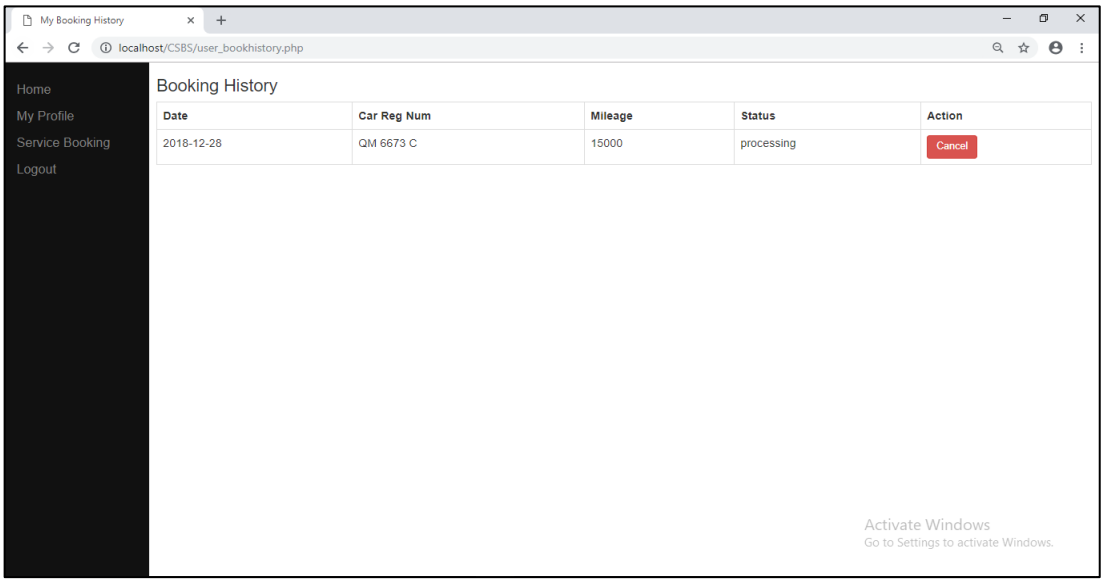


Figure 2.4: Customer Booking History Page

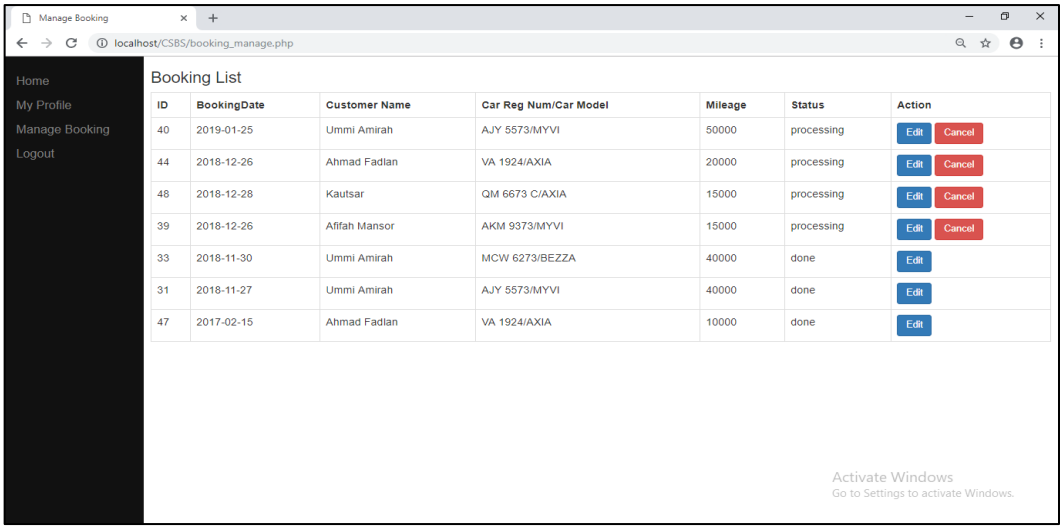


Figure 2.5: Staff List of Booking Record

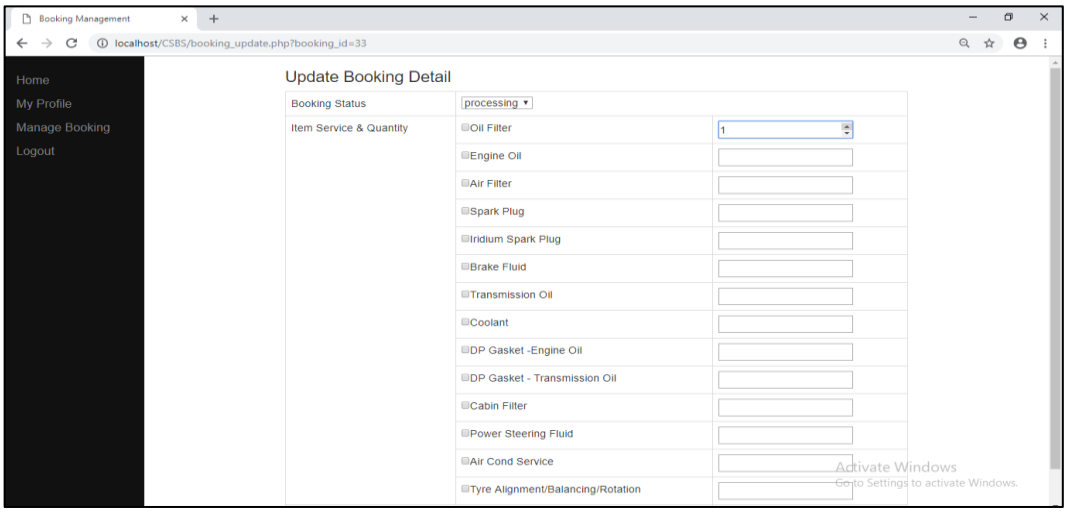


Figure 2.6: Staff Manage Booking Page

2.2 Hardware Interface

Not applicable.

2.3 Software Interface

Table 2.1 shows the list of software interface that interact with Car Service Booking System and its purpose.

Table 2.1: Software Interface for CSBS

Software	Purpose
Xampp	To connect with server
MySQL	To store data information
Adobe Dreamweaver CC 2017	To write the code
Google Chrome	To execute the system

3.0 SOFTWARE PRODUCT FEATURES

3.1 Login

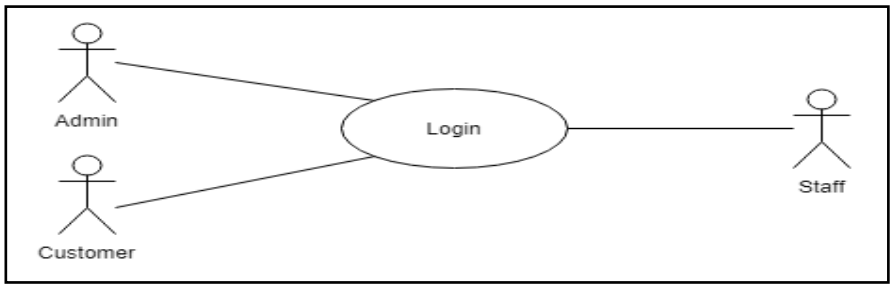


Figure 3.1: Login Use Case

Use Case ID	UC_CSBS_01
Brief Description	All users need to insert their username and password to use the system
Actor	Admin, staff and customer
Preconditions	All users must already register into the system
Basic Flow	1. This use case begins when the users click on the "Login" button. 2. The users need to insert their username and password. **[A1: Register New User]** 3. The system validates the entered username and password and logs the users into the system. [**E1: Invalid Username and Password**] 4. The use case ends.
Alternative Flow	**[A1: Register New User]** 1. User select category to login as customer or staff. Customer: a. Insert identification number as username, email, full name, phone no and password. b. Click sign up button. c. System display successful message. Staff:

	a. Insert staff id as username, email, full name, phone no and password. b. Click submit button. c. System display successful message. 2. Use case continue.
Exception Flow	[**E1: Invalid Username and Password**] 1. The username or password does not exist. 2. User re-enter username and password. 3. Use case continue.
Post-Conditions	User enable to access the system
Sequence Diagram	Refer Appendix B1 1.1 Login

3.2 Manage Booking

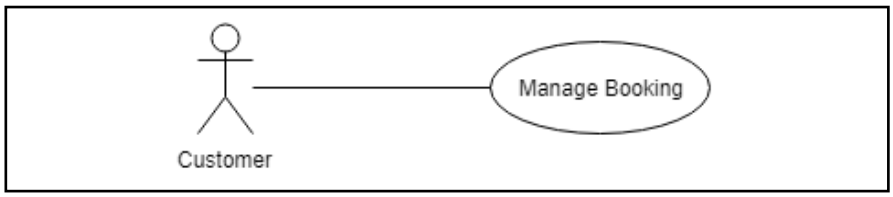


Figure 3.2: Manage Booking Use Case

Use Case ID	UC_CSBS_02
Brief Description	The users can manage booking for car service
Actor	Customer
Preconditions	User must login to the system before managing the booking
Basic Flow	1. The use case begins when customer click “Booking” button. **2.** Customers input name, phone no, car registration no, mileage, car model, service type, date and time slot. **[A1: Customer Update the Booking] [E1: Customer Cancel the Booking]** 3. Customers click “Submit” button. 4. System will send notification of upcoming service to customer phone number. 5. The use case end.
Alternative Flow	[**A1: Customer Update the Booking**] 1. Customer click edit booking button. 2. Customer insert new booking information. 3. Customer click submit button. 4. System save new booking information. 5. Use case continue. [**A2: Customer View Booking**] 1. Customer select any booking record. 2. System display booking information for selected record. 3. Use case continue.

Exception Flow	[**E1: Customer Cancel the Booking**] 1. Customer click booking history. 2. System display list of booking history. 3. Customer click cancel booking button. 4. System delete current booking information from database. 5. Use case continue.
Post-Conditions	The system displays the booking details for customers reference.
Sequence Diagram	Refer Appendix B1 1.2 Manage Booking

3.3 Manage Inventory

Figure 3.3: Manage Inventory Use Case

Use Case ID	UC_CSBS_03
Brief Description	The users can manage stock inventory
Actor	Staff, Admin
Preconditions	User must login into the system
Basic Flow	1. The use case begins when the users click “Stock” button. Staff: a. The system will display list of items. b. Staff insert quantity of each item that they want to order. c. Staff click submit button. Admin: a. The system display list of items, current quantity and price per item. b. Admin click add button. **[A1: Update Inventory]**

	c. Admin insert new item in the list. d. Admin click save button.
Alternative Flow	**[A1: Update Inventory]** 1. Admin click edit button. 2. Admin update new details such as latest price or latest quantity. 3. Admin click save button. 4. The use case continues.
Exception Flow	-
Post-Conditions	The system displays inventory information
Sequence Diagram	Refer Appendix B1 1.3 Manage Inventory

3.4 Manage Customer Service Details

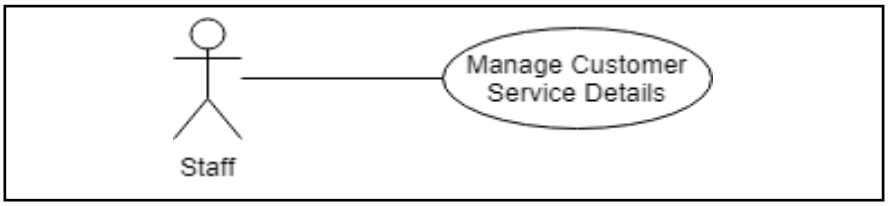


Figure 3.4: Manage Customer Service Details Use Case

Use Case ID	UC_CSBS_04
Brief Description	The users can manage customer service details
Actor	Staff
Preconditions	User must login to the system before managing customer service details.
Basic Flow	1. The use case begins when the staff click booking button. 2. System display list of booking record according selected date. 3. Staff select customer to insert service details. 4. Staff insert service details such as item and quantity. 5. System display total price of service. 6. Staff click "Confirm" button. 7. The use case end.
Alternative Flow	[**A1: Update Customer Service Details**] 1. Staff click booking button. 2. System display list of booking record according selected date. 3. Staff click edit button and insert updated information. 4. Staff click save button. 5. Use case continue. [**A2: Delete Customer Service Details**] 1. Staff click booking button.

