CHAPTER – 1 – INTRODUCTION

1.1 Introduction: -

Transportation facility is a matter of headache for those people who do not have any personal transport in city. On occasions like Wedding, Vacation, home shifting and tour outside the city and on many other situations they feel the necessity of a vehicle to sort out the problems. So if it is possible to design or develop a web based application for availing transport whenever and wherever possible, then it will be beneficial for both customer and transport provider. Now a day, by some clicks only, we can get whatever you want at home. We already know about the online shopping, e-banking etc. Similarly, The Car Renting Service is the online facility to book cars online within few clicks only. Some people cannot afford to have a car, for those people this system becomes very helpful. This system includes various cars, as per the customer order and comfort, it place the order and deliver the car as per the location within the area. For travelling a long distance, booking can be done via internet service only.

This Car Renting Service is very user friendly. It will simplifies the task and reduce the paper work and it is anticipated that functions of the system will be easily accessed by admin, customers and drivers. Admin who has full rights who can perform any type of operations in the project such as adding a new car, change the car rent or change the car details etc. and the customer can book the car online according to their expectation and hire the cars from their specific location anytime and anywhere. And the third user is driver who take a payment by the customer as the generated bill from the website and upload the payment status on the website.

This project also has to facility to check their customers and their payment mode and status details along with date and time. First time customers will have to create a profile if they are taking a car on rent and select the appropriate payment mode. However customers are taking this service by visiting the office, they will get their id and password. Customers will have the facility to select any type of car, search car by their brand name. Every client has been given unique ID and password. This system work 24×7 because of it’s an online existence and this is also helpful for those customers who want to see our newsletter without signing.

This project Car Renting Service has been developed in Java, JSP and database is MySQL which runs over the Apache Server. This is the most complete web portal for managing car renting business. It is a system designed specifically for medium and small vehicle rental businesses. Because of the variety of sizes of their vehicles, car rental agencies may also serve the self-moving industry needs, by renting vans or trucks, and in certain markets other types of vehicles such as motorcycles or scooters may also be offered.

1.1.1 Purpose for the system: -

The advancement in Information Technology and internet penetration has greatly enhanced various business processes and communication between companies (services provider) and their customers. Car Renting Service is developed to provide the following services:-

(a) Enhance Business Processes: -

To be able to use internet technology to project the rental company to the global world instead of limiting their services to their local domain alone, thus increase their return on investment.

(b) Online Car Reservation: -

Tools through which customer can reserve available cars online prior to their expected pick-up date or time.

(c) Customer's registration: -

A registration portal to hold customer's details, monitor their transaction and used same to offer better and improve services to them.

(d) Group bookings: -

Allow the customer to book space for a group in the case of weddings or corporate meetings (Event management).

1.1.2 Aims & Objectives: -

- The main aim to develop this website to get a powerful online car renting service to raise the business profitability.
- To produce a web-based system that allow customer to register and reserve car online and for the company to effectively manage their car renting business.
- To ease customer's task whenever they need to rent a car.

1.1.3 Product functionality: -

Car Renting Service provides the features for booking a car online. It includes several functionalities describes as below:

(a) Car Rental Management: -

It provides car reservation facility online. Customer can visit the website and check for various cars. If they are feasible with requirement, then booking can be done.

(b) Checking For Availability: -

Administrator can check for the availability of the car. He maintains the database of car. If no any car is available it is the responsibility of the administrator to provide alternative options.

(c) Payment system: -

Administrator/owner of the application or the driver responsible for payment from the customer. Booking cancellation, booking confirm, these all activities are done by the administrator of the application.

(d) Maintenance Manager: -

If any car requires maintenance like repair or replacement of any parts, then maintenance manager maintain the data about that. Payment of maintenance is done by the owner of application in offline mode.

1.1.4 Benefits of Online Car Renting Services: -

- This online car rental solution is fully functional and flexible.
- It is very easy to use and eco-friendly.
- This online car rental system helps in back office administration.
- It saves a lot of time, money and labor.
- The monitoring of the vehicle activity and the overall business becomes easy and includes the least of paper work.
- It increases the efficiency of the management at offering quality services to the customers.
- It provides custom features development and support with the application.

1.1.5 How Car Renting Services Work: -

A car rental is a vehicle that can be used temporarily for a period of time with a fee. Renting a car assists people to get around even when they do not have access to their own personal vehicle or don't own a vehicle at all. The individual who want to rent a car must first contact the car rental company for the desire vehicle. This can be done online. At this point, this person has to supply some information such as; dates of rental, and type of car. After these details are worked out, the individual renting the car must present a valid Identification. Most companies throughout the industry make a profit based of the type of cars that are rented. The rental cars are categorized into economy, compact, compact premium, premium and luxury. And customers are free to choose any car of their choice based on their purse and availability of such car at the time of reservation.

The general objective of this project is to develop a web service that will automate the renting process of the company and be able to store information in a single database.

1.2 Problem definition: -

Now-a-days it is too difficult to maintain a user records and to share the data from multiple system in multi user environment, there is a lot of duplicate work, and more chances of mistakes. This are some common problems which are as follows: -

- There are many customers who want to take their own drive across the city as they are uncomfortable of having a driver.
- Today customers are very busy and they do not really like the idea of visiting the vehicle rental offices to book their cars.
- Sometimes customer needs space in the car that is not possible in taxi or bus.
- Customer can't make his own choice in a taxi or bus.
- The customer does not have their own car for travel.

1.3 Proposed solution: -

There is a solution of those problems which are discussed above. Our website solves all the above mentioned problems: -

- A registration form is provided to users who want to hire a car on rent using our website.
- Customers fill up the form on the website by providing essential information and register themselves and after registration a unique user id is provided to them.
- Using this unique user id, customer can login to their account.
- Using the provided account customer can view various cars and book the car as per their requirements.
- The additional functionalities of updating user information, password recovery, posting feedbacks, password updation etc are also provided to users.
- The guest users of the website can view the car details and subscribe our newsletter.
- Customers can reserve available cars online prior to their expected pick-up date or time.
- Administrator/Owner of the website and driver can monitor their transactions and use the same to offer better and improve services to them.
- Allows the customer to book space for a group in the case of weddings or corporate meetings (Event management).

1.4 Organization of Report: -

This thesis consists of six (6) chapters. The whole website has designed after a careful study was done on the following points:-

Chapter 1: Introduction: -

This chapter is the introduction about the project that had been developed. It consists of background, problem statement, objective, scope, and report organization.

Chapter 2: Literature Review: -

This chapter explained the case study of the project. These are two general structures of this study, the technique that has been used and the former system that already created. This chapter provided the literature review that is related with that will be developed later. This chapter comprises two sections: The first section reviews about the existence of other systems. The second section describes the review on method, equipment, and technology.

Chapter 3: Analysis: -

A preliminary investigation was done through which we were able to decide how and for whom the system has to be designed? In this few questions like need for such system, problem in existing system, to whom this system will be useful and in what conditions the system will be useful, all these questions were answered. In this we studied about the feasibility of the system which was further divided into three categories which are economical, technical and operational. We also did the requirement analysis and the specifications were noted and worked upon to find an optimal solution. In our report a proper Entity-relationship diagram and class diagram has been shown to understand the working of the system.

Chapter 4: Design: -

The outer as well as inner layout of the system is covered under this heading. The architectural design, system design and the interface designs are key components which are nicely presented in pictorial way.

Chapter 5: Implementation and Testing: -

This chapter discuss on how the system Car Renting Service had been developed in development environment structurally and logically. In the report, under this heading we have only two main features they are testing and result set. Here we have mentioned what kind of testing is being used and how we have tested the designed system. This chapter discussed on the results or output produced as expected and the result is further discussed.

Chapter 6: Conclusion: -

This chapter concludes about the entire system.

CHAPTER – 2 – LITERATURE SURVEY

2.1 Literature Survey: -

2.1.1 Existing system function: -

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

Car Rental System gives car rental service for both foreign and local customers. This organization carries out its daily work by providing; their service to the customers using manually system. The organization uses a manual system for reserving, renting, register and to keep record of all the rental activities and customer information. The detailed existing system functions are listed as follows –

- During car reservation the customers book a car by making a phone call to the company otherwise they are expected to go to the company to make booking.
- During renting a car the customer personal information, payments status and rent agreements are filled in the car rent agreement form in order to hold legal contract between the customer and company for renting the car.
- The company normal work time schedule is from 10:30am – 6:00pm; therefore the company gives services for ten and half hours a day.
- The company makes a general report about the rented cars once at the end of the month and generates a report.
- An existing system can provide manually paper work.
- The user has to go in the office where user can get the car on rent and book their car.
- In the existing system you cannot provide feedback of the user to the admin online.
- The existing system only provides text-based interface, which is not as user-friendly as Graphical user Interface.
- Since the system is implemented in Manual, so the response is very slow.
- The transactions are executed in off-line mode, hence on-line data capture and modification is not possible.
- Off-line reports cannot be generated due to batch mode execution.

- Hence, there is a need of reformation of the system with more advantages and flexibility.
- Details are stored in papers.
- Maintenance is a huge problem.
- Updations, changes in details are a tedious task.
- Performance is not achieved up to the requirements.
- In the present system, companies do maintain a person for the allocating and proper functioning of transportation.

2.1.2 Proposed system: -

The Car Rental System eliminates most of the limitations of the existing system. The proposed system overcomes the problems in the Existing system. It has the following objectives:

- Data is centralized which has overcome the sharing problems in previous system.
- As data is maintained electronically, it's easy for a person to update the details, which has overcome the tedious updations in previous system.
- Maintenance is easy and performance is good.
- Mainly the system is automated the transportation process.
- The new system is totally computerized system.
- A new system provides features like time efficiency to show car details, user profiles and whatever the customer will give the feedback to the admin.
- This system provides tourism and travelling facilities.
- An inquiry is easily done by user in the system.
- It is the most software application for managing online car rental business.

2.1.3 Problems to be addressed: -

Problems	Root Cause	Symptoms and Frequency	Business Impact
Waste of Resources	Too much paperwork (consolidation process step 1 and 3).	Because they should be able to generate a report, they have to work overtime almost every day since they have to check a lot of records and minor discrepancies usually arise therefore forcing them to check and do everything all over again until all the records are already consistent with each other. Most of the staff members also have to go to the office even during weekends just to manage the large number of records and paperwork.	Due to frequent overtime, the office is forced to use the electricity longer and most of the staff would need to stay at their office even during weekends therefore increasing electricity consumption. About Php 7,000.00 is the extra amount paid for the excessive use of electricity in a month and Php 2,500.00 for the excessive use of office supplies a month.
Loss of contracts and source of income	The travel manager is forced to help out with organizing the large amount of paperwork in the office therefore giving her little time to do marketing and advertisement. (consolidation process step 5 and 6)	It is difficult to hire another employee that agrees to work overtime almost every day because of the large number of paperwork to be managed. Because of this instead of looking for more clients, the travel manager is stuck doing paper works with the employees just to beat the deadline of submitting the reports.	For a month, the travel manager can average contracts amounting to Php 20,000.00 a month if she could use her time for marketing instead of spending her time in transferring records. This value was obtained by computing for the number of contracts she gets when there is nothing much to do in the office therefore giving her time to do marketing and advertisement.
Time Consuming	Because there are too many records being made with each transaction it is more difficult for them to look for and keep track of records. Another problem is that there are numerous processes that are being followed for each transaction, most of which are very redundant and removable, therefore causing a more complex system. It would also take time for an employee to check the availability of a driver or car because there is no list of the cars and drivers that would indicate their corresponding status (i.e. under repair, not available).	Most of the time their boss would ask for records of their customers by giving the customer's name or the tour code and the staff would have to backtrack and to check numerous records manually for the right record. And also because they do not keep track those clients / drivers who have not yet settled their accounts, they would have to check back and forth in their logbooks to check whether that certain client or driver has paid or not.	Whenever this problem occurs a lot of time is wasted because instead of having the employees doing other tasks like marketing and encoding, they would spend a longer time looking for records therefore causing them to have limited time to do their work forcing them yet again to work overtime just to finish all their tasks. The company's losses because of paying for overtime work amounts to about Php 4,700.00 per week or around Php 18,000.00 a month.

Table (2.1) - Problems to be addressed

Running Business Process	Proposed System	Results to be achieved against the proposed system
Customer's data collection that rented vehicles using bookkeeping process first and then input into computer.	Customer's data collection is using online car rental system application, so the customer data has input directly into the application online.	Customer data arranged neatly, safely, and stored in the database so it can viewed and controlled by the company.
Car rental process by customers is still using rental form in the form of paper media.	Car rental process using web-based online car rental system application which data stored in the database online.	Car rental process will record with a neat, safe and stored in a database so it can viewed and controlled by the company.
Calculation rent income has done by counting rental receipts manually and recording it in rental book.	Calculation rent income is automatically on the online car rental system application and stored in the database online.	Create efficiency of time, performance, effort and cost. Rental data stored neatly and securely in a database so it can viewed and controlled by the company.

