Software Requirements Specification

Version 1.0

for

SOEN-6461-Team 11

Prepared by

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Document history

Date	Version	Description	Author
26- September-2019	1.0	Writing the software requirement based on Clerk Functionality.	Basant Gera

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1. Introduction

The following document tells us about the nature of the project or software application. The document consist of some artifacts which will help our team to kick start on the web application (Vehicle Management System) which are trying to build. We are following a set of guidelines which consists of Functional and No functional requirements towards which we are trying to build a sustainable system which is capable of booking vehicle for user with their specific requirements.

The Vehicle Management System which we are trying to make will be solving the capabilities which most often website fails to address or forgot to think. We have divided to do this project into 4 iterations which will be updated sequentially in SRS document while the works go on. The detailed requirements of **Vehicle Management system** will be listed in this document which concentrates on features and capabilities.

Purpose

The purpose of the document is to understand and present artifacts which will help developers what Vehicle Management system requirements are and what is it capable of doing. The essential things about this document is to collect and analyze all sorts of ideas which comes to mind and to define the system w.r.t our developer, designer and user. In this document we shall predict and sort out how the product (Vehicle Management System: Web Application) made based on scenarios and outline the concepts which can be developed later. The ideas which are described here may be changed or discarded as product develops.

In brief, the SRS document will provide you the details overview of software with respective parameters and goal which will be listed in this document. It also define how our users, clerk, administrator and target audience look and address how application would work and respond. Never the less it will help designer and developer to build the system efficiently and resourcefully as per the requirements stated to us.

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Scope

Primarily, the scope come to out to be helping people who wanted to book vehicles to travel in day today life. It focuses mainly on how sale and distribution of vehicles has been done over time with the ease of renting, reserving and returning the vehicles and their management respectively by users.

The SRS documents is also entitled to tell you specific requirements of software which tells you the small scenarios which are called functionality we are trying to achieve.

Definitions, acronyms, and abbreviations

SRS	Software Requirements Specification
?param	Parameters
VMS	Vehicle Management System
CRMS	Customer related management software
GPL	General public Licence

References

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2. Overall description

The following SRS documents contains the detailed Web application (Vehicle Management system) perspective to the users. It will give you the detailed description how a functionality should be made from top level and what are the expectations of the stakeholder to developer and designer. We would be following agile methodology in which 4 iterations would be carried so that we can confirm whether every build is according to stakeholder requirements or not.

The following are scenarios which are listed according to which (Vehicle Management system) should work:

Iteration:1

Setting up Environment based team unanimous decision.

Iteration :2 Clerk Functionality

- 1. Register a clerk.
- 2. Login for registered clerk.
- 3. **Travel Details gathering** from client such as (Reservation date,Return date and ?param) and showing him list of options available for the vehicle.And at the same time showcasing following things such as :
 - Filtering out or searching based on by Vehicle Make, Vehicle Type, Vehicle year and Vehicle Model.
 - Sorting Ascending/Descending based on Vehicle Make, Vehicle Type, Vehicle year and Vehicle Model.
- 4. Cars Catalog with support to filter and sort based on different criteria such as:
 - a. Type
 - b. Year
 - c. Make
 - d. Model
- 5. Car Details view:
 - a. Car available / not available
- 6. **Booking View** to capture client information such as:
 - a. First Name
 - b. Last Name
 - c. Licence Number
 - d. Licence Expiry Date
 - e. Phone Number
- 7. **Client Manager** to help clerk manage all clients, supported functions are:
 - a. Modify client details
 - b. Delete client
 - c. Cancel a reservation
 - d. Handle return of vehicle

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The general factors that affect the product (Web Application: Vehicle management system) based on given scenarios are as follows:

Product perspective

The overall picture of the product is self-owned and self-contained by the company. The vehicle that the company owns has the sole purpose to give vehicles on the rent to the user based on certain requirements that may be asked by the user. The product (VMS) has a set of teams and set of departments that have different functionality on which they are trained such as user group for e.g Clerk, Administrator.

Following is the overall picture been shown to the Designer and developer for VMS.

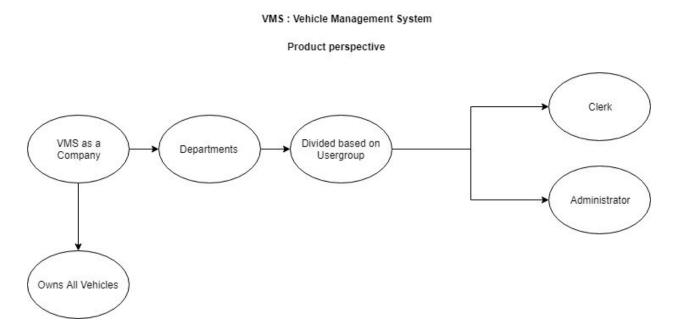


Figure : 2.1

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Product functions

The product VMS should functions are as follows:

Since every functionality varies from the clerk to Administrator so we have decided to make 2 user groups which are 1. clerk 2.Administrator.

- 1. It should be able to register and login.
- 2. If successfully logged in then the clerk should be able to give the start, end date and ?param which he wants to rent a vehicle and sort according what he wants like (ascending to descending in terms of alphabets and numbers). And can open the details and view the booking and can book the booking.
- 3. Clerk can able to search how many available vehicles are available and unavailable based on that a customer can modify his information if he wants to modify the reservation date and end date.

Figure: 2.2 below shows how VMS should perform.

VMS: Vehicle Management System

How VMS would Functions?