	2. System display list of booking record according selected date. 3. Staff click delete button and system will delete the current information from database. 4. Use case continue.
Exception Flow	-
Post-Conditions	The system displays the result of service information
Sequence Diagram	Refer Appendix B1 1.4 Manage Customer Service Details

4.0 REQUIREMENT TRACEABILITY

Requirement	Description	Use Case
Login	System shall allow user to log in	UC-CSBS-01
Register	System shall allow user to register new account	UC-CSBS-01
Booking	System shall allow user to book for car service	UC-CSBS-02
Cancel booking	System shall allow user to cancel the booking	UC-CSBS-02
Update booking	System shall allow user to update for car service details	UC-CSBS-02
Update stock	System shall allow user to update stock inventory	UC-CSBS-03

5.0 SYSTEM REQUIREMENTS APPROVAL

	Name	Date
Verified by: Developer		
Approved by: Client		

APPENDIX B1

SEQUENCE DIAGRAM

1.1 Login

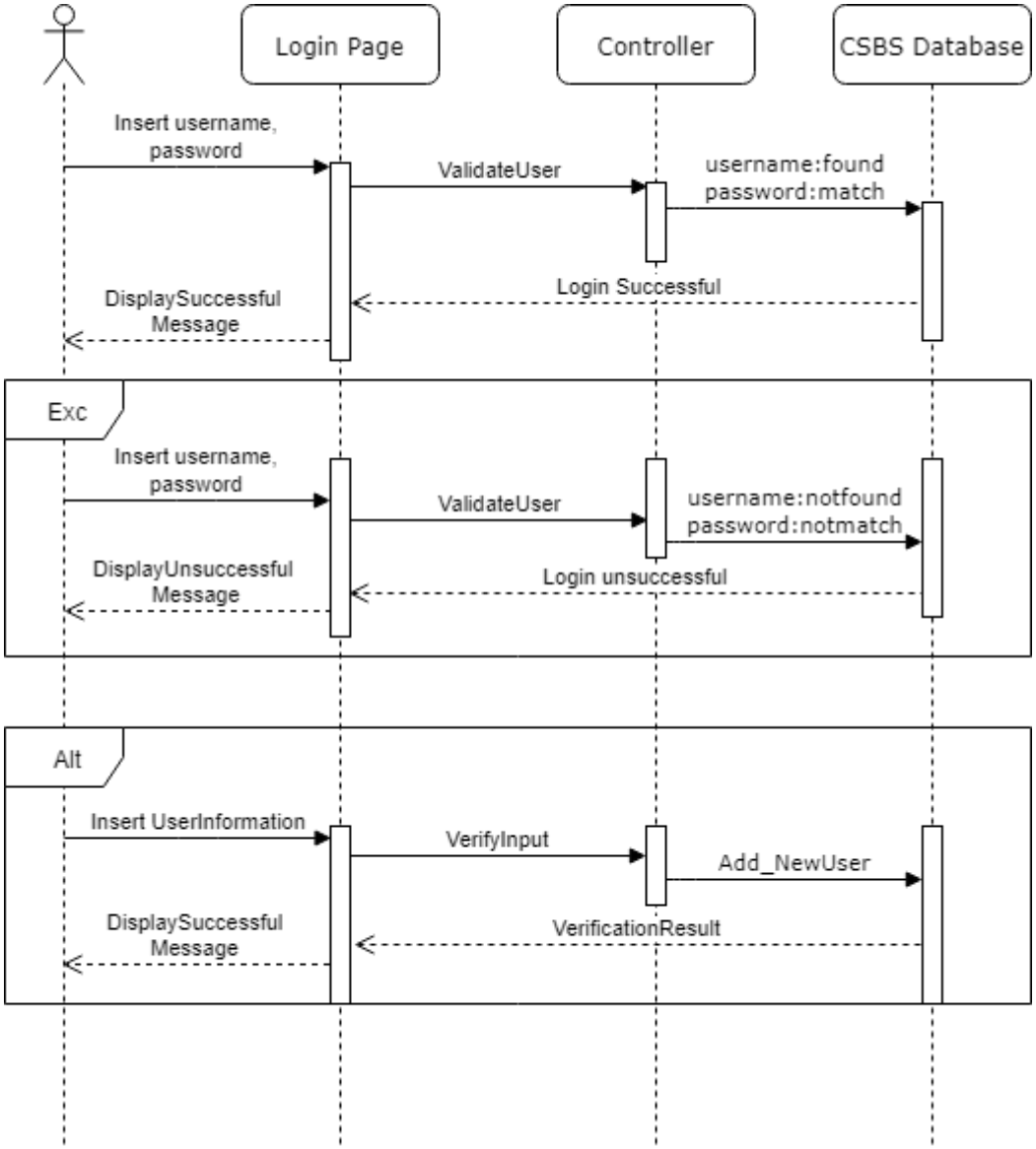


Figure 5.1: Sequence Diagram for Login

1.2 Manage Booking

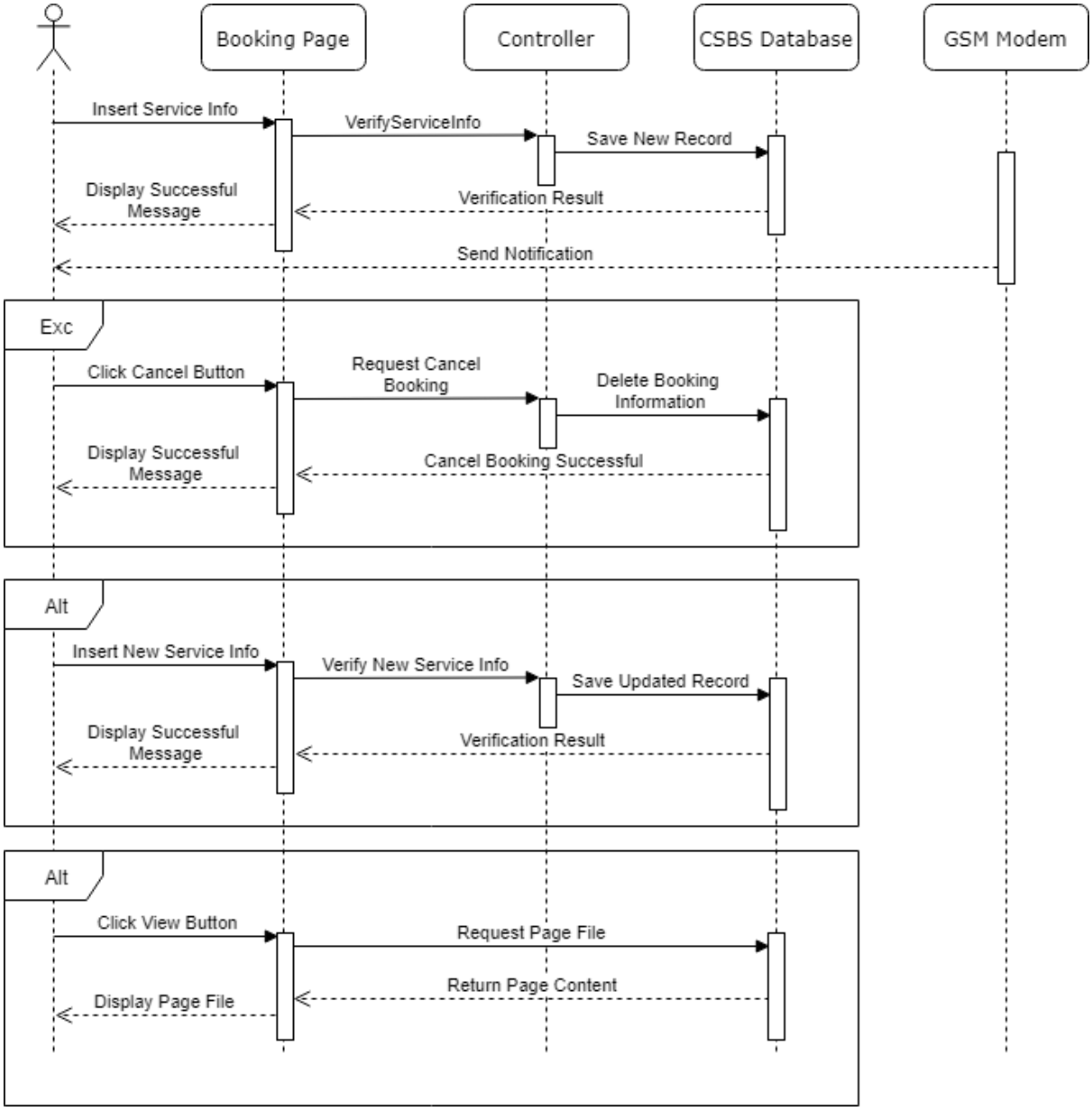


Figure 5.2: Sequence Diagram for Manage Booking

1.3 Manage Inventory

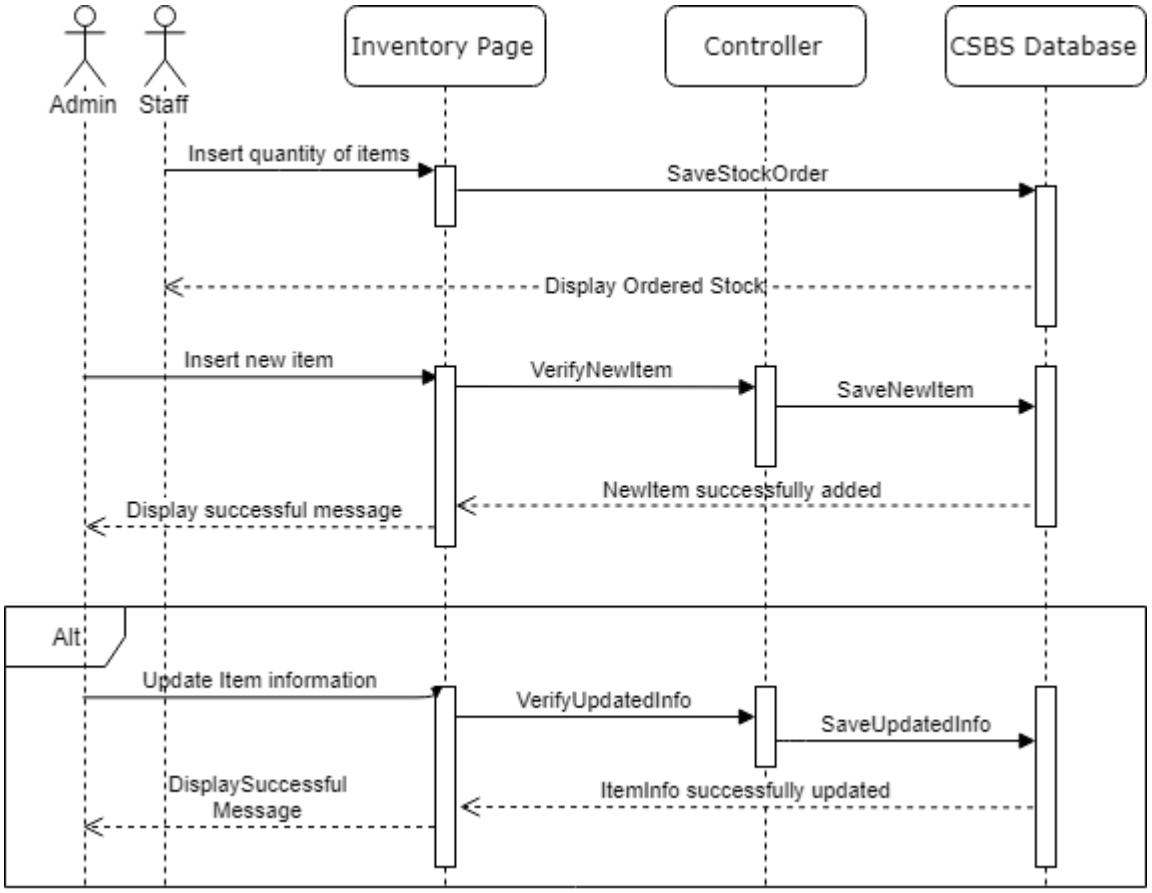


Figure 5.3: Sequence Diagram for Manage Inventory

1.4 Manage Customer Service Details

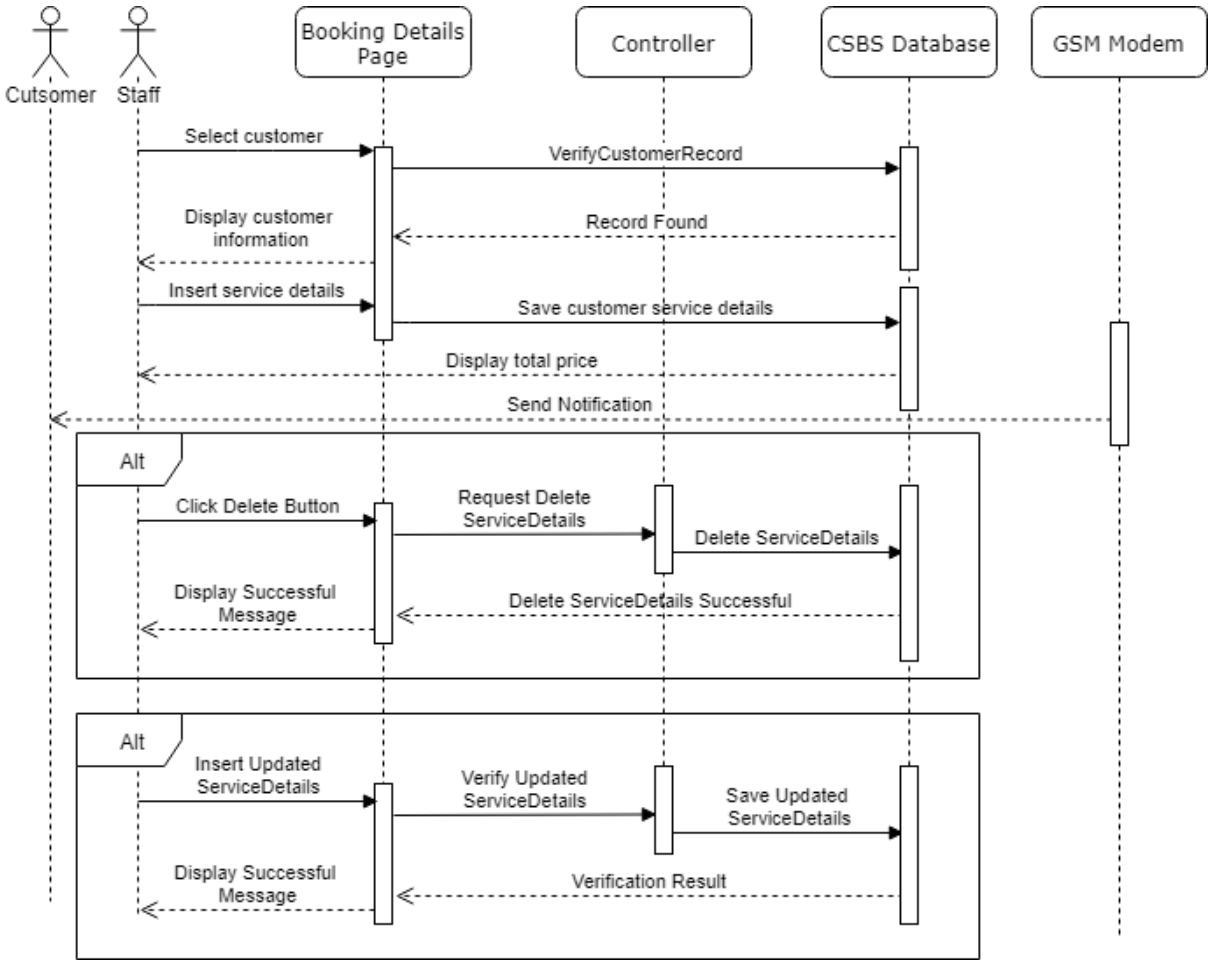


Figure 5.4: Sequence Diagram for Manage Customer Service Details

APPENDIX C SOFTWARE DESIGN DOCUMENT (SDD)

CAR SERVICE BOOKING SYSTEM FOR DMM SERVICE CENTRE

Faculty of Computer Systems & Software Engineering

SOFTWARE DESIGN DOCUMENT (SDD)

TABLE OF CONTENTS

1.0 DATA DICTIONARY

1.1 Customer

Table 1.1: Customer Data Dictionary

Field Name	Description	Data Type	Constraint
ICNum	Customer identification number	Integer	Primary Key
CustName	Customer full name	varchar (50)	
CustPassword	Customer password	varchar (10)	
CustPhoneNum	Customer handphone number	varchar (15)	
CustEmail	Customer email address	varchar (50)	

1.2 Staff Registration

Table 1.2: Staff Registration Data Dictionary

Field Name	Description	Data Type	Constraint
StaffId	Staff identification number	Integer	Primary Key
StaffName	Staff full name	varchar (50)	
StaffPassword	Staff password	varchar (10)	
StaffPhoneNum	Staff handphone number	varchar (15)	
StaffEmail	Staff email address	varchar (50)	

1.3 Booking

Table 1.3: Booking Data Dictionary

Field Name	Description	Data Type	Constraint
BookingId	Booking unique number	Integer	Primary Key
BookingDate	Date of booking	Date	
Mileage	Customer's car mileage	varchar (10)	
ICNum	Customer identification number	Integer	Foreign Key
SlotID	Slot unique id	Integer	Foreign Key
StaffId	Staff unique id	Integer	Foreign Key

1.4 Car

Table 1.4: Car Data Dictionary