Table (2.2) – System Comparison Analysis

2.2 Technologies and Tools used: -

1.	Front End	HTML5, CSS3 and Javascript 1.8 (Bootstrap 4.0).
2.	Client-side validation	Javacsript 1.8
3.	Core Technology	JAVA SE 8
4.	Presentational Tier	Java Server Pages(JSP) 2.2 & Servlet 3.0
5.	Database tools	MySQL 5.6 & SQLyog 12.4
6.	Web Server	Apache Tomcat
7.	Other tools	Netbeans IDE 7.1

Table (2.3) – Technology Stack

2.2.1 Brief Overview of the technology: -

(a) Front end: - HTML, CSS, JavaScript, Bootstrap.

1. **HTML: -** HTML is the program that is used to create and generate html documents.

2. **CSS: -** It is a style sheet language that is used to describe the look and format of a web document written in any markup language.

3. **Java Script: -** It is dynamic computer programming language. JavaScript is mostly used as a part of web browser.

4. **Bootstrap: -** Bootstrap is a free and open-source front-end library for designing websites and web applications. It contains HTML and CSS based design templates for typography, forms, buttons, navigation and other interface components.

(b) Back end: - JSP, Servlet, MySQL, SQLyog.

1. JSP: - Java Server Pages (JSP) is a server-side programming technology that enables the creation of dynamic, platform-independent method for building Web-based applications.

2. Servlet: - Servlets provide a component-based, platform-independent method for building Web based applications, without the performance limitations of CGI programs.

3. MySQL: - MySQL is the most popular Open Source Relational SQL Database Management System. MySQL is one of the best RDBMS being used for developing various web-based software applications.

4. SQLyog: - SQLyog is a GUI tool for the RDBMS MySQL. SQLyog provides you with powerful means to manage your MySQL databases.

(c) Other Tools: - Netbeans, Apache Tomcat.

1. Netbeans: - NetBeans is an integrated development environment (IDE) for Java. NetBeans allows applications to be developed from a set of modular software components called modules.

2. Apache Tomcat: - Apache Tomcat is a web server and servlet container that is used to deploy and serve Java web applications.

2.3 Methodology: -

It is based on Client-Server Technology. Client/Server computing provides the capability to use the most cost – effective user interface, data storage, and connectivity and application services. Frequently, Client/Server products are developed within the present organizations but are not used effectively. The client/Server model provides the technological means to use previous investments in concern with current technology options. There has been a dramatic decline in the cost of technology component of Client/Server computing. Organizations see completions in the market place further increase the need to take the advantage of benefits available from applications build on Client/Server model.

CHAPTER – 3 – ANALYSIS

3.1 Process Model Adopted: -

The system uses “Prototype Model”.

3.1.1 Description: -

SDLC - Software Prototype Model: -

Software prototyping is becoming very popular as a software development model, as it enables to understand customer requirements at an early stage of development. It helps get valuable feedback from the customer and helps software designers and developers understand about what exactly is expected from the product under development.

Prototype is a working model of software with some limited functionality. The prototype does not always hold the exact logic used in the actual software application and is an extra effort to be considered under effort estimation.

Prototyping is used to allow the users evaluate developer proposals and try them out before implementation. It also helps understand the requirements which are user specific and may not have been considered by the developer during product design.

Following is a stepwise approach explained to design a software prototype:-

- Basic Requirement Identification
- Developing the initial Prototype
- Review of the Prototype
- Revise and Enhance the Prototype

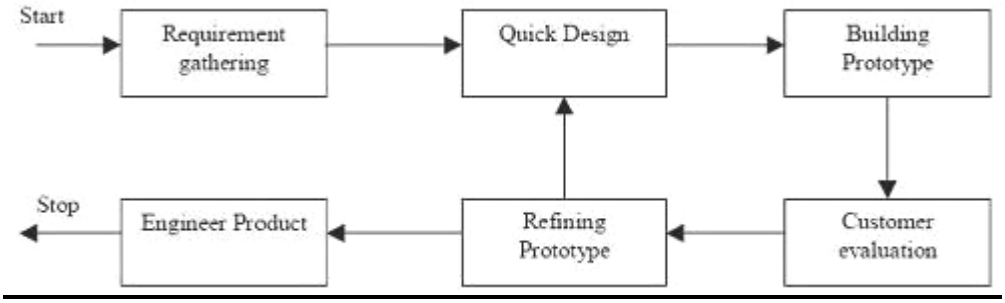


Fig (3.1) – Prototype Model

3.1.2 Advantages and Disadvantages: -

Software prototyping is used in typical cases and the decision should be taken very carefully so that the efforts spent in building the prototype add considerable value to the final software developed. The model has its own pros and cons discussed as follows: -

Advantages: -

The advantages of the Prototyping Model are as follows −

- Increased user involvement in the product even before its implementation.
- Since a working model of the system is displayed, the users get a better understanding of the system being developed.
- Reduces time and cost as the defects can be detected much earlier.
- Quicker user feedback is available leading to better solutions.
- Missing functionality can be identified easily.
- Confusing or difficult functions can be identified.

Disadvantages: -

The Disadvantages of the Prototyping Model are as follows −

- Risk of insufficient requirement analysis owing to too much dependency on the prototype.
- Users may get confused in the prototypes and actual systems.
- Practically, this methodology may increase the complexity of the system as scope of the system may expand beyond original plans.
- Developers may try to reuse the existing prototypes to build the actual system, even when it is not technically feasible.
- The effort invested in building prototypes may be too much if it is not monitored properly.

3.1.3 Reasons for Use: -

- Prototype model should be used when the desired system needs to have a lot of interaction with the end users.
- Typically, online systems, web interfaces have a very high amount of interaction with end users, are best suited for Prototype model. It might take a while for a system to be built that allows ease of use and needs minimal training for the end user.
- Prototyping ensures that the end users constantly work with the system and provide a feedback which is incorporated in the prototype to result in a useable system. They are excellent for designing good human computer interface systems.

3.2 Requirement analysis: -

Requirements analysis provides the software designer with a representation of information. Requirements are feature of a system or description of something that the system is capable of doing in order to fulfill the system's purpose. It provides the appropriate mechanism for understanding what the customer wants, analyzing the needs, assessing, feasibility negotiating a responsible solution specifying the solution unambiguously , validating the specification and managing the requirement as they are translated into a operational system.

3.2.1 Software Requirements: -

- Operating system : Windows XP or Higher version.
- Web Server : Apache Tomcat Server
- Web Browser : Google Chrome, Mozilla Firefox, Internet Explorer or any other browser.
- Database Tool : SQLyog.
- IDE : Netbeans.
- Designing Tools : Dreamweaver, Paintbrush
- Java JDK : JDK 1.6 or higher.
- UML Diagram Tool : Draw.io, StarUML, Creately or any other online tool.

3.2.2 Hardware Requirements: -

- RAM : 512 MB.
- Cache Memory : 512 KB.
- Processor : Processor(P5) core
- Server : Any server like Apache Tomcat/Glassfish server.
- HDD : 40GB.
- CPU : Intel Pentium 4(1GHz) or higher.
- GPU : Any GPU that is compatible.
- Other Hardware : Keyboard, Mouse, Monitor, LAN Card etc.

3.3 Feasibility Study: -

Preliminary investigation examine project feasibility, the likelihood the system will be useful to the organization. The main objective of the feasibility study is to test the Technical, Operational and Economical feasibility for adding new modules and debugging old running system. All system is feasible if they are unlimited resources and infinite time. There are aspects in the feasibility study portion of the preliminary investigation:

Development Phase	90 Days						Duration (Day)
	0 to 15 Day	16 to 30 Day	31 to 45 Day	46 to 60 Day	61 to 75 Day	76 to 90 Day	
Requirement Gathering							10
Analysis							15
Design							30
Coding							25
Testing							12
Implementation							08
Documentation							80
Total Time (Days)							90

Table (3.1) – Time Line Chart

3.3.1 Technical Feasibility: -

The technical issue usually raised during the feasibility stage of the investigation includes the following:

- Does the necessary technology exist to do what is suggested?
- Do the proposed equipments have the technical capacity to hold the data required to use the new system?
- Will the proposed system provide adequate response to inquiries, regardless of the number or location of users?
- Can the system be upgraded if developed?
- Are there technical guarantees of accuracy, reliability, ease of access and data security?
- The current system developed is technically feasible. Thus it provides an easy access to the users.

3.3.2 Economical feasibility: -

In economic feasibility, the most important is cost-benefit analysis. For any system if the expected benefits equal or exceed the expected costs, the system can be judged to be economically feasible. In economic feasibility, cost benefit analysis is done in which expected costs and benefits are evaluated. Economic analysis is used for evaluating the effectiveness of the proposed system.

3.3.3 Operational feasibility: -

Operational feasibility is mainly concerned with issues like whether the system will be used if it is developed and implemented. Proposed projects are beneficial only if they can be turned out into information system. That will meet the organization's operating requirements. Some of the important issues raised are to test the operational feasibility of a project includes the following: -

- Is there sufficient support for the management from the users?
- Will the system be used and work properly if it is being developed and implemented?
- Will there be any resistance from the user that will undermine the possible application benefits?
- Does management support the project?

3.4 Architectural Specification: -

The primary objective of Architectural Design is to develop a modular program structure and represent the control relationships between modules. It also melds program structure and data structure, defining interfaces that enable data to flow throughout the program.

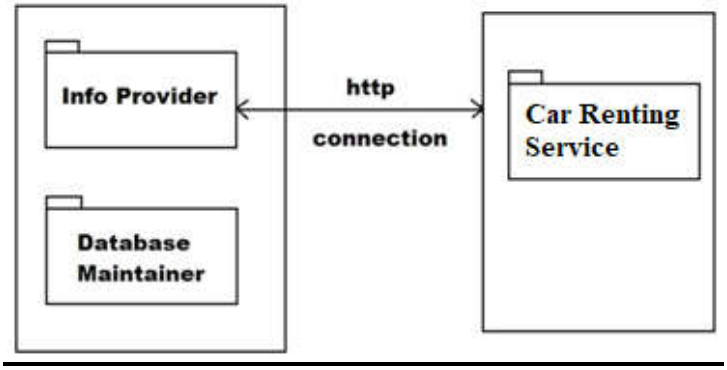


Fig (3.2) – Car Renting Service - Working

Client Server Architecture is used in this system i.e. Desktop Monitoring system. Client server architecture consists of two part Client and server. A server is anything that has some resource to share. The Web server stores web pages. A client is any other entity who wants to gain access other entity at server. The server is permanently available resource, which the client is free to unplug after it is has been served.