Figure :2.2

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User characteristics

The table listed below shows the level of expectancy required to operate VMS.

User/Actors	Expected Education level	Experience	technical Expertise (if any)	Basic Description(<i>if any</i>)
Clerk	Educated person required or High School passed.	High School passed.	No. Basic Training is required to operate VMS.	None.
Administrator	Educated person required or High School passed.	High School passed.	No. Basic Training is required to operate VMS.	None.

Constraints

Safety Regulation: Stakeholder or Administrator can View or monitor the request submitted by the clerk.

Hardware : Since the application will run on browser if hosted on Server than connection with internet is required to open the VMS site.or if planned to host on server to work on intranet also then TCP/IP protocol suite is required.

Limitation: VMS will work on HTTP on browser on Port Number 80.So if you are planning to run something on port number 80 better be careful about the same.

Safety & Security: It can store the username and password in Session variable and cookies. So better delete it if you don't want to share with anyone else.

User Interface : The user can open it in Chrome, IE and Safari and the user interface shall be implemented in java, EJB etc.

Software Interface : It has various screens such as FrmRegister,FrmLogin,FrmChoose,FrmSearch,FrmClient.

Communication Interface: The VMS should use HTTP protocol for communication on internet if hosted.

Licensing requirement: Not Applicable.

Applicable Standards: It should be as per industry standard.

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Assumptions and dependencies

- 1. Our Assumption would be that this product should only be used on browser since its a web application. If may work on mobile but since the design is according to PC browser height width width.
- 2. Other assumption which need to be cleared since it is a vehicle management website it doesn't use any GPS.
- 3. Make sure java plugin is installed in your browser. many a times if user may not allow to run java in back end the application seems to be not working properly.
- 4. It should work on various OS like Windows 10, Windows 7 and Mac.

3. Specific requirements

The requirements are divided into 2parts which are as follows:

Functional Requirements which need to be achieved are as follows:

<u>Iteration No.2</u>		
Sno/ Name	Form-Name	Description/Functionality Expected
1.Registration Page	registrationpage.html	 The form is expected is to take all the information of the user such as First-name,last-name,Driving-licence(unique alphanumeric, in the format A-1234-123456-12),Expiry date of DL and phone number. When user try to register it will ask for username and password with above details to register. Creation of user can be done here on the registration page.
2.Login page	LoginPage.html	The registered user can then

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		login successfully.
3.Information from which contains vehicle details.	vehicle.html DetailedViewPage.html bookingForm.html	 The vehicle search Catalog contains the following things which are as follows: Check Available and unavailable Vehicles Listed to user Only on vehicle page: Sorting based on [a-z] ascending and descending in case of Alphabets and in case of number [1-10] ascending and descending. Searching can be done based on criteria like "View all SUV models not more than 3 years old" or "View sorted by year."The client can go back and front from one view to another when he is in detail view.Client can book the reservation for user what user likes and rent out a vehicle to him/her based on rentals and choice what they are looking for. They can also modify the same. Deleting and modifying or editing the booking details of vehicle can be done here. Every rental ,reservation and return to be stored in the database with timestamp and history can be maintained.So that every time user return or reserve something can be stored in the database in history table.

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5.Client Manager/Client Modify	client-manager.html, client-modify.html	 The userInfo consist of editing the field which he gave at the time of registration.For e.g the fields like mobile number or Driving license number can be renewed if Driving licence has expired. Deleted and modifying field of the user can be done here.So that an update command can be fired to update his/her info.

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This section contains all requirements in detail: Functional as well as non-functional requirements (quality attributes and constraints). The quality attributes are listed according to the *ISO/IEC 25010* standard that classifies software quality in a structured set of characteristics and sub-characteristics. Below Figure shows the aspects and their following characteristics.

Characteristic	Sub-Characteristic
Performance efficiency	Time behaviour
	Resource utilization
	Capacity
Compatibility	Co-existence
	Interoperability
	Learnability
	Operability
	User error protection
	User interface aesthetics
Reliability	Maturity
	Availability
	Fault tolerance
	Recoverability
Security	Confidentiality
	Integrity
	Non-repudiation

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	Accountability
	Authenticity
Maintainability	Modularity
	Reusability
	Analysability
	Modifiability
	Testability
Portability	Adaptability
	Installability
	Replaceability

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3.1 External interfaces

These are expected result in psd file which has been given by stakeholder and a glimpse of how an application should look. Following are the .psd file according to which design should me made and get started by development.

Listed all the User Interface which should be as follows:

Registration page

Figure:3.1

UserRegistration

FirstName:	
LastName:	
UserName:	
Password:	
EmailID:	
ClerkID:	
Register	

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Login Page



Figure:3.2

Information page (Which ask for Reservation date and return date) with sorting and booking.