Field Name	Description	Data Type	Constraint
CarRegNum	Car registration number	varchar (10)	Primary Key
CarModel	Model of customer's car	varchar (10)	
ICNum	Customer identification number	varchar (15)	Foreign Key

1.5 Slot

Table 1.5: Slot Data Dictionary

Field Name	Description	Data Type	Constraint
SlotId	Unique number for service slot	Integer	Primary Key
SlotTime	Time of service slot	varchar (10)	
SlotTurn	Turn for each slot	varchar (10)	

1.6 Service

Table 1.6: Service Data Dictionary

Field Name	Description	Data Type	Constraint
ServiceId	Unique number for Services	Integer	Primary Key
ServiceName	Name of Services	varchar (50)	
ServicePrice	Price for each service	varchar (10)	
StaffID	Staff unique id	varchar (10)	Foreign Key

1.7 Product

Table 1.7: Product Data Dictionary

Field Name	Description	Data Type	Constraint
ProductId	Unique number for Product	Integer	Primary Key
ProductName	Name of product	varchar (50)	
ProductPrice	Price for each product	varchar (10)	
ProductQuantity	Quantity of the product	Integer	
StaffID	Staff unique id	varchar (10)	Foreign Key

2.0 PRELIMINARY DESIGN

2.1 System Architecture

This subsection describes the internal organization structure of the system. The relationship among the system subsystem will be described.

2.1.1 Static Organization

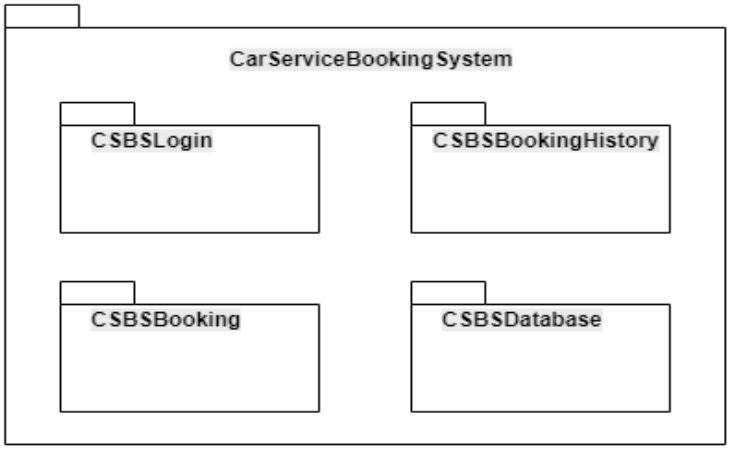


Figure 2.1: Static Organization of Car Service Booking System

This section describes the details for each package

1. CSBSLogin

   This package is responsible for system user to login and make registration to the system. This package consists of following classes:

   a) Registration Class
   b) RegistrationController Class
   c) LoginView Class
   d) UserProfile Class

2. CSBSBooking

   This package is responsible for the system user to check the availability and booking for car services. It also responsible to view, update and cancel the booking. This package consists of following classes:

   a) Booking Class
   b) BookingController Class
   c) BookingView Class
   d) CancelBooking Class
   e) UpdateBooking Class

3. CSBSCustomerBookingDetails

   This package is responsible for the system user to manage the customer details for car service. This package consists of:

   a) CustomerBookingDetails Class

4. CSBSInventory

   This package is responsible for the system user to check the availability and booking for car services. It also responsible to view, update and cancel the booking. This package consists of following classes:

   a) Inventory Class
   b) InventoryController Class
   c) InventoryView Class

5. CSBSDatabase

   This package is responsible to store information about customer and booking details. This package does not consist any classes and just acts as database that consist many table.