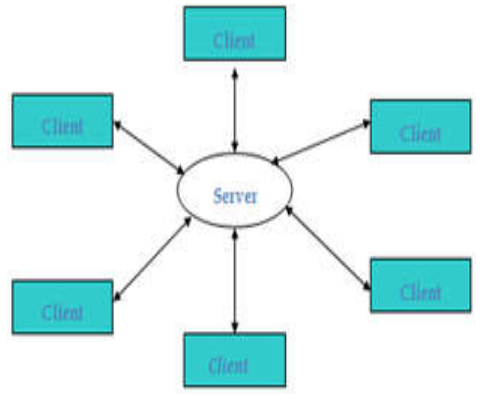


Fig (3.4) – Client Server Architecture

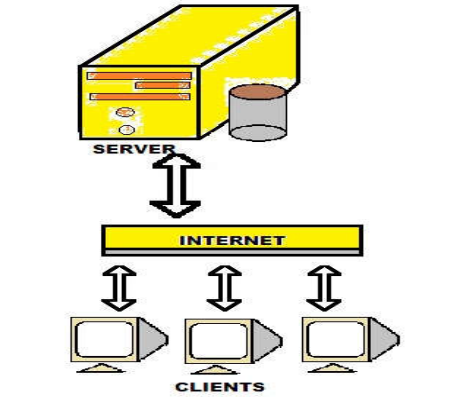


Fig (3.3) – Client Server Architecture

3.5 Use Case Diagram: -

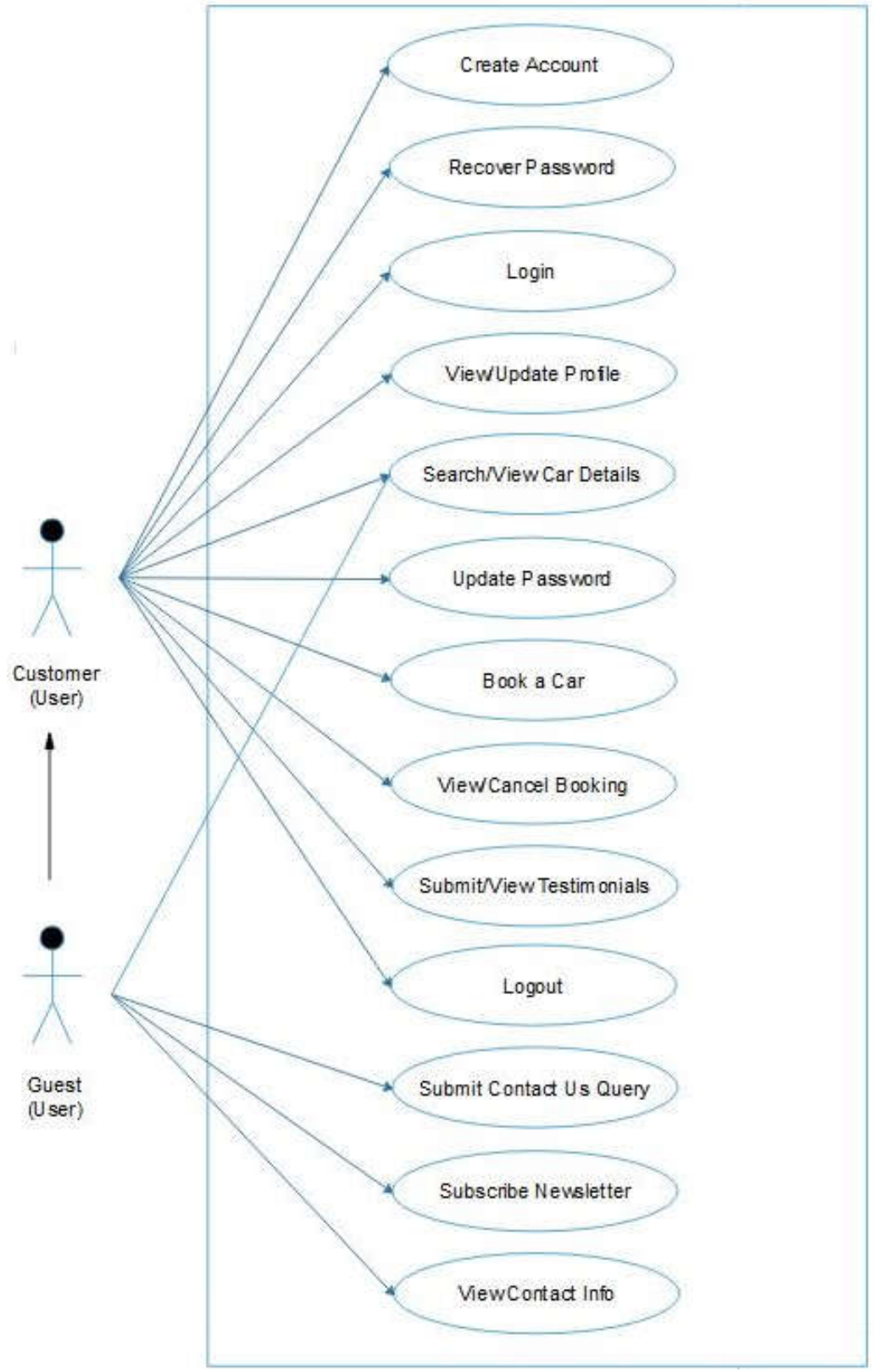


Fig (3.5) - Car Renting Service (Use Case Diagram for User)

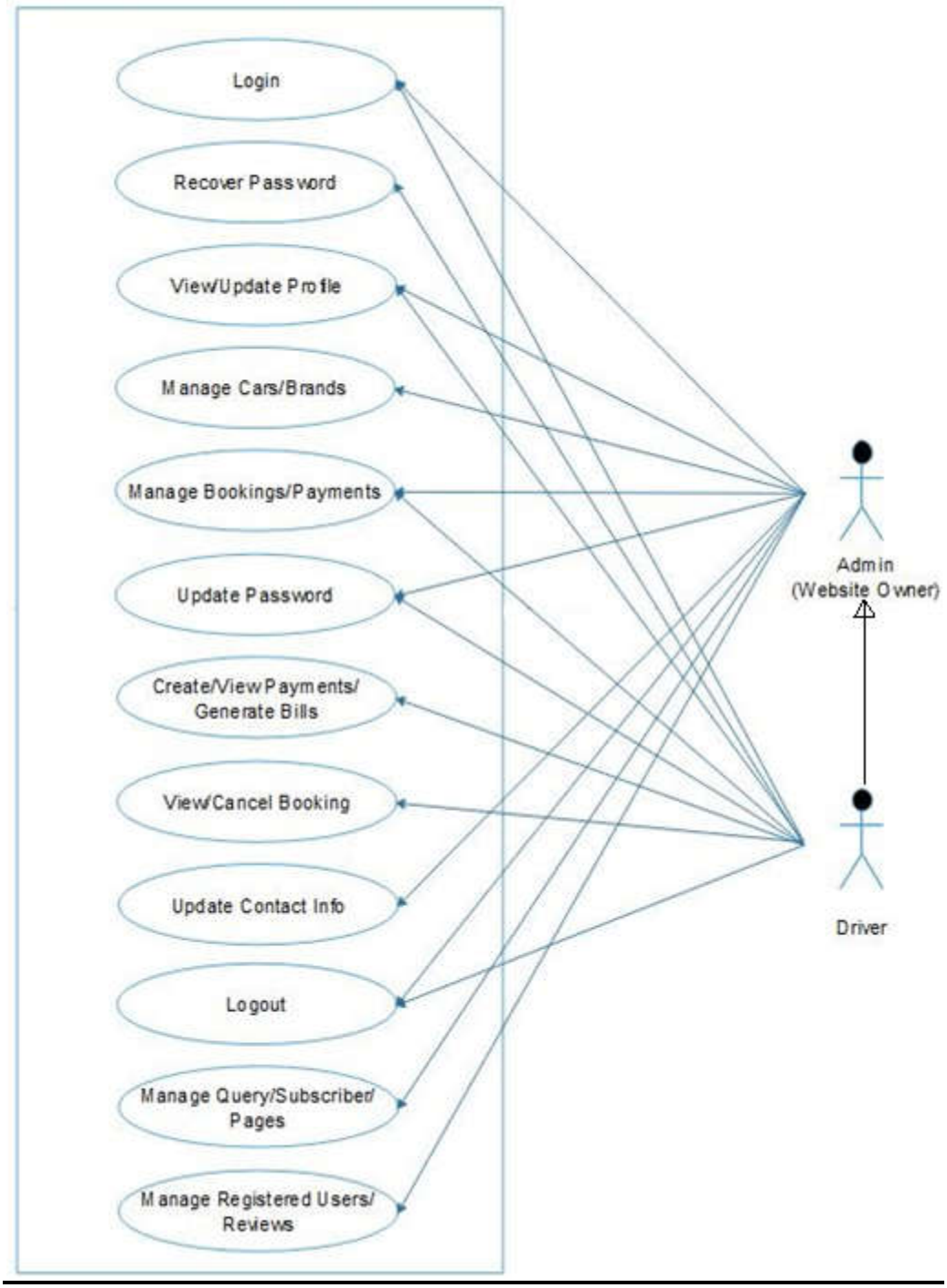


Fig (3.6) - Car Renting Service (Use Case Diagram for Admin)

3.6 Use Case Description: -

3.6.1 List of Actors: -

1. User: - It can be any one from two – guest user or registered user.

2. Admin: - It is the person who will maintain the server; it can be a network Admin.

3. Driver: - It is the person who is partially responsible for the tasks of Admin i.e. payment.

3.6.2 Use Case Description: -

1. Register: -

Introduction: - It is a function which allows us to register to the website so that we can use the website functions.

Post-condition: - After registration then only you could perform login and then you could use the function such as update and view profile.

Flow Control: -

Basic Flow: -

- Click on register button
- Enter all the mandatory fields.
- Click on Submit button.

Alternate Flow: -

- Refill the form in case of mandatory field missed.
- Click on Submit button.

2. Login: -

Introduction: - It is a function which allows us to login to the website so that we can use Website functions.

Post-condition: - After login is done then you can use website other functions such as modify, view cars etc.

Flow Control: -

Basic Flow: -

- Enter the username.
- Enter the password.
- Click on Submit button.

Alternate Flow: -

- Enter the username.
- Enter the password.
- Click on Resubmit button.

3. Submit Testimonial: -

Introduction: - It is a function which allows the users to submit testimonial.

Flow Control: -

Basic Flow: -

- Go to website.
- Click on Feedback.

- Enter the feedback.
- Click on Submit Feedback.

4. Manage a Car: -

Introduction: - It is a function which allows the admin to add cars.

Post-condition: - After login is done then admin can use this function.

Flow Control: -

Basic Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function to add car.

Alternate Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function to add car.

5. Book a Car: -

Introduction: - It is a function which allows the user to book a car.

Post-condition: - After login is done then user can use this function.

Flow Control: -

Basic Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function to book a car.

Alternate Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function to book a car.

6. Subscribe Newsletter: -

Introduction: - It is a function which allows the user to subscribe newsletter.

Post-condition: - After login is done then above given user can use this function.

Flow Control: -

Basic Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function to subscribe newsletter.

Alternate Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function to subscribe newsletter.

7. View/Cancel Booking: -

Introduction: - It is a function which allows the user to view/cancel booking.

Post-condition: - After login is done then user can use this function.

Flow Control: -

Basic Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function view/cancel booking.

Alternate Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function view/cancel booking.

8. Manage Booking/Payments: -

Introduction: - It is a function which allows the admin and driver to manage booking or payment.

Post-condition: - After login is done then admin and driver can use this function.

Flow Control: -

Basic Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function to manage booking/payments.

Alternate Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function to manage booking/payments.

9. Update Password: -

Introduction: - It is a function which allows the users, admin and driver to update the password.

Post-condition: - After login is done then user, admin and driver can use this function.

Flow Control: -

Basic Flow: -

- Enter the username.
- Enter the password.
- Click on login button
- Use the function to update password.

Alternate Flow: -

- Enter the username.
- Enter the password.
- Click on login button.
- Use the function to update password.

10. Search/View Car Details: -

Introduction: - It is a function which allows the users who wants to book the car and they search a car according to their necessities.

Flow Control: -

Basic Flow: -

- Click on the website.
- Search a Car.

11. Submit Contact Us Query: -

Introduction: - It is a function which allows the users to submit contact us query.

Flow Control: -

Basic Flow: -

- Click on the website.
- Login.
- Submit Contact Us Query.

12. Logout: -

Introduction: - Through this user, driver and admin can logout from their session.