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Car Search Catalog Car Type Model -----Select----- * Year Car Rental ------Select----- * Reservation Date Return Date Availability Log Details **End Date** Client Allocated ✓ Make Color Car Rental Reservation Date Submit Model vear Santro 2010 Green 2000 22-02-2019 28-03-2019 No -----Select-----■ Jeep Santro 2010 Green 2000 22-02-2019 28-03-2019 No -----Select------Jeep Santro 2010 Green 2000 22-02-2019 28-03-2019 No ------Select------ * Santro 2010 Green 2000 22-02-2019 28-03-2019 No -----Select------Jeep Santro 2010 Green 2000 22-02-2019 28-03-2019 No -----Select------Santro 2010 Green 2000 22-02-2019 28-03-2019 No Jeep Santro 2010 Green 2000 22-02-2019 28-03-2019 No -----Select------☐ Jeep Santro 2010 Green 2000 22-02-2019 28-03-2019 No ------Select------ • Santro 2010 Green 2000 22-02-2019 28-03-2019 No -----Select-----2000 22-02-2019 28-03-2019 ☐ Jeep Santro 2010 Green No -----Select------

Figure:3.3

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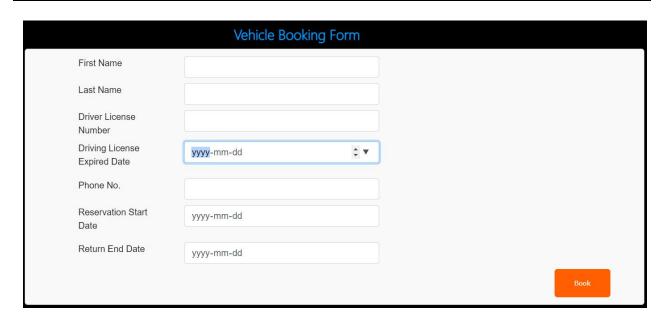


Figure:3.4

Detailed View page

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Detailed Information for Vehicle

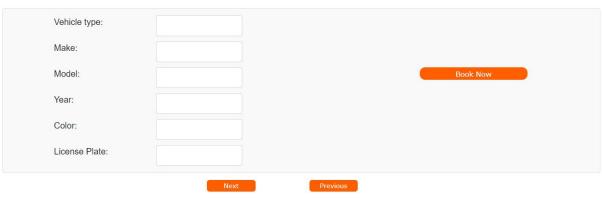


Figure:3.5

User Information update page

Add/Edit Client Information

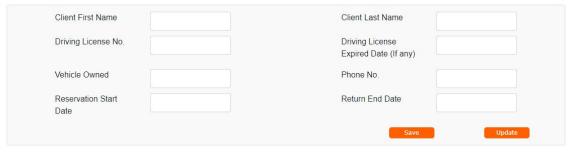


Figure:3.6

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Client Manager page

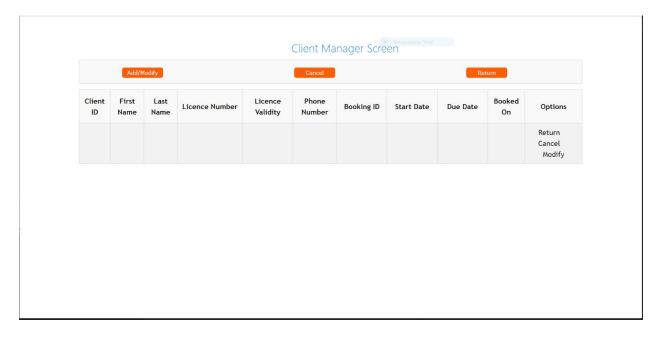


Figure:3.7

3.2 Functional requirements

Functional requirements capture the intended behaviour of the system. This section contains the *Actor Goal List* and the *Use Case view*.

Actor goal list

Actor	Goal
Clerk	The goal of clerk is following which are as follows:
	 Register user based on their personal data such as first name, last name, Driving licence number, username, password and expired license date.
	 Based on user's Reservation and Return date of vehicle and their availability is checked.
	 Clerk can check the list of available and unavailable car.

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	 Clerk can update the user info which he entered at the time of registration and can modify(update) the user details. clerk can check the log details of a particular client so that tracking of Reserve date, return date of vehicle can be stored with time stamp.
Administrator	Can load the information of Vehicles which user wanted to rent for specific date he/she wants. Or can see the log details/history or enrollment for every user per timestamp. Since money is involved in term of rental everything need to be stored into the history table to view the history of the clerk by administrator.

Use case view

The use case View for the following scenarios are as follows:

Registration page

Login Page

Information page (Which ask for Reservation date and return date) with sorting and booking.

Detailed View page for Vehicles

User interaction with detailed view page

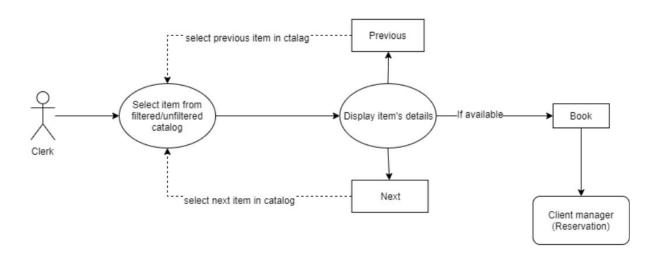


Figure: UseCase 4.1

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Details: The clerk can filter the catalog for desired results and view each item in the vehicle catalog in detail. The clerk can then make a booking based on the vehicle's availability. The clerk can also browse through each item of the catalog using the buttons provided in detailed view page.

Search catalog page & User Information update page

Search Vehicle Availability based on Reservation Search Vehicle <included> Client Informatation Availability <Extend> <Extend> {Option == Modifiy} {Option == Edit} <Extend> {Option == Create} Edit Client Add Client Modify Client Record Record Record

Figure: UseCase 4.2

Description : The clerk can search the vehicle based on filtering criteria which is added by clerk for user at the time of registration. Afterwards clerk can update the personal information of user.

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3.3 Non-functional requirements

Performance efficiency

The performance efficiently for VMS focuses on following things which are as follows:

- 1. The system shall be able to process how many vehicle booking per second in perk load.
- 2. In standard CPU usage shall be less than 50%.
- 3. Going from one page to another may contain data can take upt 1-2 sec.