2.1.2 Dynamic Organization

This section describes the components and their relationships between each other in the system.

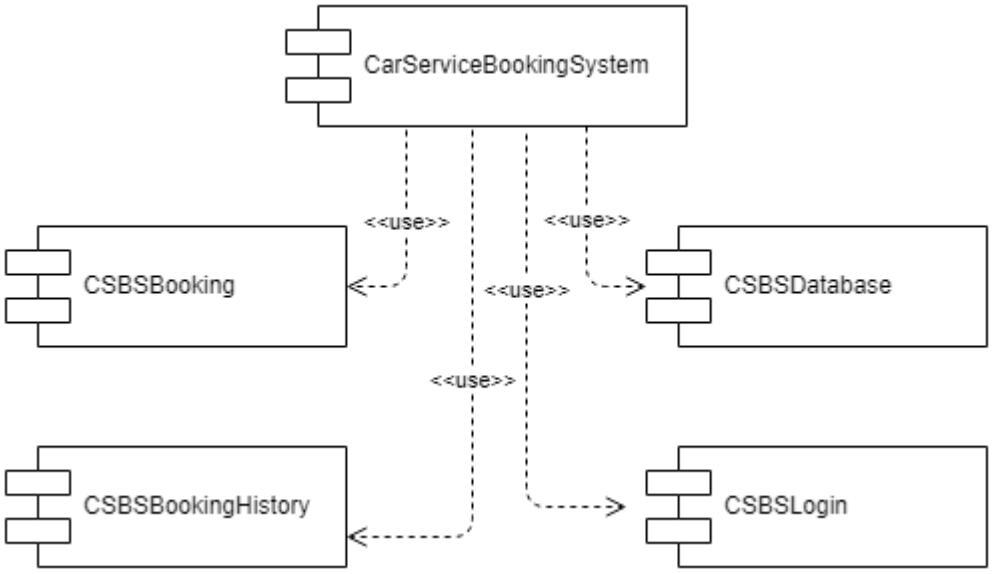


Figure 2.2: Component Diagram of Car Service Booking System

3.0 DETAILED DESIGN

This section is divided into the following paragraphs to describe the detailed design.

3.1 CSBSLogin

3.1.1 Registration.class

Class Type	: Model		
Responsibility	: Manage all operation related to Registration table in database		
Attributes	: ICNum	: Int	
	CustName	String	
	CustPassword	String	
	CustPhoneNum	String	
	CustEmail	String	
Methods	: Void getRegister	Get registration information from database	
	Void setRegister	Add new user information to database	
	Void Login	Get login information from database	

3.1.2 RegistrationController.class

Class Type	: Controller	
Responsibility	: Manage the data flow between Registration class, LoginView class and UserProfile	
Attributes	: ICNum	: Int
	CustName	String
	CustPassword	String
	CustPhoneNum	String
	CustEmail	String
Methods	: Void getRegister	Obtain information of the user

3.1.3 LoginView.class

Class Type	: View	
Responsibility	: Receive information that related to the user from Registration	
Attributes	: ICNum	: Int
	CustPassword	String
Methods	: void login	Receive login input and pass to RegistrationController

3.1.4 UserProfile.class

Class Type	: Model	
Responsibility	: Receive user information inputs and retrieve data from Registration	
Attributes	: ICNum	: Int
	CustName	String
	CustPassword	String
	CustPhoneNum	String
	CustEmail	String
Methods	: void updateUserProfile	Update user information in database

3.2 CSBSBooking

3.2.1 Booking.class

Class Type	: Model		
Responsibility	: Manage all operation related to Booking table in database		
Attributes	: BookingId	: Int	
	Name	String	
	PhoneNo	String	
	CarRegNum	String	
	Mileage	String	
	CarModel	String	
	BookingDate	Date	
	TimeSlot	String	
	ServiceType	String	
Methods	: Void setBooking	Add booking information to database	

3.2.2 BookingController.class

Class Type	: Controller		
Responsibility	: Manage the data flow between Booking and BookingView		
Attributes	: BookingId	: Int	
	Name	String	
	PhoneNo	String	
	CarRegNum	String	
	Mileage	String	
	CarModel	String	
	BookingDate	Date	
	TimeSlot	String	
	ServiceType	String	
Methods	: Void getBooking	Obtain booking information from Booking	

3.2.3 BookingView.class

Class Type	: View	
Responsibility	: Receive booking inputs and retrieve data from Booking	
Attributes	: BookingId	: Int
	Name	String
	PhoneNo	String
	CarRegNum	String
	Mileage	String
	CarModel	String
	BookingDate	Date
	TimeSlot	String
	ServiceType	String
Methods	: Void Booking	Receive booking information inputs and pass to BookingController

3.2.4 CancelBooking.class

Class Type	: Model	
Responsibility	: Delete booking information in existing database	
Attributes	: BookingId	: Int
	Name	String
	PhoneNo	String
	CarRegNum	String
	Mileage	String
	CarModel	String
	BookingDate	Date
	TimeSlot	String
	ServiceType	String
Methods	: Void CancelBooking	Delete booking information from database

3.2.5 UpdateBooking.class

Class Type	: Model		
Responsibility	: Update booking information in existing database		
Attributes	: BookingId	: Int	
	Name	String	
	PhoneNo	String	
	CarRegNum	String	
	Mileage	String	
	CarModel	String	
	BookingDate	Date	
	TimeSlot	String	
	ServiceType	String	
Methods	: Void UpdateBooking	Update booking information from database	

3.3 CSBSCustomerBookingDetails

3.3.1 CustomerBookingDetails.class

Class Type	: Model		
Responsibility	: Manage customer booking details and insert service item		
Attributes	: BookingId	: Int	
	Name	String	
	PhoneNo	String	
	CarRegNum	String	
	Mileage	String	
	CarModel	String	
	BookingDate	Date	
	TimeSlot	String	
	ServiceType	String	
	ServiceItem	String	
	ItemQuantity	String	
	ServicePrice	String	
Methods	: void CustomerBookingDeatils	Add details about customer's car service	

4.0 SYSTEM DESIGN APPROVAL

	Name	Date
Verified by: Developer		
Approved by: Client		

APPENDIX D USER ACCEPTANCE TEST (UAT)

CAR SERVICE BOOKING SYSTEM FOR DMM SERVICE CENTRE

Faculty of Computer Systems & Software Engineering

USER ACCEPTANCE TEST (UAT)

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1.0 TESTING REPORT

The purpose of this section is to outline the User Acceptance Test (UAT) process for the system. Approval of this testing implies that reviewers are confident that following the execution of the test plan, the resulting system will be considered fully-testes and eligible for implementation.

The chosen user will go through each of the instructions in the user manual. Any errors or problems found by the user must be noted on the form below.

1.1 Test Case for Login function

Event	Test Data	Expected Result	Actual Result	Pass/Fail
User Login	Valid username and password	Success	Login successfully	Pass
User Login	One of the fields is invalid	Error access	Alert message appeared	Pass
User Login	Both field username and password are invalid	Error access	Alert message appeared	Pass
User Login	No input	Error access	Alert message appeared	Pass

1.2 Test Case for Customer Registration

Event	Test Data	Expected Result	Actual Result	Pass/Fail
Customer Sign Up	All field with valid input	Success	Login successfully	Pass
Customer Sign Up	Duplicate IC Number or Email	Error access	Alert message appeared	Pass
Customer Sign Up	One or more field is empty	Error access	Alert message appeared	Pass
Customer Login	No input	Error access	Alert message appeared	Pass

1.3 Test Case for Booking Function

Event	Test Data	Expected Result	Actual Result	Pass/Fail
Service Booking	All field with valid input	Success	Booking successfully	Pass
Service Booking	Insert invalid time or slot	Error access	Alert message appeared	Pass
Service Booking	One or more field is empty	Error access	Alert message appeared	Pass
Service Booking	No input	Error access	Alert message appeared	Pass

1.4 Test Case for Add New Car

Event	Test Data	Expected Result	Actual Result	Pass/Fail
Add Car	All field with valid input	Success	New car	Pass

			successfully added	
Add Car	Insert existing car	Error access	Alert message appeared	Pass
Add Car	One or more field is empty	Error access	Alert message appeared	Pass
Add Car	No input	Error access	Alert message appeared	Pass

1.5 Test Case for Add User

Event	Test Data	Expected Result	Actual Result	Pass/Fail
Add User	All field with valid input	Success	New user successfully added	Pass
Add User	Add existing IC number or email	Error access	Alert message appeared	Pass
Add User	One or more field is empty	Error access	Alert message appeared	Pass
Add User	No input	Error access	Alert message appeared	Pass

2.0 SYSTEM TESTING APPROVAL

	Name	Date
Verified by: Developer		
Approved by: Client (Staff)		
Approved by: Client (Customers)		

APPENDIX E USER MANUAL

CAR SERVICE BOOKING SYSTEM FOR DMM SERVICE CENTRE

Faculty of Computer Systems & Software Engineering

USER MANUAL

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1.0 GENERAL INFORMATION

1.1. System Overview

Car Service Booking System is a web-based system that is developed for DMM Service Centre which current booking process is done manually. This system allows user to create an account, manage their own account and booking for car services. The objective is to design the Car Service Booking System that will replace the manually booking into computerize booking system. It helps to ease the staff's work by providing the list of customers that wanted to service their car. The customers can book for car services at any time without making a phone call to the service centre. The system provides cancel function in case the customers wanted to cancel their booking. It also provides booking history to check the previous service that have been made.

2.0 SYSTEM SUMMARY

2.1. System Configuration

CSBS operates on computer devices with Windows operating system. It is compatible with Windows 8 and above version. This system requires an Internet connection in order to save data to database. After installation on the device, XX system can be used immediately without further configuration.

2.2. User Access Levels

There are three users in this system which are customer, staff and admin. A customer needs to register an account before they can manage their own account. They can also manage the car service booking. Staff can manage their own account that have been created by admin and manage booking that the customers have made. Lastly, the admin of this system can access the whole system include manage booking, manage customer and staff.

3.0 GETTING STARTED

3.1. Register Page

Figure 3.1 shows a register page where the customers of car service will create an account before started to use this system. Each user can create only one account where it requires IC number and email. Existing IC number and email would not be able to create an account.