CHAPTER – 4 – DESIGN

4.1 Activity Diagrams: -

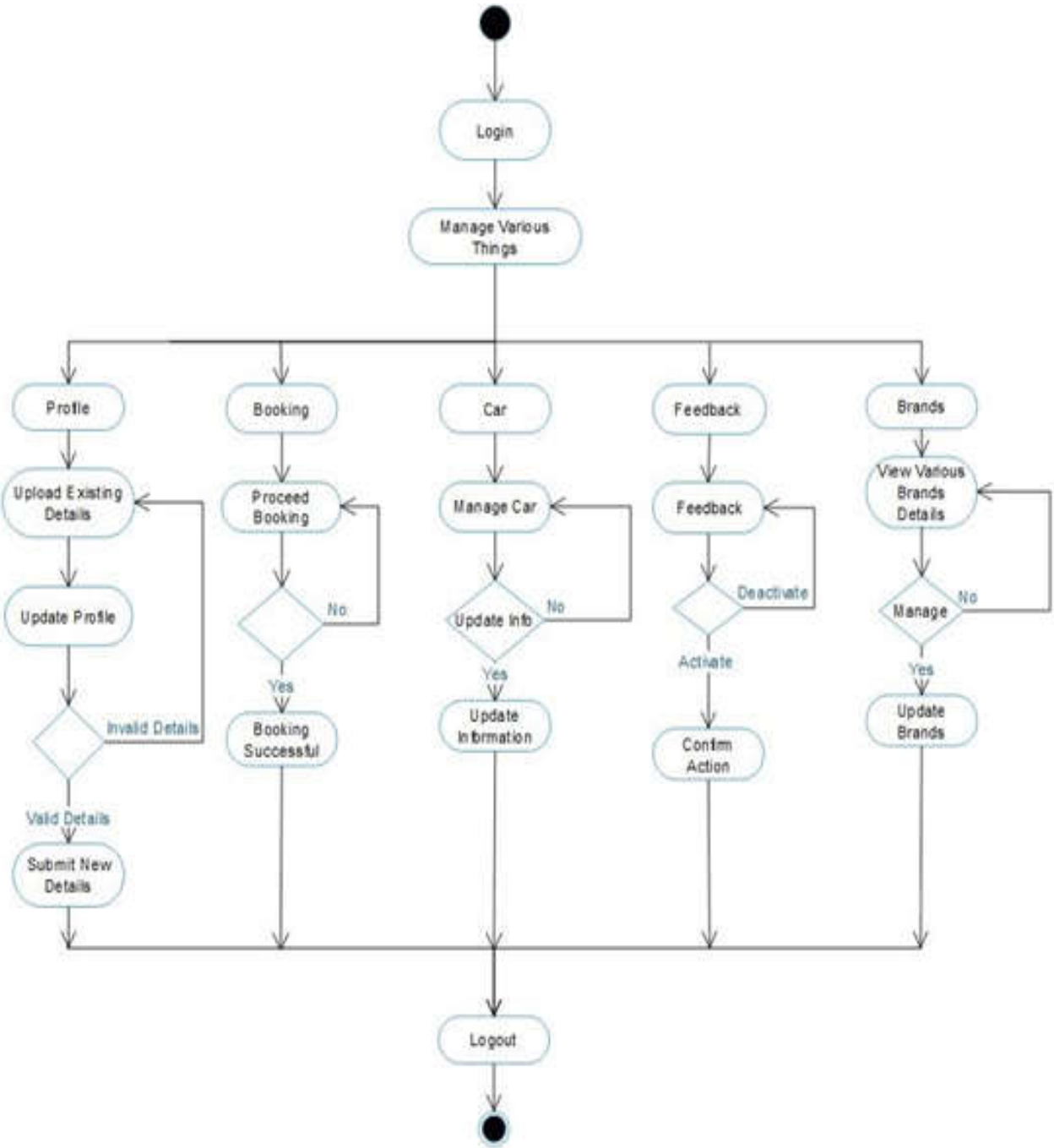


Fig (4.1): Activity Diagram for Admin Functions

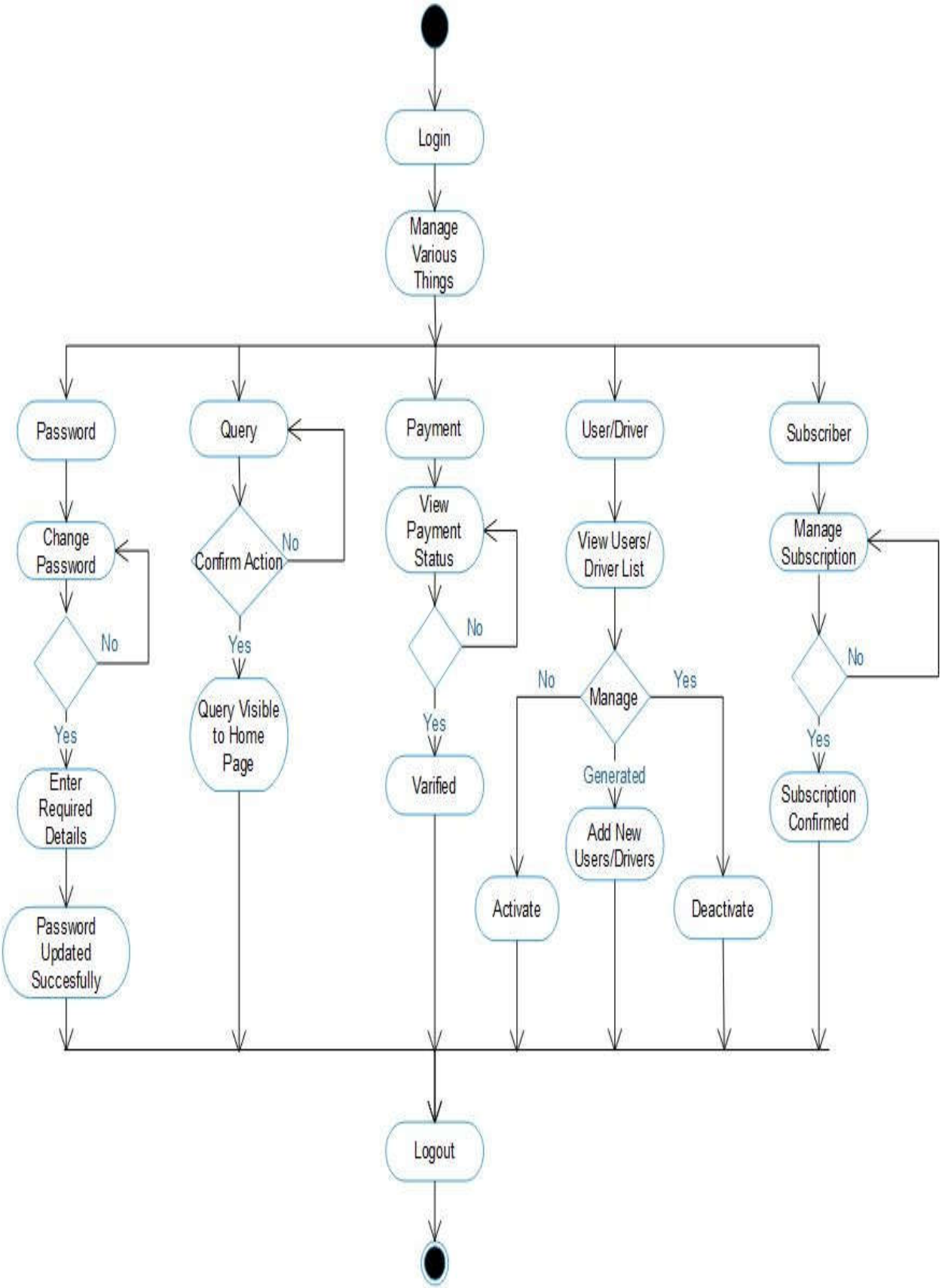


Fig (4.2): Activity Diagram for Admin Functions

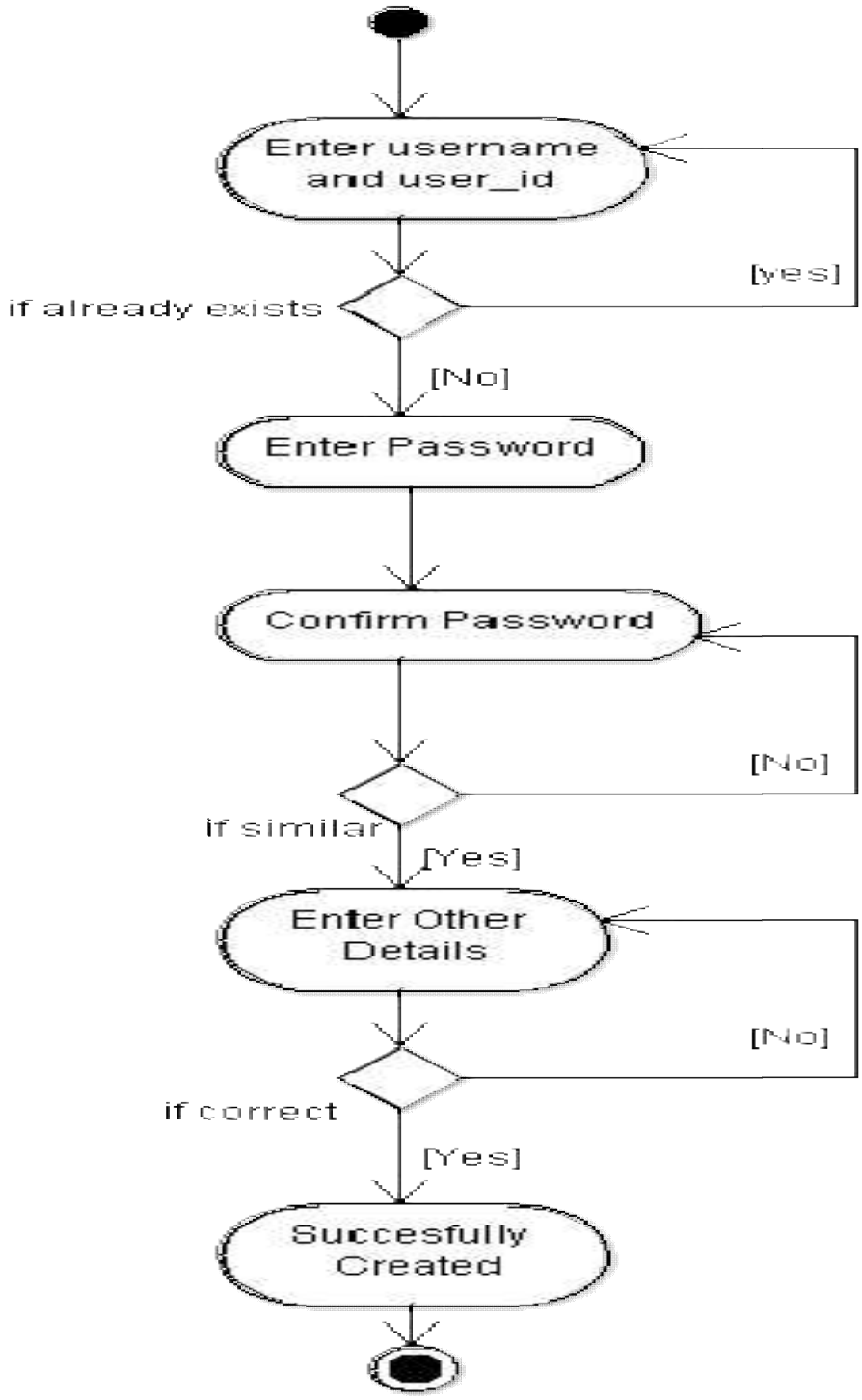


Fig (4.3): User Registration (Activity Diagram)

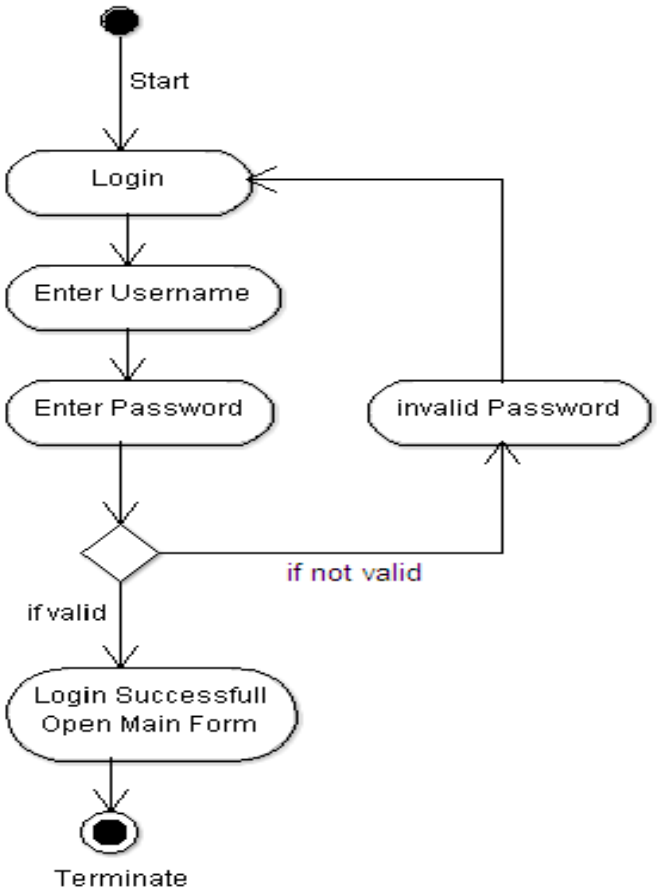


Fig (4.4): Login into System (Activity Diagram)

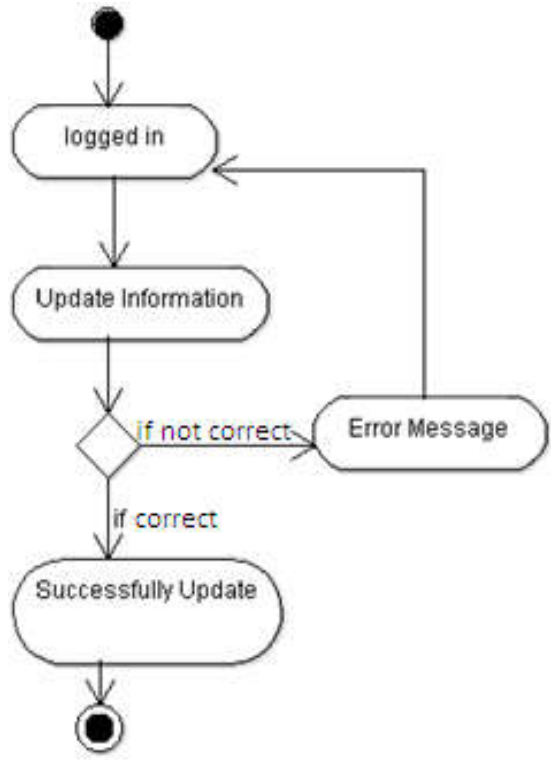


Fig (4.5): Updating User Information (Activity Diagram)