Compatibility

Few compatibility issues that VMS can faced which are as follows:

Design compatibility: Since we are working on HTML5 with bootstrap design which can hamper the design when browser can get changed or won't work when opened in old browser of IE 4.0 or earlier or Chrome earlier version which don't not support some functionality.

Java Earlier Version or Plug allowed on web browser: user should have the latest version of Java installed or plugin active in browser which he need to allow it. Since our application is in java. user should allow the java in popup in browser.

It may not work if java is not enabled or clicked on denied.

Usability

The ability in VMS of using existing components which can be reused in VMS application which can be as follows:

- 1. Code design and percentage of reused requirements
- 2. coupling of components.
- 3. degree and use of framework.
- 4. Functions

Reliability

The reliability constraints for VMS consist of things which are as follows:

1. Resistance to be failure free and fault tolerant.

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- 2. Ability to perform certain tasks under specific amount of time. For e.g Asker for reservation and return date of vehicle based on the cretia given by user to client and if any failure occurs may result to pop up saying error message occurred or switching to login page in case of session value turn out to be null since it can save the value for only 10 minutes.
- 3. It should work based on the conditions which is specified in the system like sorting and searching and booking without errors.

Security

Security measures for VMS are taken as follows:

- 1. The ability to resist entering unwanted url will result into login page.
- 2. Success rate at time of authentication.
- 3. lifespan of password for session.

Maintainability

Maintainability are measures which has been considered while making VMS such as:

- 1. Extension of new functionality if given by stakeholders.
- 2. Adapting and working in new OS such as MAC and windows various versions.
- 3. Quality/ quantity managing the requirements which should be documented well for understanding what stakeholders is trying to say and developer and designed are trying to design.
- 4. Code analysis tool can also be used to see whether proper procedure has been followed or not while designing, developing and documenting.

Portability

Probability measures are those measured in which VMS can run under different environment which are as follows :

- Target platform(hardware,OS)
- 2. some platforms work specific to components with some functionality should be kept in mind while making VMS.

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Design constraints

Following are Design constraints must be kept in mind while making VMS which are as follows:

Languages: Java, HTML5, CSS 3.0, C#, Vb.net

Framework: Spring/spring boot or .Net

Database: mysql workbench or SQL Server

Tools: Eclipse IDE or IntelliJ

Server: Tomcat 7.0,8.0,9.0 Versions can be used

Architectural design: MVC pattern with java spring framework.

Revision version control: Github or Gerrit

Software Project management tool: Maven in Eclipse for spring dependencies or Gradle or dynamic web project.

Libraries Used: Maven dependencies such as core, context, WebMVC and JSTL expression language or any language in which developer can write expressions easily.

(On-line) user documentation and help

Since we have been designing and developing this document a help document and user manual document will be created at least once the version/iteration 2.0,3.0,4.0 are up and running and complete as per stakeholder.

Purchased components

The plans for VMS if get successful than it will be called as CRMS software which can be purchased in future.

Licensing requirements

A GPL will be carried out for VMS for the user and can be modified according to stakeholder need.

Legal, copyright and other notices

All rights will be reserved by Team which is named as of (Team of 6) lead by team leader and guided by our professor Dr. Constantinos Constantinides.

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4. Analysis Models

UML conceptual class diagram ("domain model") of Clerk Functionality Based on iteration :2

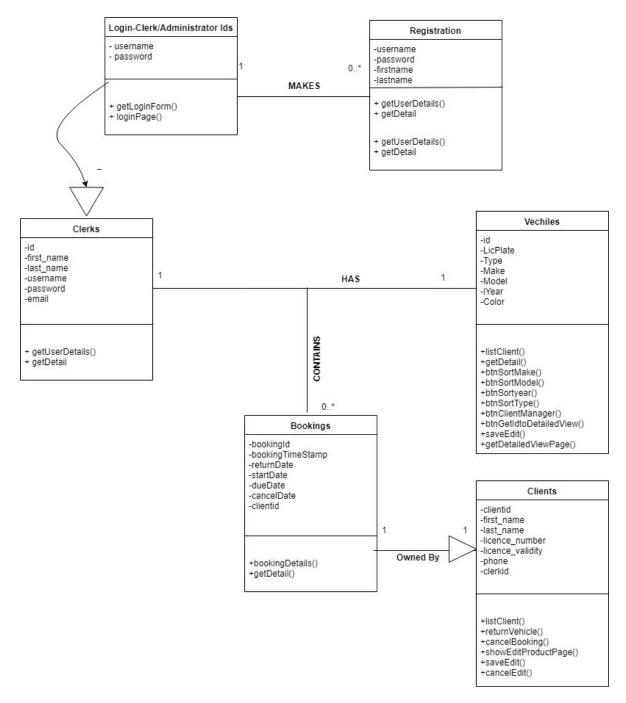


Figure 4.1

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1.0 Registration page

Use Case Diagram:

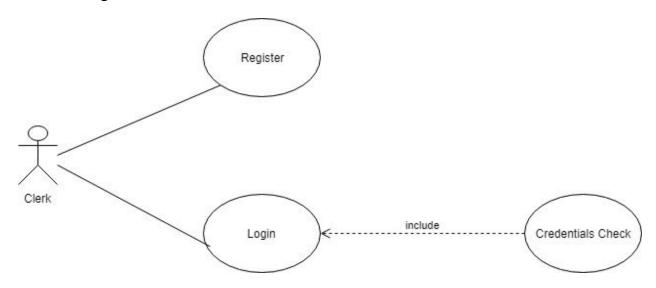


Figure 4.2

STATE DIAGRAM FOR REGISTER

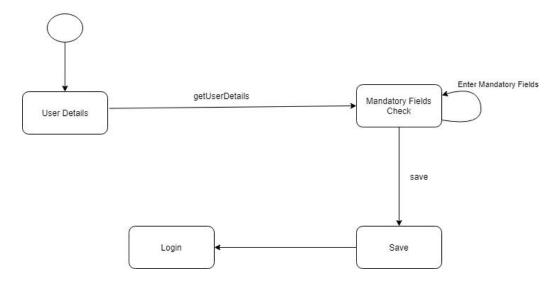


Figure 4.2

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Conceptual Class diagram for Registration component:

Registration	
-username -password -firstname -lastname	
+ getUserDetails() + getDetail	

Figure 4.3

Sequence Diagram For Register

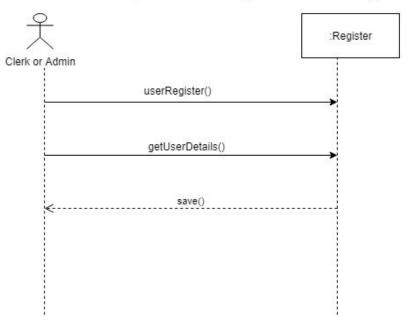


Figure 4.4

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2.0 Login Page

Use Case Diagram For Login:

Use Case Diagram For Login And Register

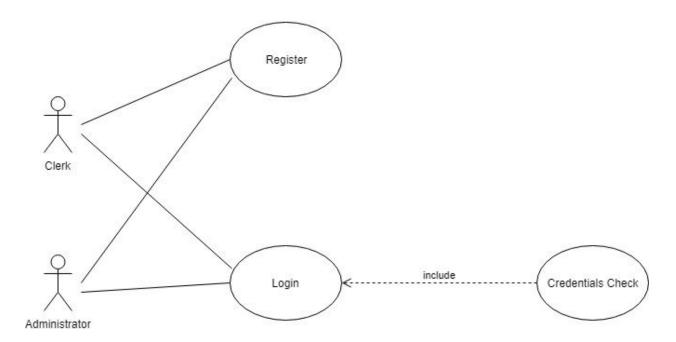


Figure 4.5

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Sequence Diagram:

Sequence Diagram For Login

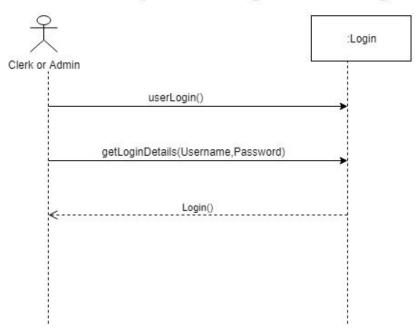


Figure 4.5

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State Diagram For Login

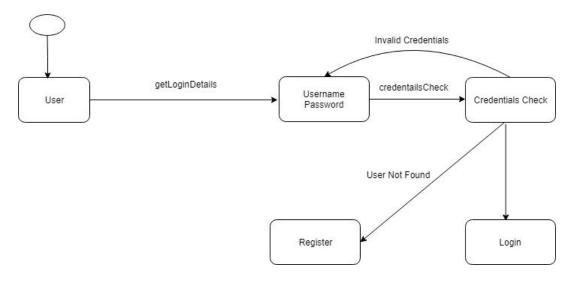


Figure 4.6

Conceptual Class diagram for Login - Reservation component:

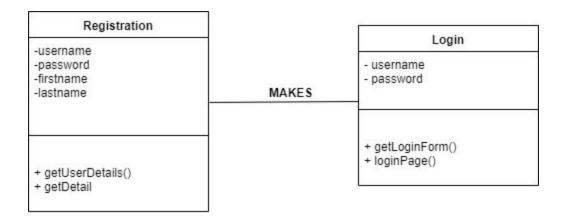


Figure 4.7

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3.0 Information page with sorting and booking.

Use Case Diagram Sorting:

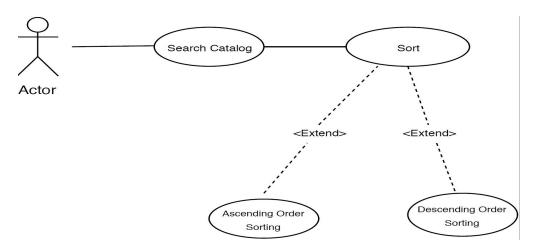


Figure 4.8

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Sequence Diagram for Sorting

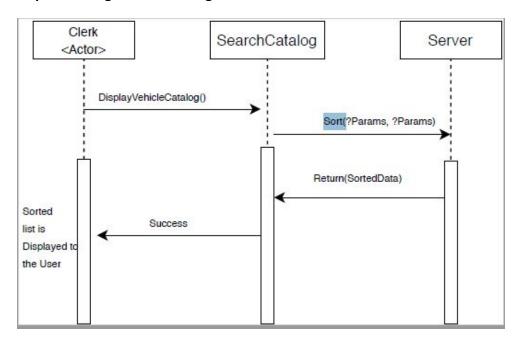


Figure 4.8

State Diagram:

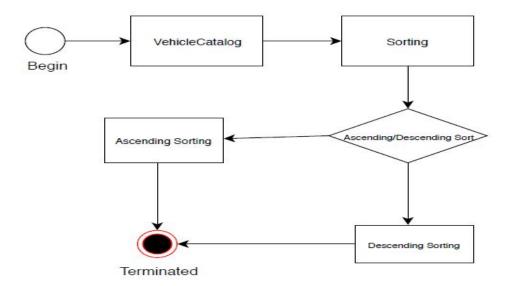


Figure 4.9

Page **32** of **50**

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Booking Page

Use Case Diagram:

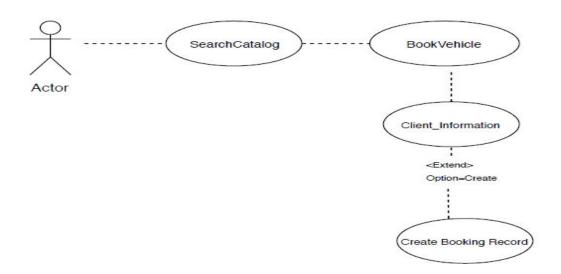


Figure 4.10

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Sequence Diagram:

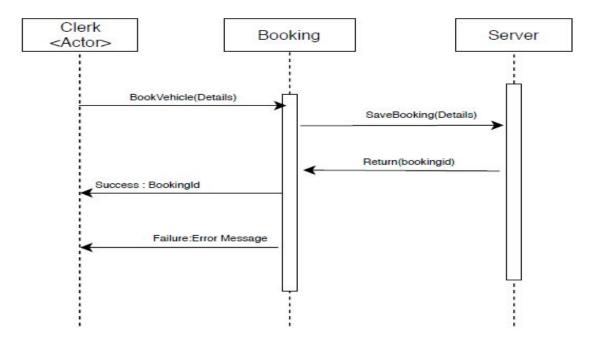


Figure 4.11

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State Diagram:

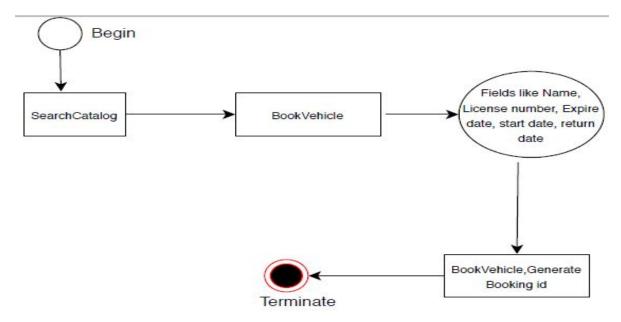


Figure 4.12

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4.0 Search catalog page

Sequence Diagram:

Sequence Diagram for Search and Book Vehicle Availability

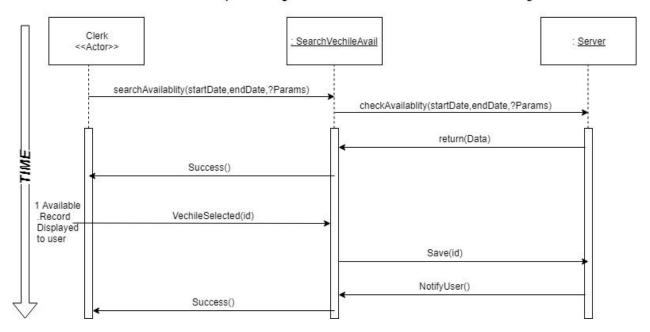


Figure 4.13

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State Diagram:

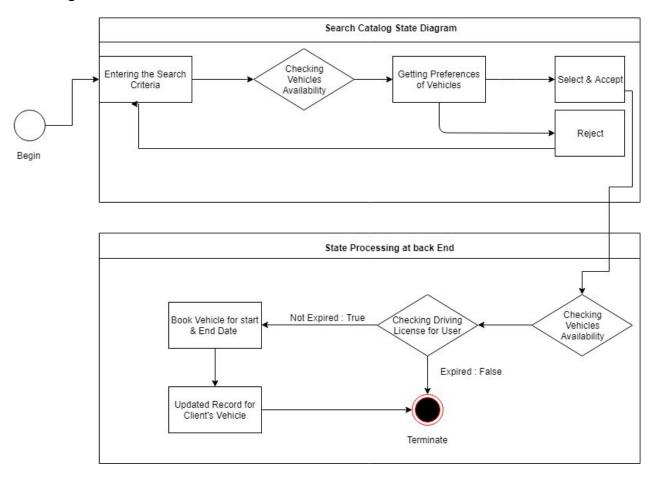
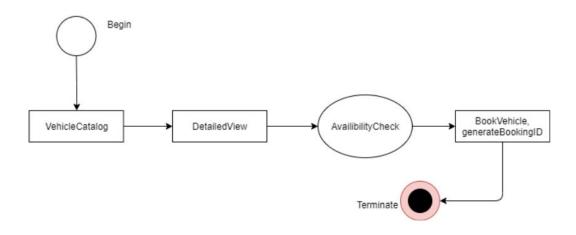


Figure 4.14

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5.0 User Information update page

State Diagram for Detailed View



Sequence Diagram : Detailed View Page:

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Sequence diagrams(select vehicle from unfiltered catalog)