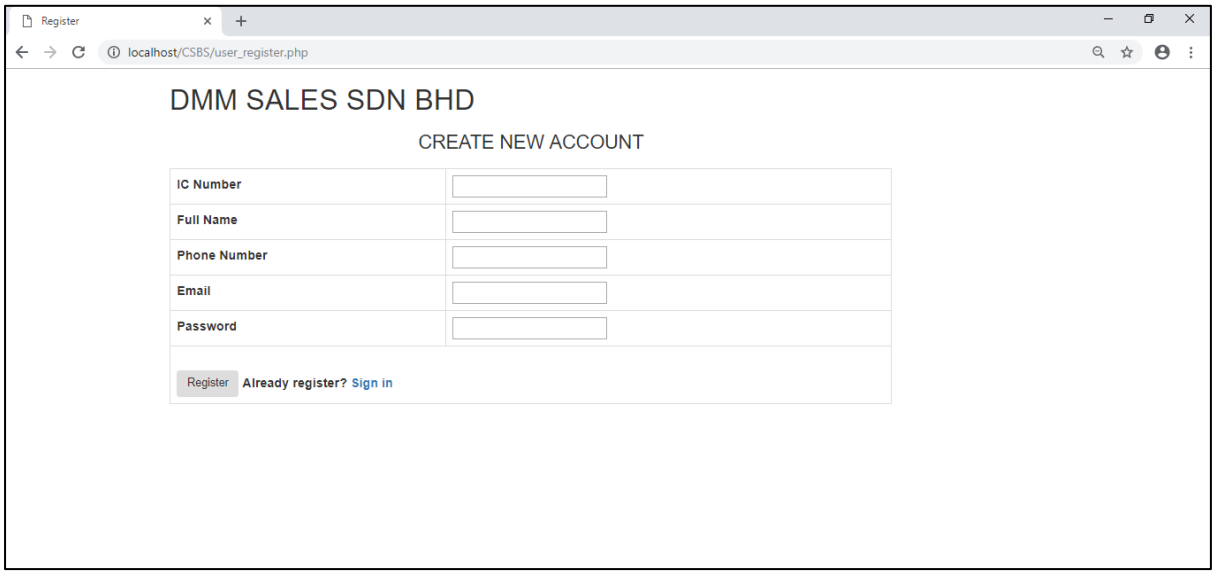

Figure 3.1: Register Page

3.2. Login Page

Figure 3.2 shows a login page for customers that require them to insert IC number and password. Wrong combination will display an error message.

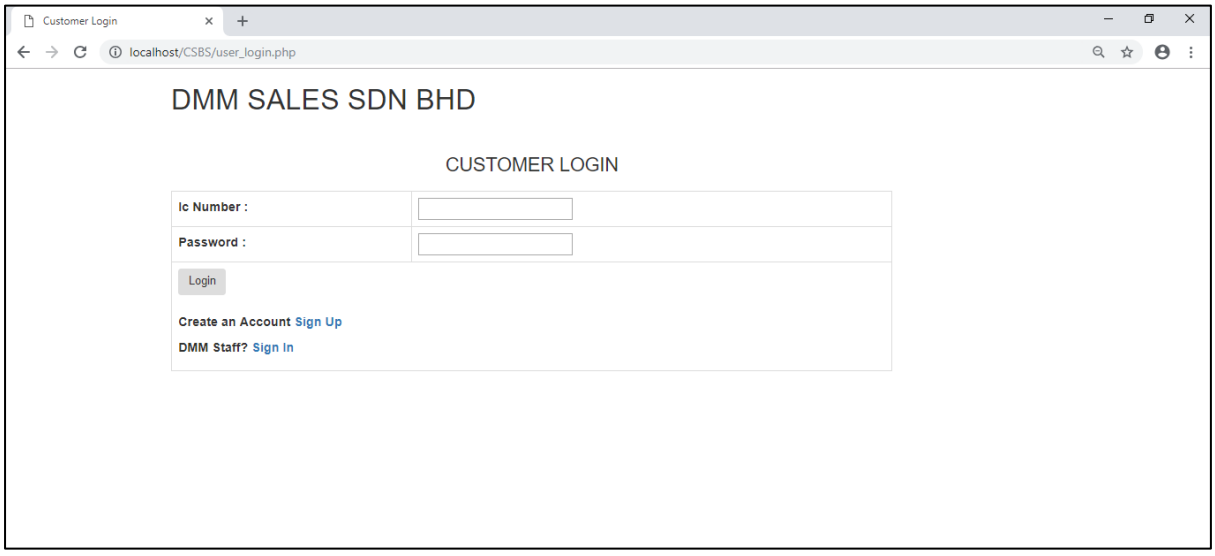

Figure 3.2: Login Page Customer

Figure 3.3 shows a login page for staff that require them to insert staff id and password. Wrong combination will display an error message. Staff id and password will be given by the admin however they need to change the password once they started to use this system.

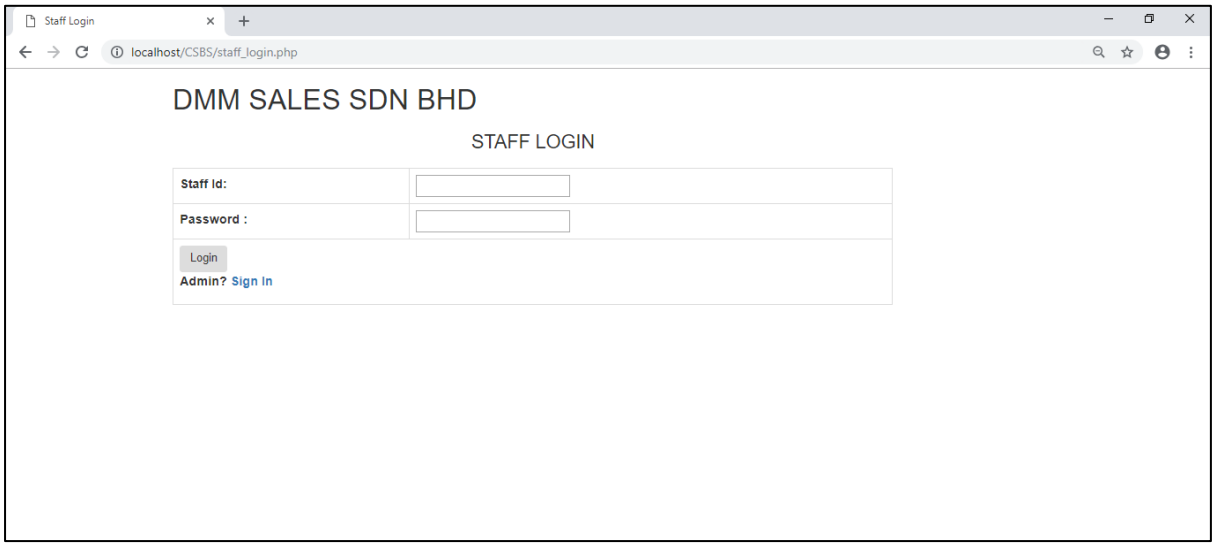

Figure 3.3: Login Page Staff

Figure 3.4 shows a login page for admin that require them to insert username and password. Wrong combination will display an error message. Username and password have been set however they can change the password after they login into the system.

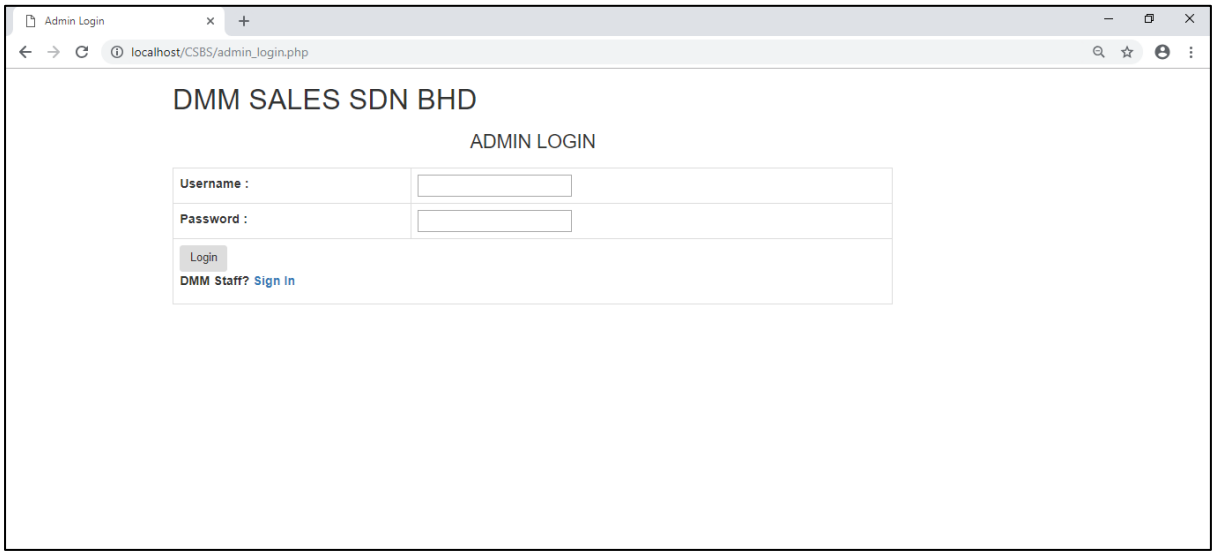

Figure 3.4: Login Page Admin

3.3. Main Page

Figure 3.5 shows the main page of this system after the user login. Different level of user has different function on the side bar.

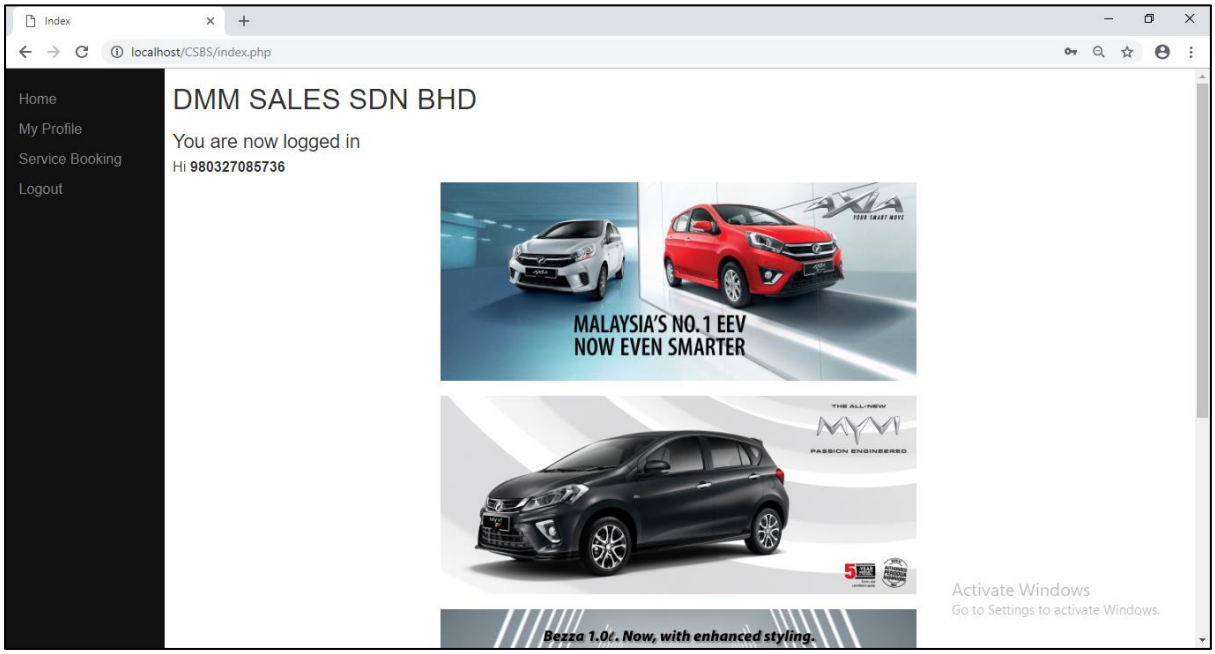

Figure 3.5: Main page

3.4. Customer Profile Page

Figure 3.6 shows the customer's profile where they can edit their information.