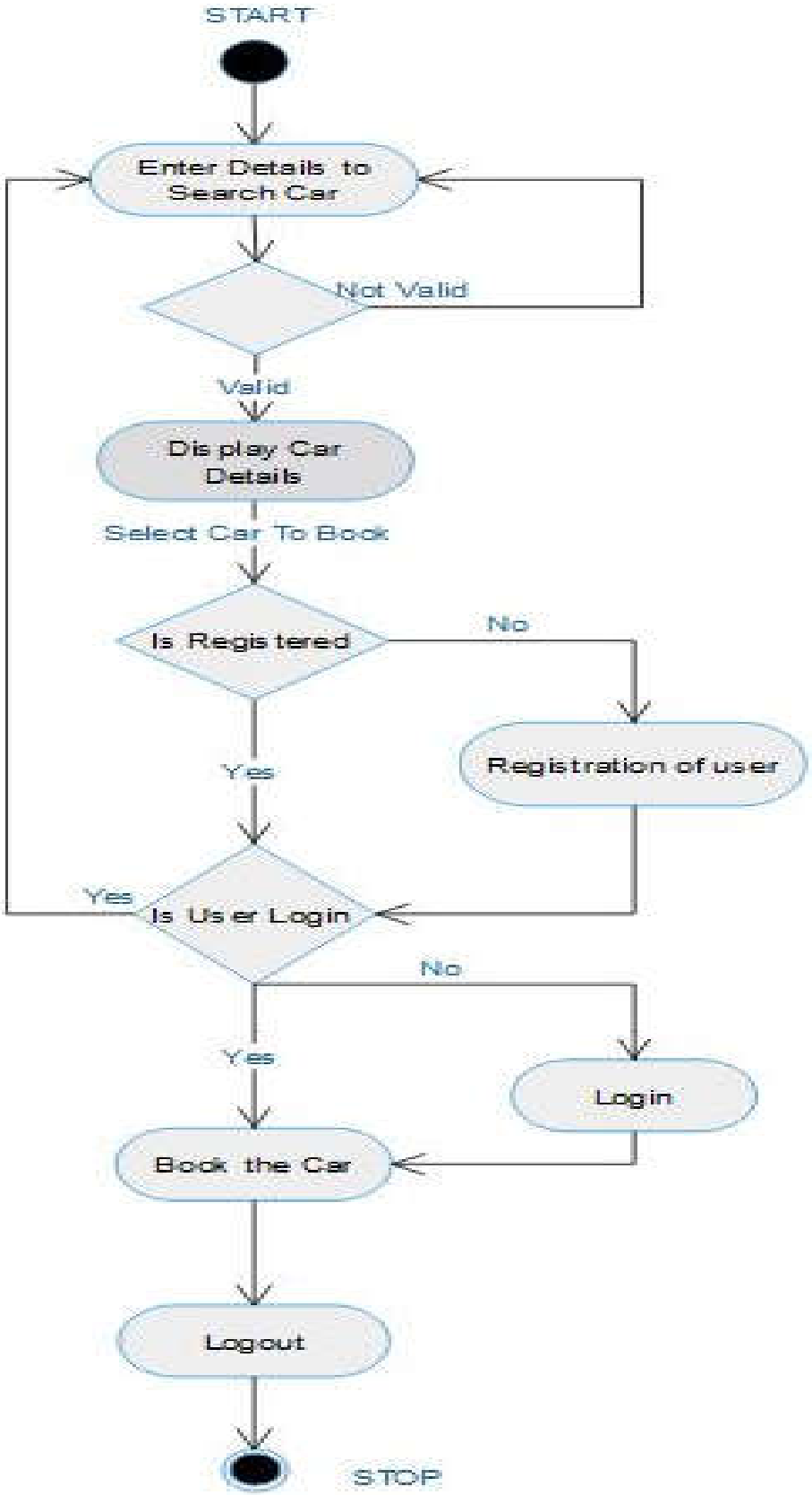


Fig (4.5): Car Booking (Activity Diagram)

4.2 Sequence diagram: -

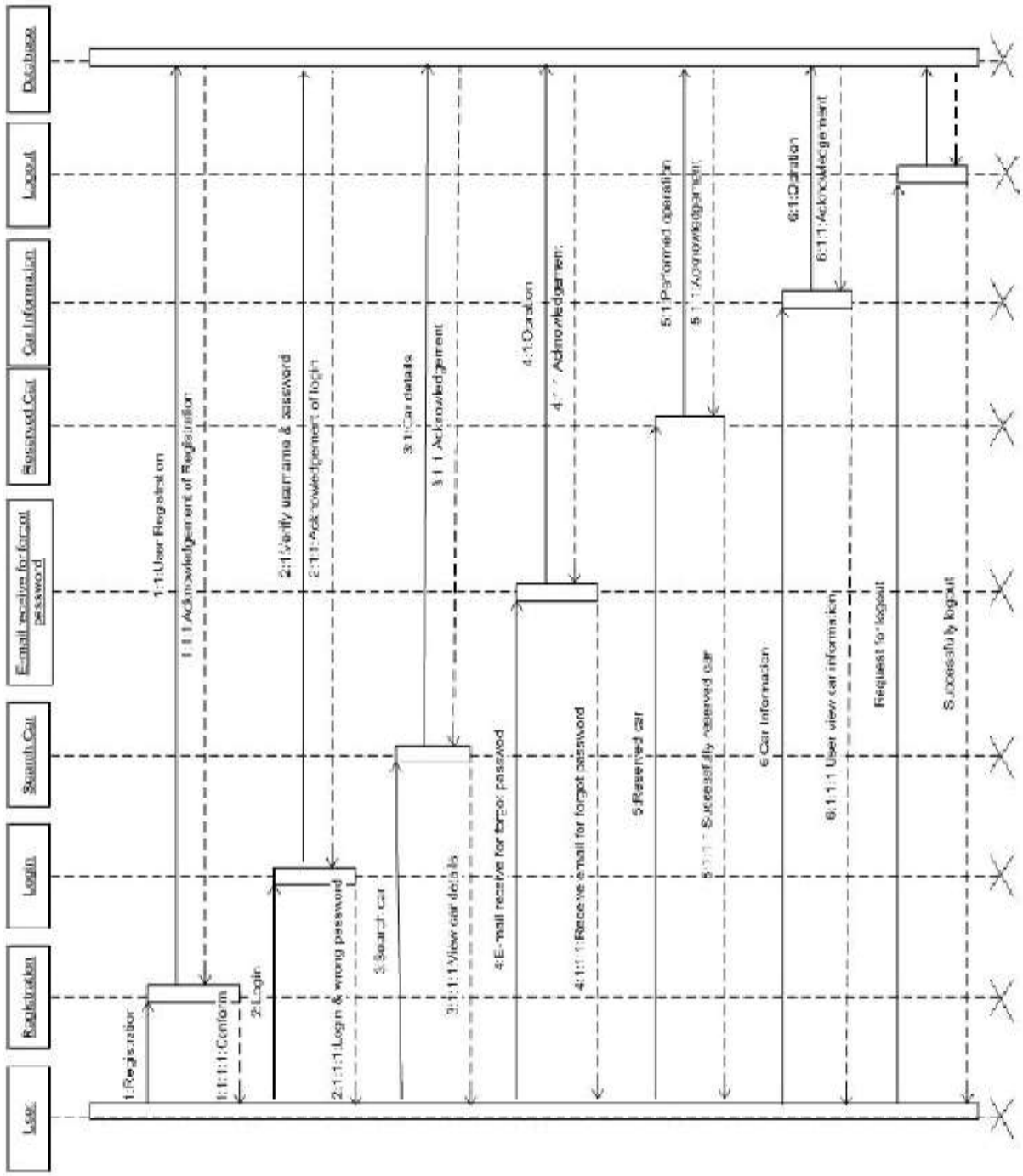


Fig (4.7): Sequence Diagram for User Actions

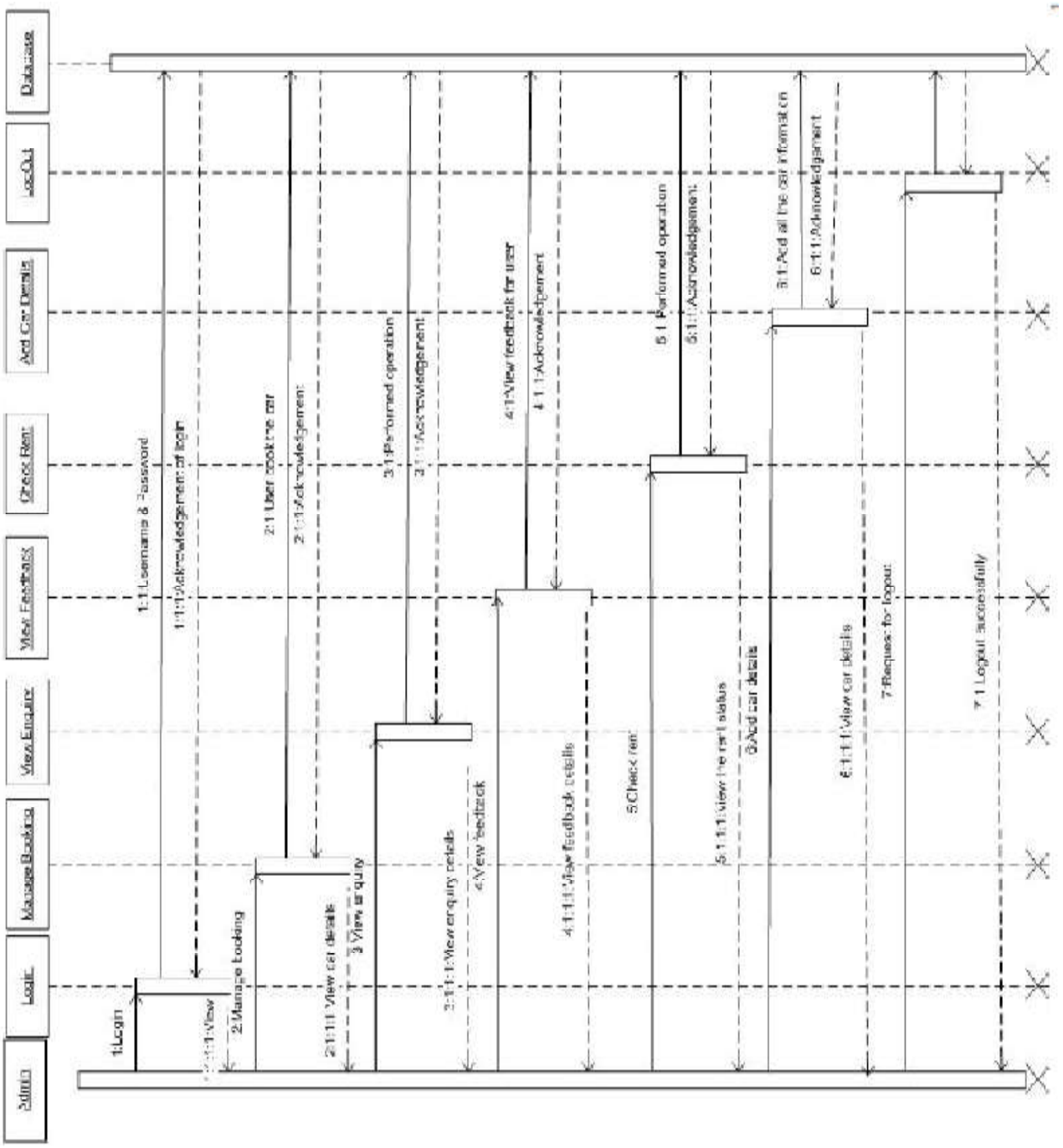


Fig (4.8): Sequence Diagram for Admin Actions

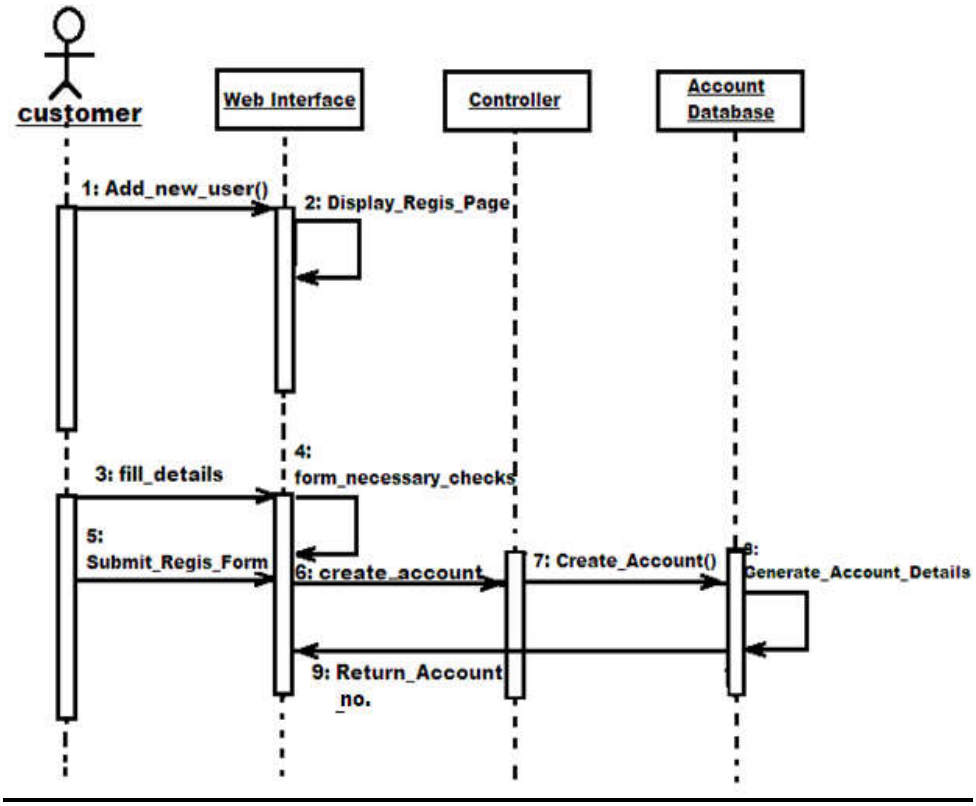


Fig (4.9): Register New User (Sequence Diagram)