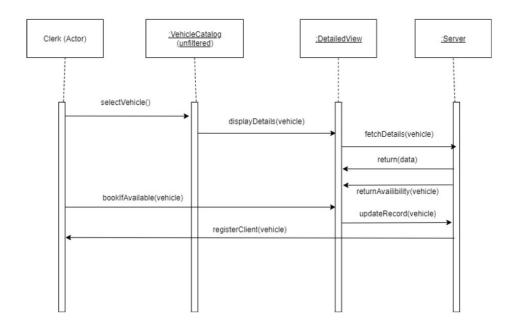
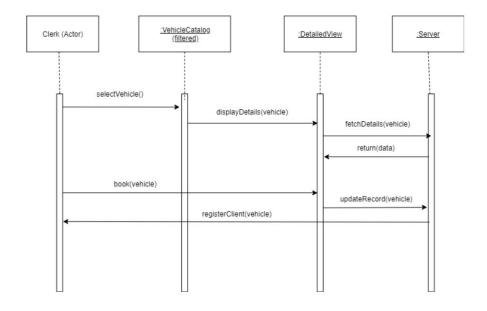


Figure 4.15

Sequence diagrams(select vehicle from filtered catalog)



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Figure 4.16

Sequence diagrams(Browse vehicles in detailed view)

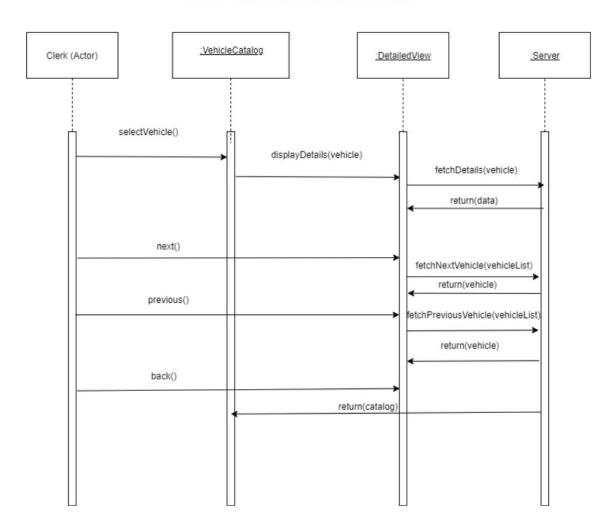


Figure 4.17

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State Diagram:

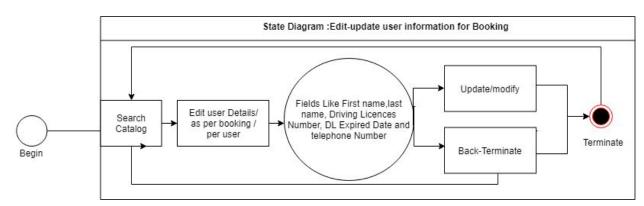


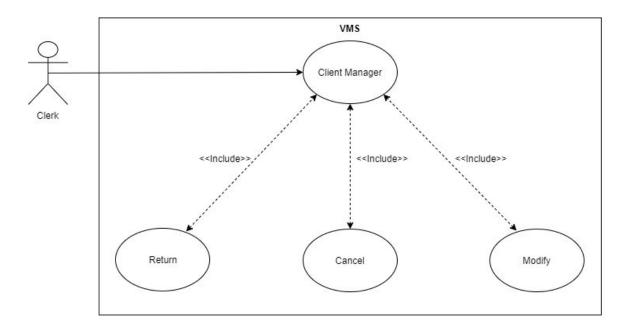
Figure 4.18

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06.Client Manager

Use Case Diagram

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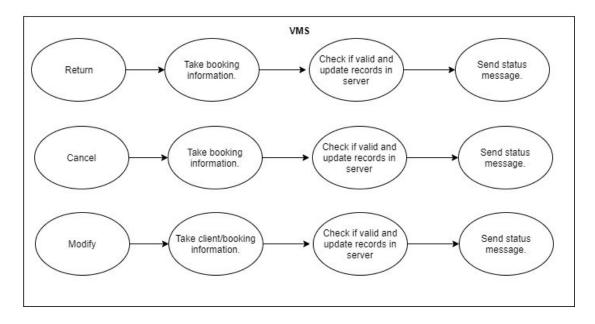