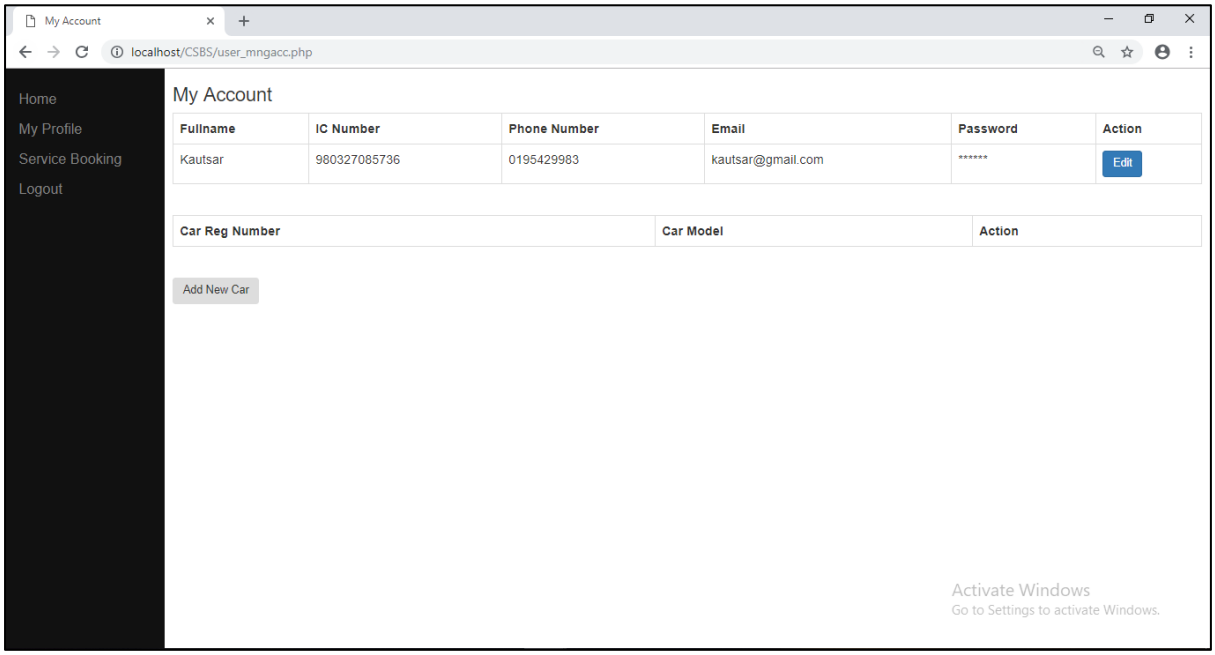

Figure 3.6: My Profile

Figure 3.7 shows the add car page where the customers need to add their car's information such as plate number and car model. The customers need to add car into the system before they can start to book for services.

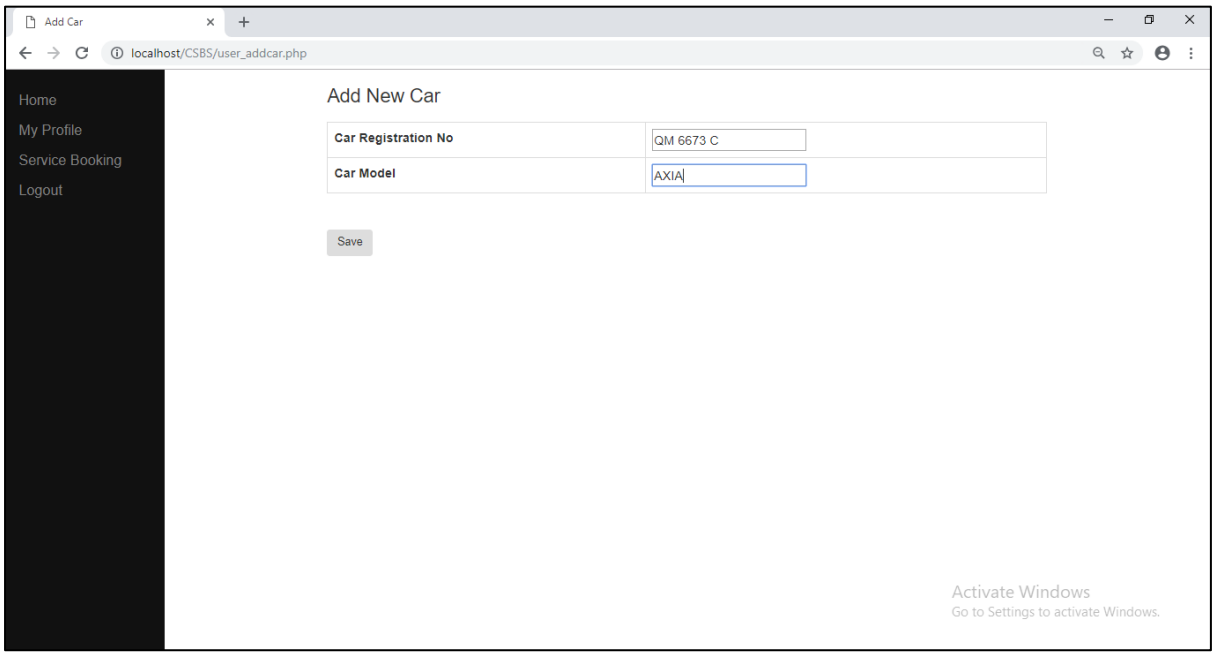

Figure 3.7: Add Car Page

3.5. Booking Page

Figure 3.8 shows booking page where the customers make their appointment. First, the customers need to check the availability slot by choosing the date and click check button. Then, they can choose date, time and slot that are still available as shown in Figure 3.9. Choosing unavailable slot will displaying an error message.

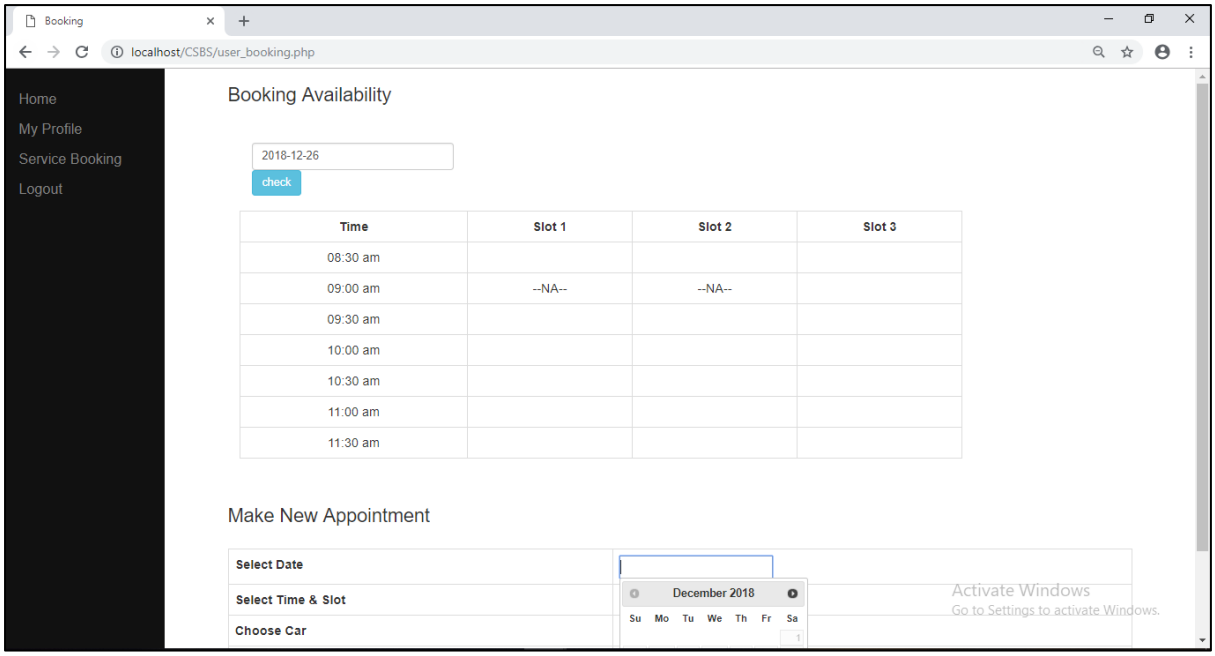

Figure 3.8: Booking Page

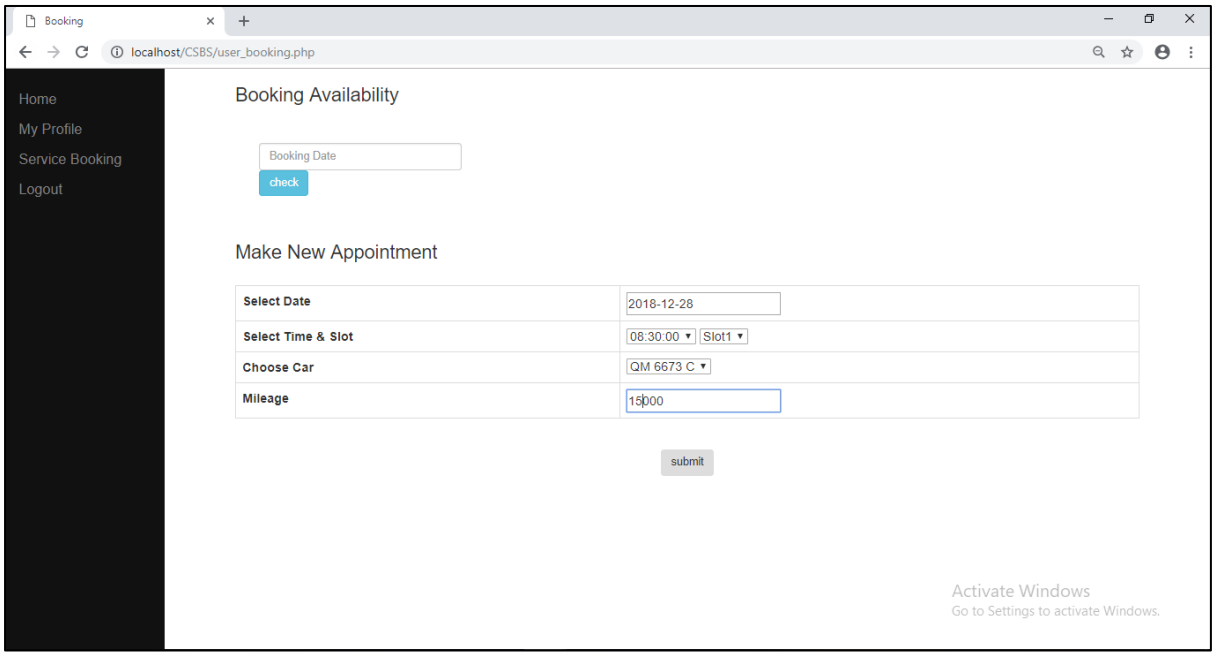

Figure 3.9: Make New Booking

Figure 3.10 shows a booking history page. In this page, the customers can view the booking that they have made. They also can cancel the booking if the booking in processing status and the cancel button will be disabled if the booking has been in done status.