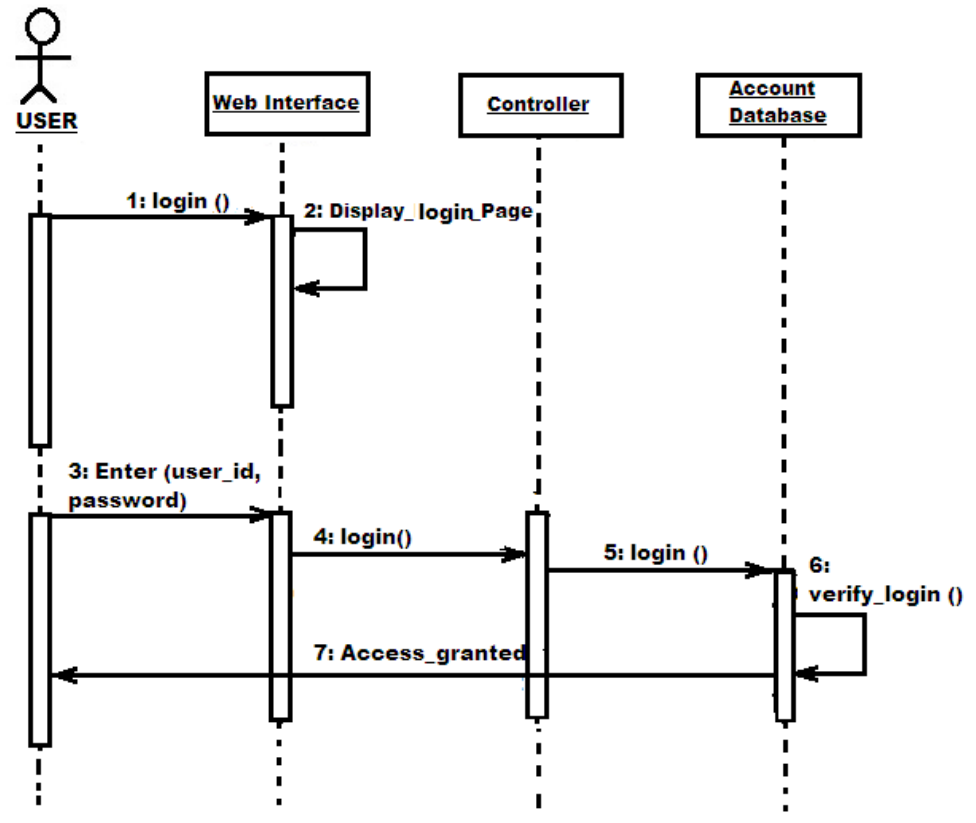


Fig (4.10): Login into System (Sequence Diagram)

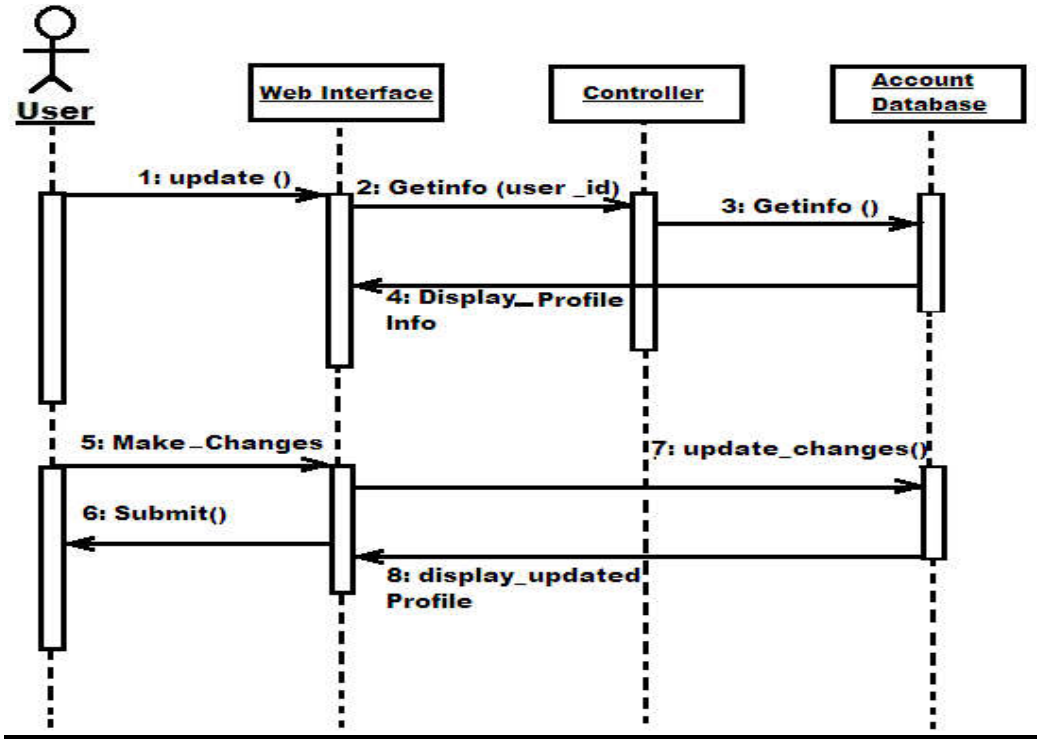


Fig (4.11) : Update User Profile (Sequence Diagram)

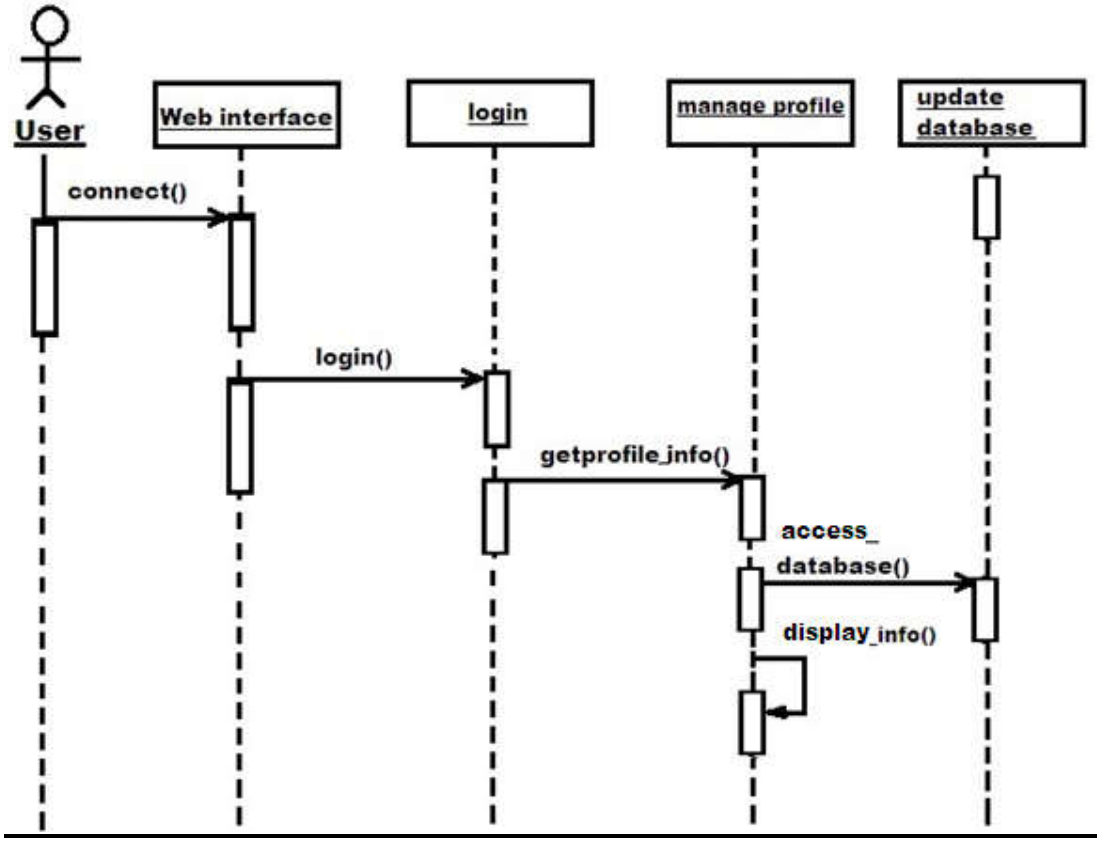


Fig (4.12) : Displaying User Information (Sequence Diagram)