Figure 6.1

Sequence Diagram

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1. Modify Client

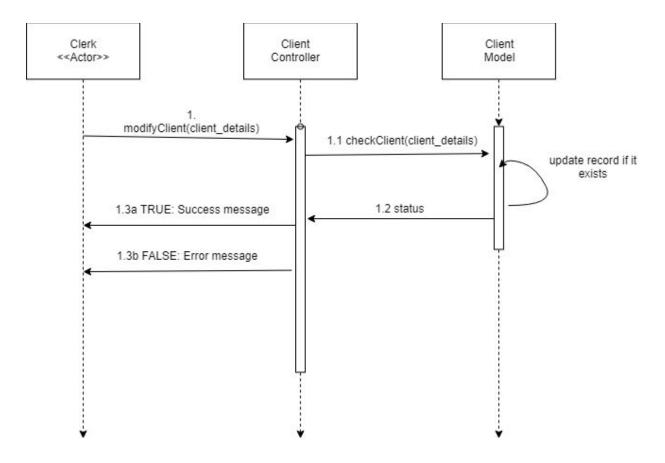


Figure 6.2

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2. Return Vehicle

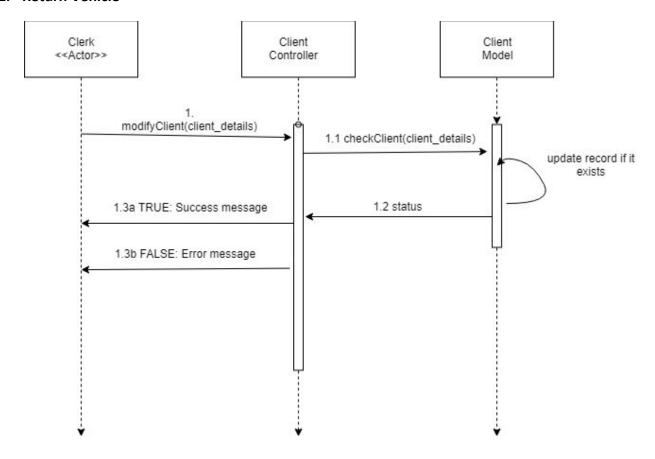


Figure 6.3

3. Modify Booking

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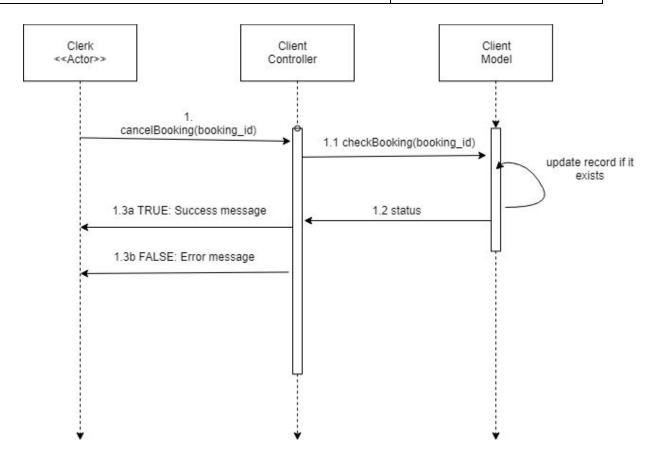


Figure 6.4

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State Diagram

1. Return

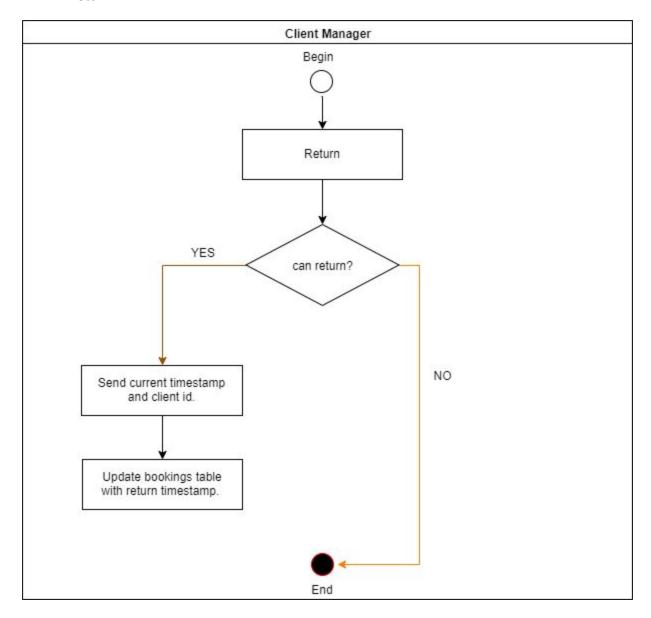


Figure 6.5

2. Cancel

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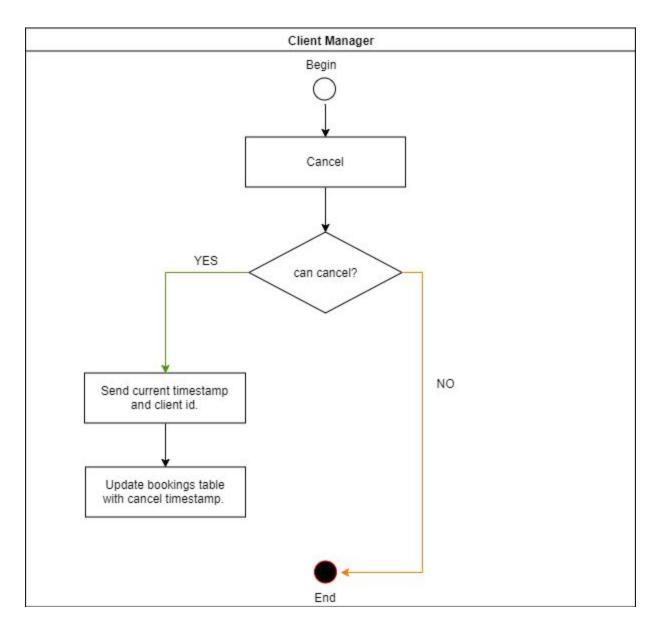


Figure 6.5

SOEN6461- Team 11	Version:1.0
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3. Modify

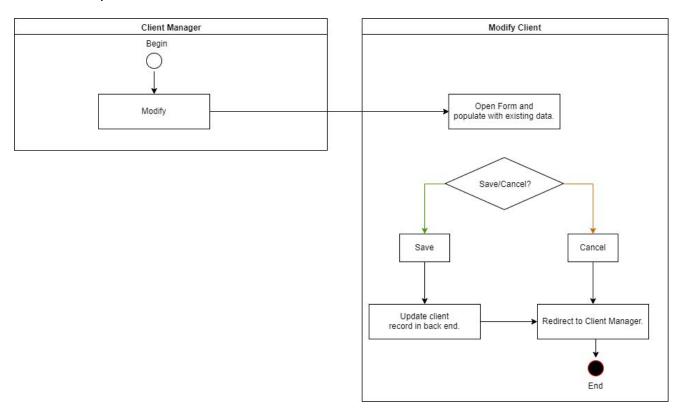


Figure 6.6