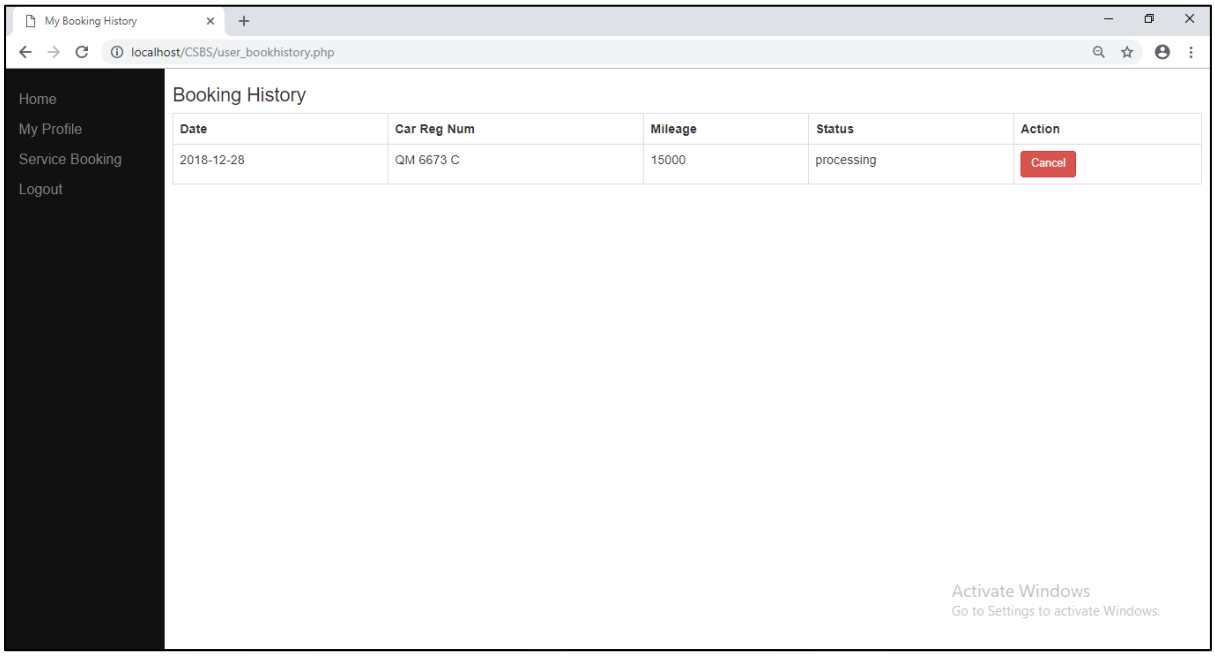

Figure 3.10: Booking History Page

3.6. Staff Profile Page

Figure 3.11 shows staff profile where they can edit the information and change password.

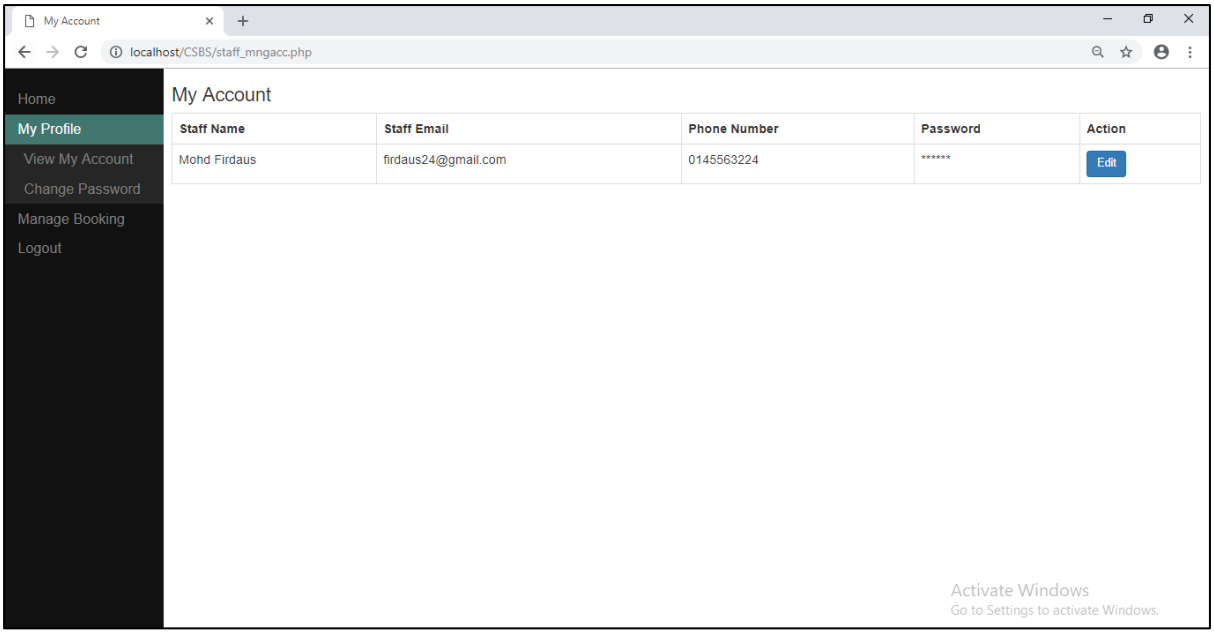

Figure 3.11: Staff Profile Page

3.7. Manage Booking Page

Figure 3.12 shows the list of booking that being used by staff and admin. They can edit this booking to insert the service details as shown in Figure 3.13. They also can delete the booking if customers did not come on the selected time slot or if the customers are not able to cancel their booking.

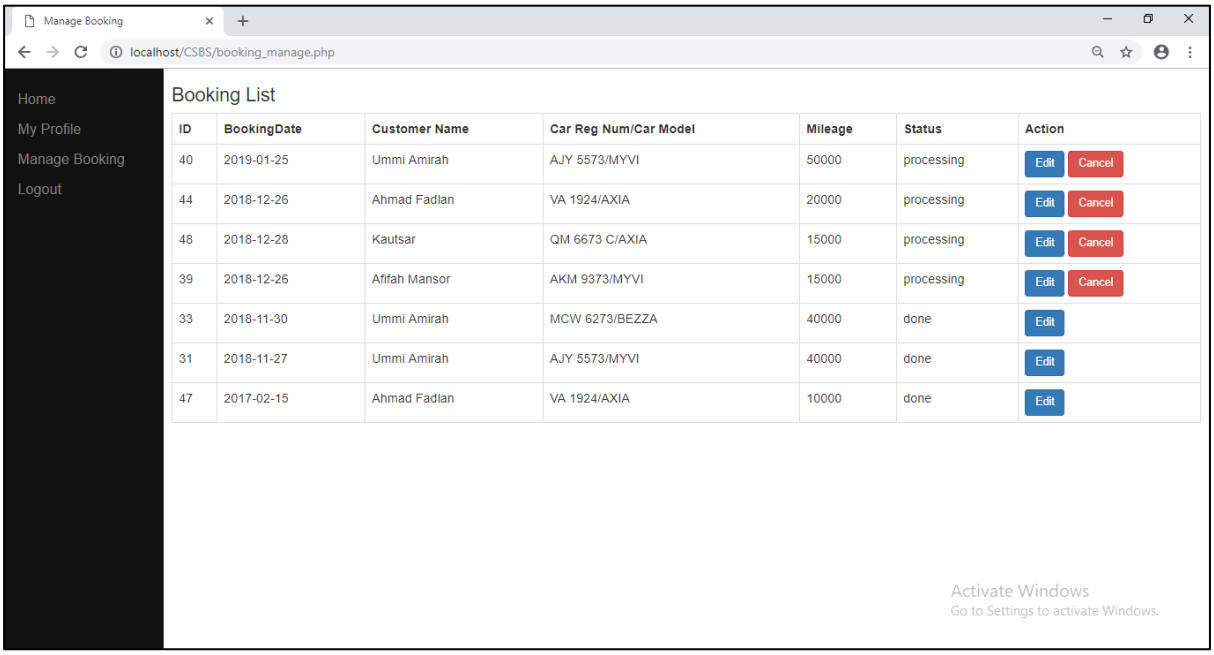

Figure 3.12: Manage Booking Page

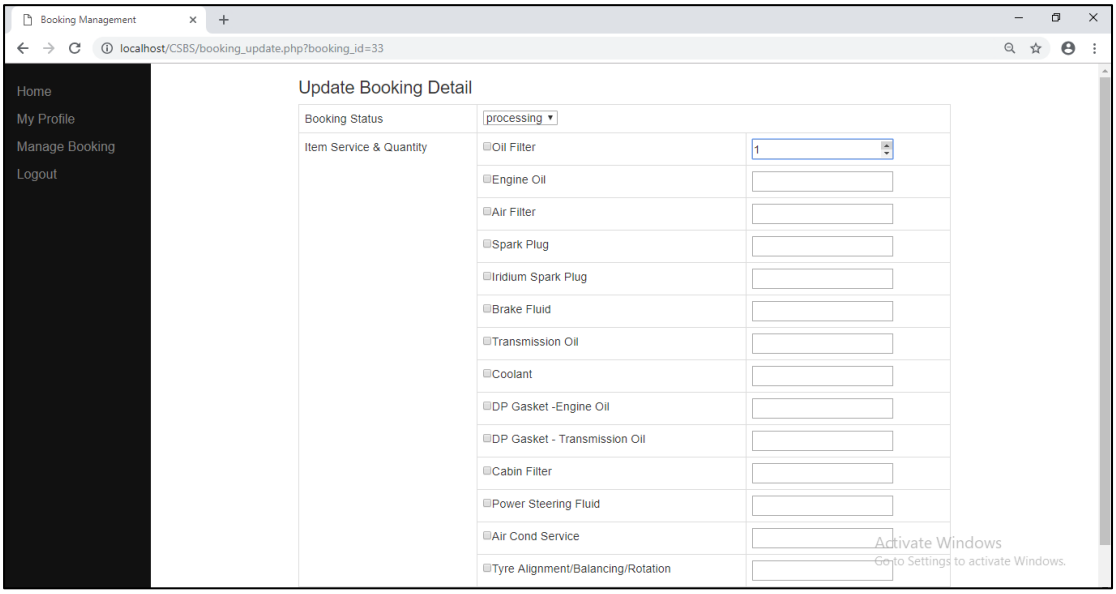

Figure 3.13: Update Booking Page

3.8. Manage User Page

Figure 3.14 shows the list of customers that already registered into the system. This function is used by admin. They can add new customers as shown in Figure 3.15, edit customer's information or delete customer's account. Admin also can manage staff as shown in Figure 3.17 where they can add staff's account if there is a new staff in their company and view list of staff that already registered an account as shown in Figure 3.16.