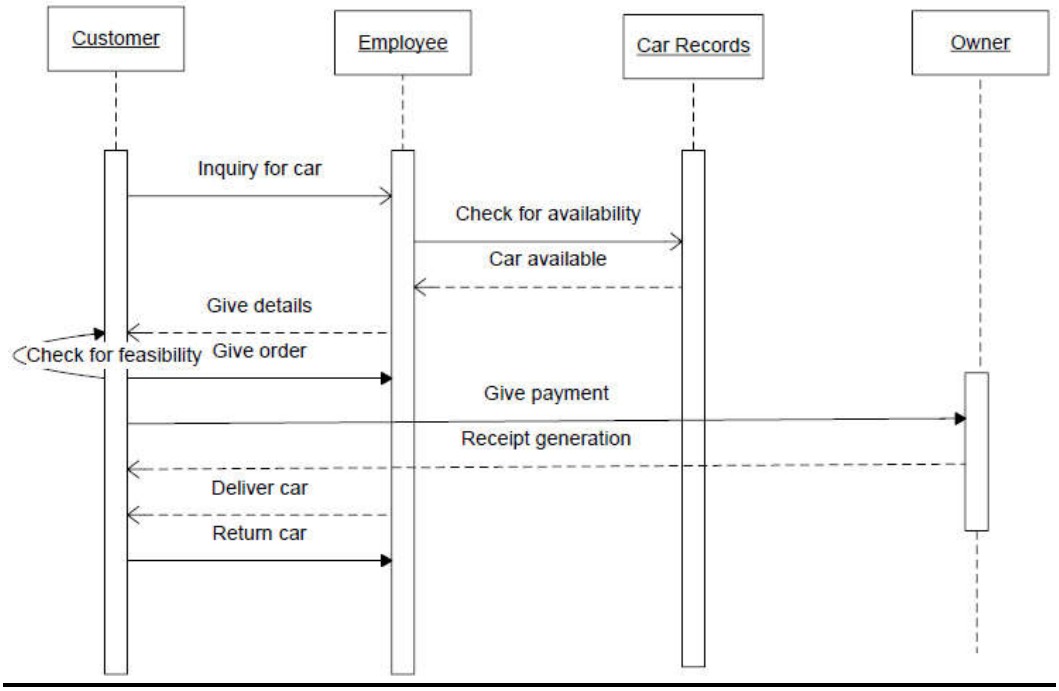


Fig (4.13): Sequence Diagram for Report Generation

4.3 Class diagram: -

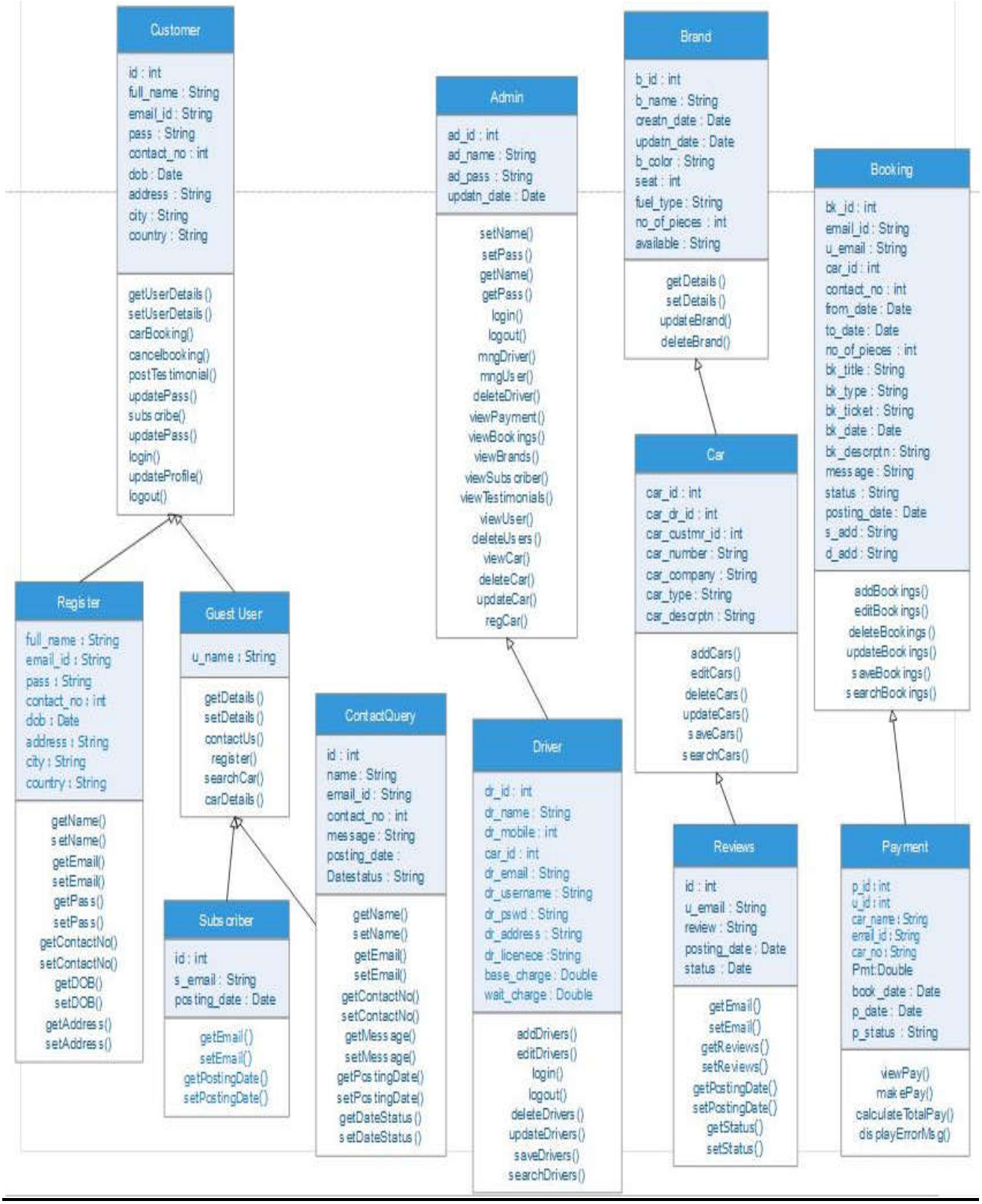


Fig (4.14): Class Diagram for Car Renting Service

4.4 System Flow Chart: -

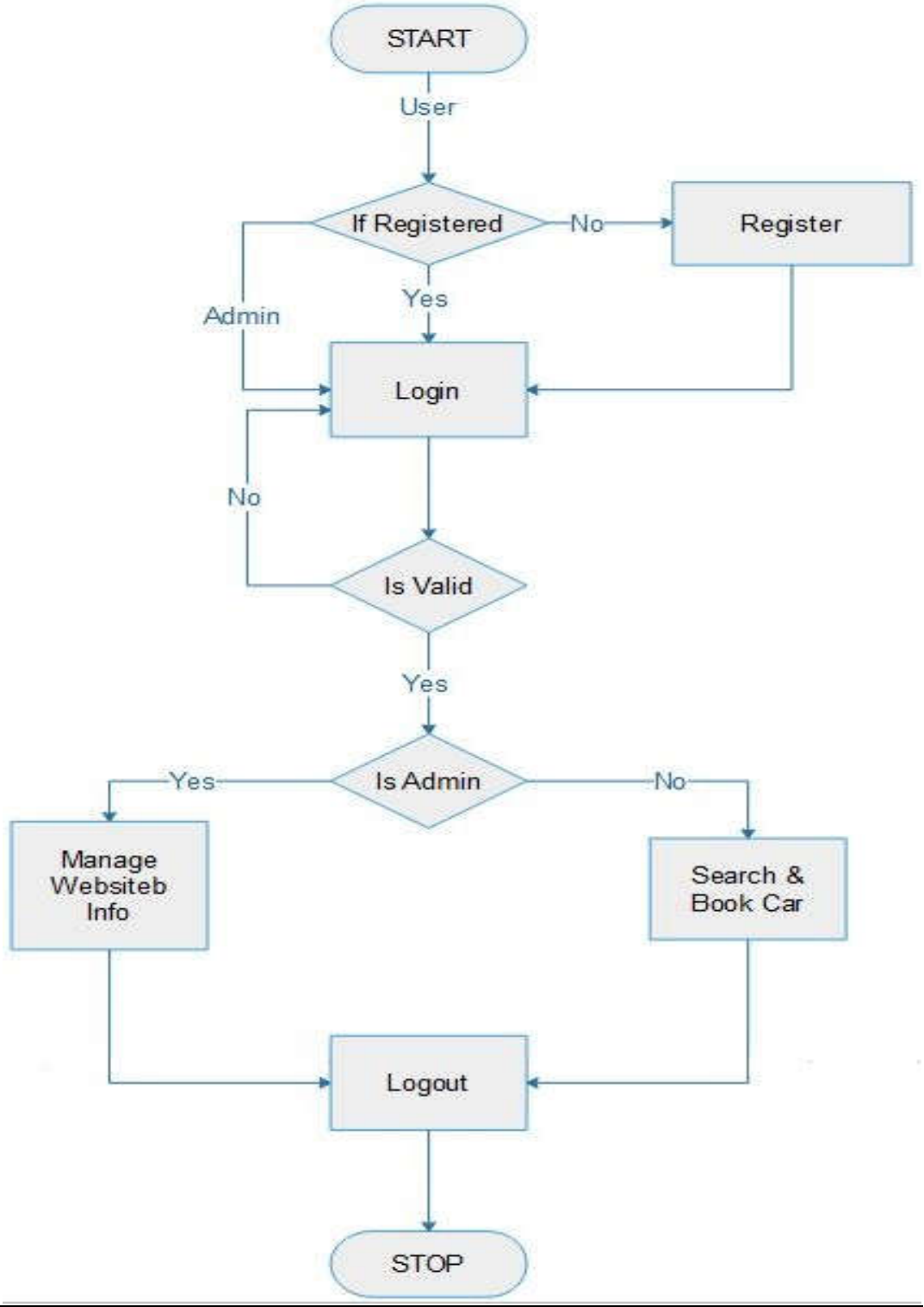


Fig (4.15) : System Flow Chart Diagram

4.5 ER-Diagram: -

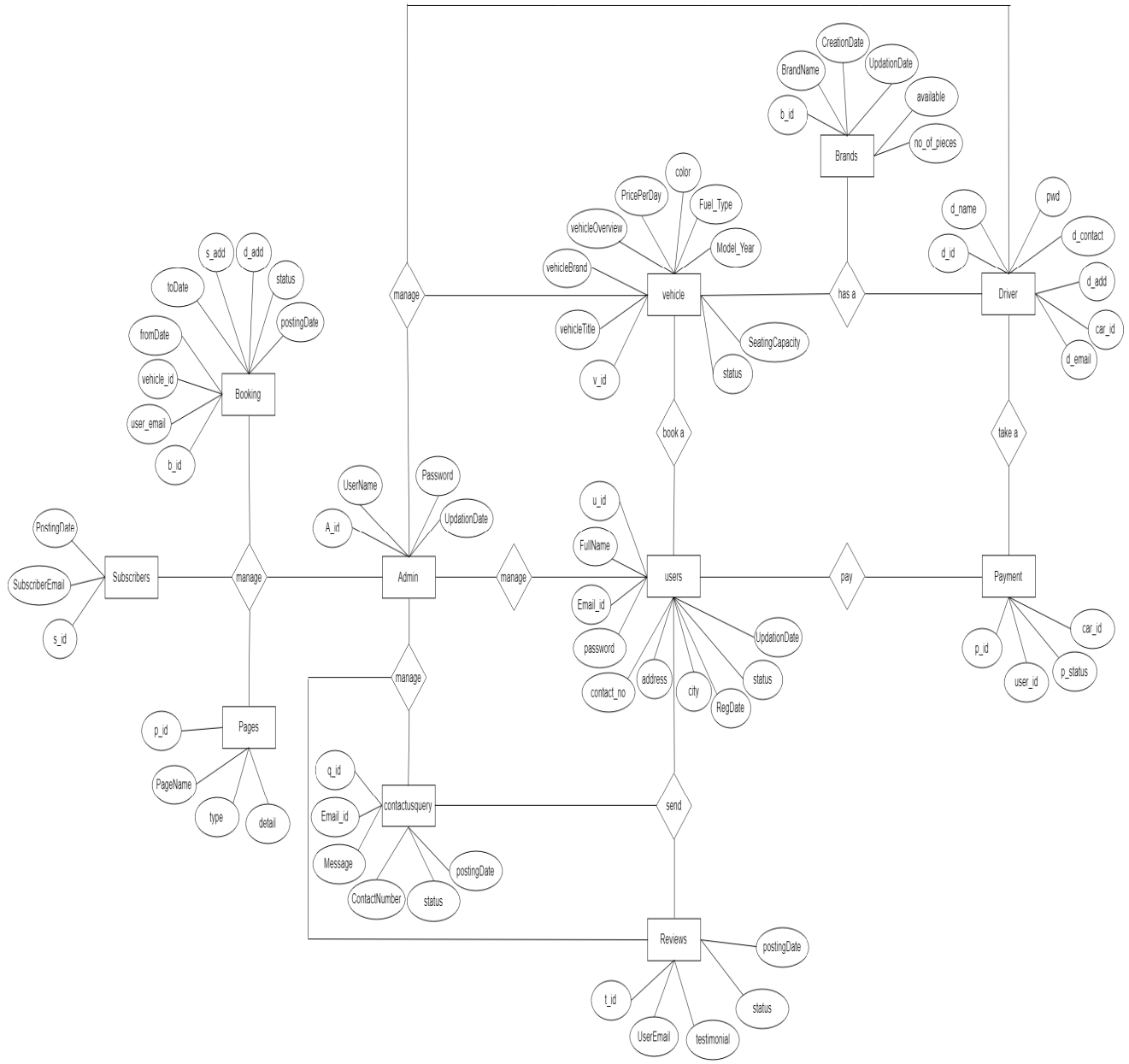


Fig (4.16): ER Diagram for Car Renting Service

4.6 Database Design: -

Database: caratrent_db

Different Tables in the Database are as follows: -

Table Name: Admin

Description: This table is store information about Admin

Column	Type	Constraints	Description
Id	int(11)	Primary Key	Store the admin id
UserName	varchar(100)	Not Null	Store the name of admin
Password	varchar(100)	Not Null	Store the password of admin
updationDate	timestamp	Not Null	Store the updation date

Table (4.1) – Table structure for Admin

Table Name: Users

Description: This table is store information about users.

Column	Type	Constraints	Description
Id	int(11)	Primary Key	Store the id of user
FullName	varchar(120)	Not Null	Store the full name of user
EmailId	varchar(100)	Not Null	Store the email id of user
Password	varchar(100)	Not Null	Store the password of user
ContactNo	varchar(25)	Not Null	Store the contact number of user
Dob	date	Null	Store the date of birth of user
Address	varchar(255)	Not Null	Store the address of user
City	varchar(100)	Not Null	Store the city of user
Country	varchar(100)	Null	Store the country of user
RegDate	timestamp	Not Null	Store the registration date of user
UpdationDate	timestamp	Null	Store the updation date of user
Status	varchar(20)	Not Null	Store the status of user
Img	blob	Null	Store the image of user

Table (4.2) – Table structure for Users

Table Name: Driver

Description: This table is store information about drivers.

Column	Type	Constraints	Description
d_id	int(10)	Primary Key	Store the id of driver
d_name	varchar(20)	Not Null	Store the name of driver
Pwd	varchar(30)	Not Null	Store the password of driver
d_add	varchar(30)	Not Null	Store the address of driver
d_contact	varchar(10)	Not Null	Store the contact number of driver
car_id	varchar(10)	Not Null	Store the id of car
d_email	varchar(30)	Not Null	Store the email id of driver
base_charge	varchar(6)	Not Null	Store the base charge of driver
wait_charge	varchar(6)	Not Null	Store the wait charge of driver

Table (4.3) – Table structure for Driver

Table Name: Brands

Description: This table is store information about brand of car.