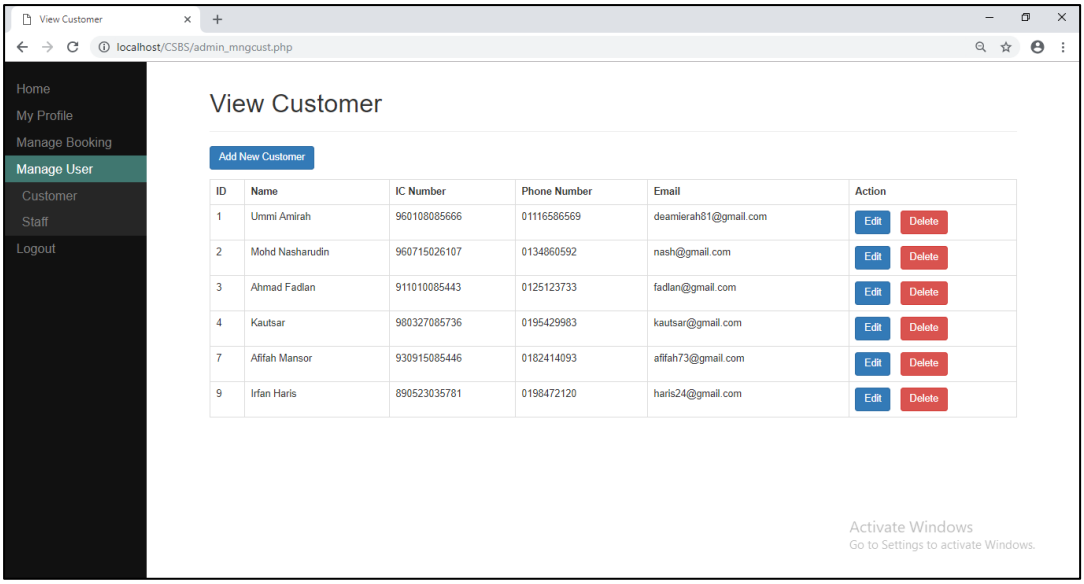

Figure 3.14: View Customer Page

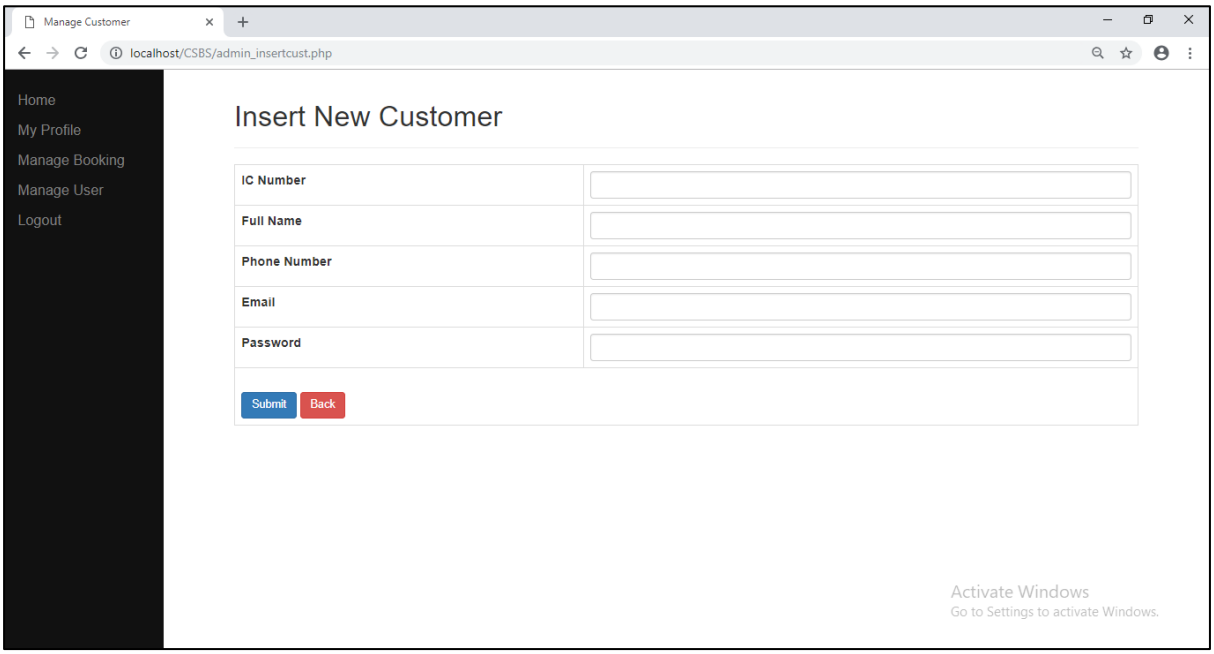

Figure 3.15: Add Customer Page

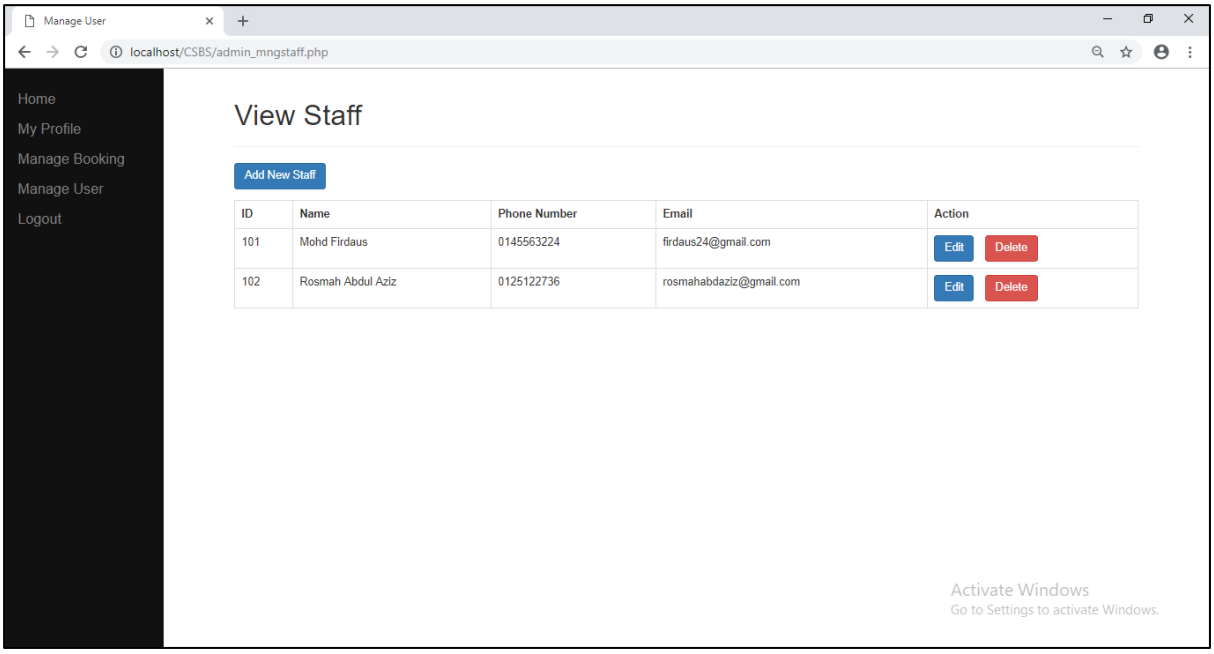

Figure 3.16: View Staff Page

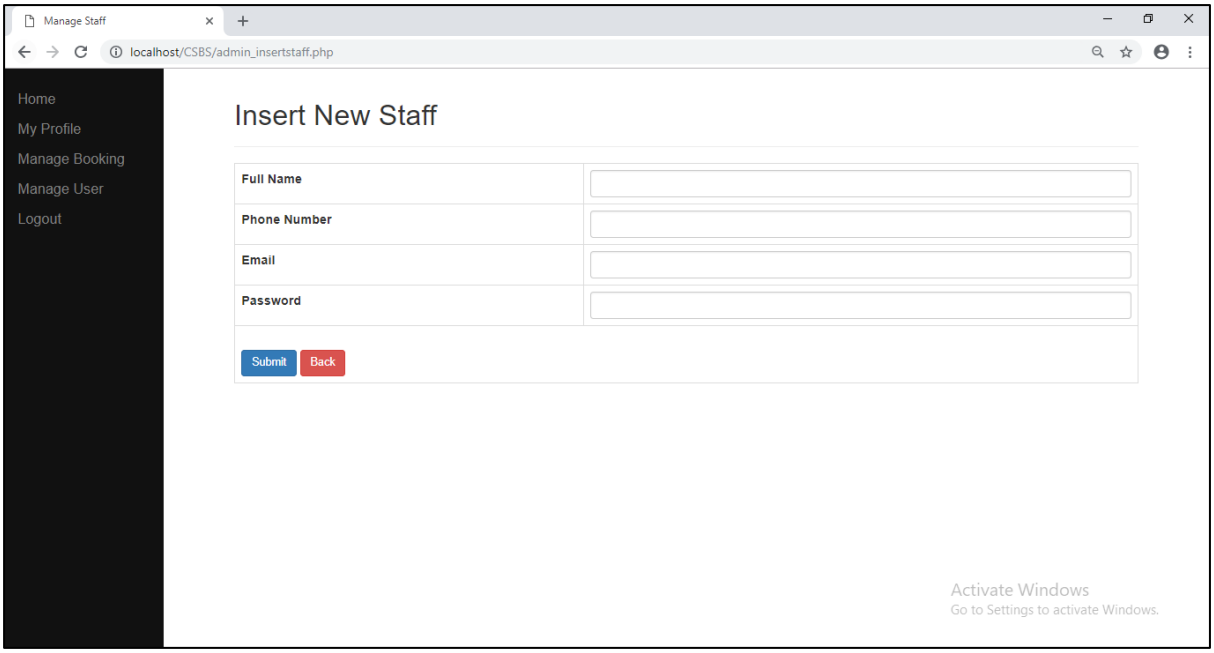

Figure 3.17: Add Staff Page

3.9. Log out Function

To exit from the system, the users need to click Logout button at the sidebar and users will redirect to Login page.