Column	Type	Constraints	Description
Id	int(11)	Primary Key	Store the id of brand
BrandName	varchar(120)	Not Null	Store the name of brand
CreationDate	timestamp	Not Null	Store the date of creation of brand
UpdationDate	timestamp	Not Null	Store the date of updation of brand
Color	varchar(15)	Null	Store the color of brand
Seat	int(3)	Null	Store the seat of brand
fuel_type	varchar(10)	Not Null	Store the type of fuel
no_of_pieces	int(4)	Not Null	Store the number of pieces of brands
available	varchar(3)	Not Null	Store the availability of brand

Table (4.4) – Table structure for Brands

Table Name: Cars

Description: This table is store information about cars.

Column	Type	Constraints	Description
Id	int(11)	Primary Key	Store the id of car
VehiclesTitle	varchar(150)	Not Null	Store the title of car
VehiclesBrand	int(11)	Not Null	Store the brand of car
VehiclesOverview	longtext	Not Null	Store the overview of car
PricePerDay	int(11)	Not Null	Store the price per day of car
FuelType	varchar(100)	Not Null	Store the type of fuel of car
ModelYear	int(6)	Null	Store the model year of car
SeatingCapacity	int(11)	Not Null	Store the seating capacity of car
Vimage1	varchar(120)	Not Null	Store the img of car
Vimage2	varchar(120)	Null	Store the img of car
AirConditioner	int(11)	Not Null	Store the airconditioner of car
PowerDoorLocks	int(11)	Not Null	Store the power door locks of car
AntiLockBrakingSystem	int(11)	Not Null	Store the antilock braking of car
BrakeAssist	int(11)	Not Null	Store the brake assist of car
PowerSteering	int(11)	Not Null	Store the power steering of car
DriverAirbag	int(11)	Not Null	Store the driver airbag of car
PassengerAirbag	int(11)	Not Null	Store the passenger airbag of car
PowerWindows	int(11)	Not Null	Store the powerwindos of car
CDPlayer	int(11)	Not Null	Store the CD Plays of car
CentralLocking	int(11)	Not Null	Store the central locking of car

CrashSensor	int(11)	Not Null	Store the crash sensor of car
LeatherSeats	int(11)	Not Null	Store the leather seats of car
RegDate	timestamp	Null	Store the car registration date
UpdationDate	timestamp	Null	Store the updation of car
Color	varchar(15)	Null	Store the color of car
Driver_id	int(20)	Not Null	Store the id of driver
base_rate	int(5)	Null	Store the

Table (4.5) – Table structure for Cars

Table Name: Payment

Description: This table is store information about Payments.

Column	Type	Constraints	Description
p_id	int(10)	Primary Key	Store the payment id of user
Userid	varchar(30)	Not Null	Store the id of user
p_status	varchar(10)	Not Null	Store the status of payment
car_name	varchar(20)	Not Null	Store the name of car
email_id	varchar(30)	Not Null	Store the email id of user
car_id	varchar(20)	Not Null	Store the id of car
Amount	varchar(10)	Not Null	Store the amount of payment
Contact	varchar(10)	Not Null	Store the contact number of user
book_date	datetime	Not Null	Store the date of book
p_date	datetime	Not Null	Store the date of payment

Table (4.6) – Table structure for Payment

Table Name: Booking

Description: This table is store information about booking.

Column	Type	Null	Description
Id	int(11)	Primary Key	Store the id of car booking
userEmail	varchar(100)	Not Null	Store the email id of user
VehicleId	int(11)	Not Null	Store the id of car
contact_no	Tinytext	Not Null	Store the contact number of user
s_add	Tinytext	Not Null	Store the source address
d_add	Tinytext	Not Null	Store the destination address
FromDate	Datetime	Not Null	Store the from date of car booking
ToDate	Datetime	Not Null	Store the to date of car booking
message	varchar(255)	Null	Store the message of user
Status	int(11)	Not Null	Store the status of book
PostingDate	Timestamp	Not Null	Store the date of posting

Table (4.7) – Table structure for Booking

Table Name: Contactusinfo
Description: This table is store information about contact us info.

Column	Type	Constraints	Description
Id	int(11)	Primary Key	Store the id of user
Address	tinytext	Null	Store the address of user
EmailId	varchar(255)	Not Null	Store the email id of user
ContactNo	char(11)	Null	Store the contact number of user

Table (4.8) – table structure for Contactusinfo

Table Name: Contactusquery
Description: This table is store information about contact us query.

Column	Type	Constraints	Description
Id	int(11)	Primary Key	Store the id of contact us query of user
Name	varchar(100)	Not Null	Store the name of user
EmailId	varchar(120)	Not Null	Store the email id of user
ContactNumber	char(11)	Not Null	Store the contact number of user
Message	varchar(200)	Not Null	Store the message of user
PostingDate	timestamp	Not Null	Store the posting date of query
Status	int(11)	Not Null	Store the status of query

Table (4.9) – table structure for Contactusquery

Table Name: Subscribers
Description: This table is store information about subscribers.

Column	Type	Constraints	Description
Id	int(11)	Primary Key	Store the id of subscriber
SubscriberEmail	varchar(120)	Not Null	Store the email id of subscriber
PostingDate	timestamp	Not Null	Store the date the posting of subscribe

Table (4.10) – table structure for Subscribers

Table Name: Testimonial
Description: This table is store information about testimonial.

Column	Type	Constraints	Decription
Id	int(11)	Primary Key	Store the id of testimonial
UserEmail	varchar(100)	Not Null	Store the email id of testimonial
Testimonial	mediumtext	Not Null	Store the testimonial of user
PostingDate	timestamp	Not Null	Store the date of posting a testimonial
Status	int(11)	Not Null	Store the status of testimonial

Table (4.11) – table structure for Testimonial

CHAPTER – 5 – IMPLEMENTATION AND TESTING

5.1 Language Used Characteristics: -

(a) Why JSP: -

Java Server Pages (JSP) is a technology for developing Web pages that supports dynamic content. This helps developers insert java code in HTML pages by making use of special JSP tags, most of which start with <% and end with %>. A Java Server Pages component is a type of Java servlet that is designed to fulfill the role of a user interface for a Java web application.

(b) Why HTML: -

HTML is the standard markup language for creating Web pages. HTML describes the structure of Web pages using markup and its elements are the building blocks of HTML pages. HTML elements are represented by tags. HTML tags label pieces of content such as "heading", "paragraph", "table", and so on. Browsers do not display the HTML tags, but use them to render the content of the page.

(c) Why JAVASCRIPT: -

JavaScript is a lightweight, interpreted programming language. It is designed for creating network-centric applications. It is complimentary to and integrated with Java. JavaScript is very easy to implement because it is integrated with HTML. It is open and cross-platform.

(d) Why MySQL: -

MySQL is the most popular Open Source Relational SQL Database Management System. MySQL is one of the best RDBMS being used for developing various web-based software applications. MySQL is developed, marketed and supported by MySQL AB, which is a Swedish company.

5.2 Testing: -

Testing is a process of executing a program with the intent of finding an error and missing operations and also a complete verification to determine whether the objectives are met and the user requirements are satisfied.

5.2.1 Testing Objectives: -

The objectives of testing are:

- Testing is done with intent of finding an error.
- Testing is done in order to check the various control flow of system.
- The scope of testing is the extensiveness of the test process.

5.2.2 Test Case: -

Test 01: Test Case 'A':

Case No.	Action	Expected Result	Success	Comments
1	User tries to type symbols or alphabets in login account.	Not allowed to do so. Prompted by error.	Yes	Action successfully tested
2	User types incorrect password.	Invalid user id or password display. Prompted to re-type.	Yes	Action successfully tested
3	View profile option selected.	Account details field loaded dynamically to the same screen.	Yes	Action successfully tested

Table (5.1) – Test Case 'A'

Test 02: Test Case 'B':

Case No.	Action	Expected Result	Success	Comments
1	User leaves user id field empty.	Prompted to write the correct input.	Yes	Action successfully tested
2	User leaves password field empty.	Prompted to write the correct input.	yes	Action successfully tested
3	User leaves mobile no field empty.	Prompted to write the correct input.	Yes	Action successfully tested
4	User types weak password. (length too small)	Prompted to write correct input.	Yes	Action successfully tested
5	Typed password doesn't match to confirm password.	Prompted to write correct input.	Yes	Action successfully tested

6	User typed incorrect mobile no.	Prompted to write correct input.	Yes	Action successfully tested
7	User tries to type symbols are alphabet in mobile number field.	Not allowed to do so.	yes	Action successfully tested

Table (5.2) – Test Case 'B'

Test 03: Test Case 'C':

Case No.	Test Case title	Description	Expected outcome	Result
1	Successful new account creation.	Registration with new userid, similar password and confirm password.	Registration should be successful and the user should enter into the login section.	passed
2	Unsuccessful registration due to dissimilar password and confirm password.	The password string is not similar in password and confirm password.	Registration should fail with an error "password doesn't match".	Passed
3	Unsuccessful registration due to already existing userid.	Check with this id, is any user already exist.	Registration should fail with an error 'user already exist'.	Passed
4	Unsuccessful registration due to incomplete or other incorrect details.	When all the information are not provided correctly by the user.	Registration should fail with an error 'fill all the entries'.	Passed

Table (5.3) – Test Case 'C'

Test 04 Test Case 'D':

Case No	Test Case title	Description	Expected outcome	Result
1	Update the information.	Programmer should be able to update the record.	Successfully updated the record.	Passed
2	User login.	Verify the password given by the user. Shows main screen.	Verify the password and display main screen.	Passed
3	User logout	User should logout from the program.	Logout from the program.	Passed

Table (5.4) – Test Case 'D'

Test 05: Test Case'E':

Case No	Test Case title	Description	Expected outcome	Result
1	All files are empty	Error message: *indicates compulsory field*	Error message: *indicates compulsory field*	Pass
2	Email	Error message: Invalid Email-address	Error message: Invalid Email-address	Pass
3	Password and confirm password	Error message: Both Password does not match	Error message: Both Password does not match	Pass
4	Login	Login to the system should be try with the login assigned by the admin and the correct password	Login should be successful and the user should enter into the system	Fail
		The System give an error and denied from the Login.	Login should fail with an error 'Invalid Details'	Pass
5	User	Login should be allow and admin get Admin home page.	Login successfully and admin get its admin home page	Pass
		Login should be allow and Travel admin get Travel admin home page.	Login successfully and Travel admin get its Travel admin home page	Pass
		Login should be allow and User get Visitor side User page.	Login successfully and User gets its user page.	Pass
6	Validation Test	Pre-define format must be required in control	System give error to enter valid input	Pass
		Enter data in a compulsory field with required field validations.	Data must be field in compulsory field otherwise its messages are displayed.	Pass

Table (5.5) – Test Case 'E'

5.2.2.1 Test Case Result: -

- After the testing of modules, no errors were found & our project is well tested.
- The system is working fine and all functional requirements are satisfied but interface need to be improved.

CHAPTER – 6 – CONCLUSION

6. Conclusion and Discussion: -

"Technology feeds on itself. Technology makes more technology possible. And thus, it is very rightly called by Alvin Toffler, 'That's great, growling engine of change ---Technology'".

6.1 Conclusion: -

Nowadays, customers can reserve cars online, rent car online, and have the car brought to their door step once the customer is a registered member or go to the office to pick the car. The web based car rental system has offered an advantage to both customers as well as Car Rental Company to efficiently and effectively manage the business and satisfies customers need at the single click of a button.

This online Car Renting Service will be very easy to use that will saves a lot of time, money and labor. This website will be eco friendly; the monitoring of the car activity and the overall business becomes easy and includes the least of paper work. It increases the efficiency of the management at offering quality services to the customers. It provides custom features development and support with the software. In this website the customer can also give a feedback of the drivers or the car rental service such as the driver is able to drive a car properly or not, the behavior of driver is good or bad and users are satisfied with the service provided or not from using this car rental service. It increases the efficiency of the management at offering quality services to the customers. It provides custom features development and support with the software.

The following conclusions can be deduced from the development of the project.

- Automation of the entire system improves the efficiency
- It provides a user friendly graphical user interface which proves to be better when compared to the existing system.
- It gives appropriate access to the authorized users depending on their permissions.
- Updating of information becomes so easier.

- System security, data security and reliability are the striking features.
- The System has adequate scope for modification in future if it is necessary.
- Here the details of customers, drivers and cars are maintained.

6.1.1 Limitation of project: -

- Our project have limited scope, it will provide services only for Sub-Domain.
- In this project we cannot give current status of service provider.
- This Web application is restricted to only limited type of users.
- Limited searching options are available to search a car.
- There is no online payment facility available.
- In this project, there is no option available to login by using social media like facebook and gmail.
- There is no service available to sending an OTP on mobile and password recovery through e-mail.
- Any people cannot give their own car on rent.
- This web application is only for a single city; not for multiple cities.
- There is not any android app created for this web application.

6.1.2 Difficulties encountered: -

- We had to design such a site which was removing the demerits of the existing system. We have to keep in mind and make the system as user friendly as possible for the convenience of the people working in this environment.
- Due to less Team size we face many problem like survey, documentation etc.

6.1.3 Suggestions for future enhancements: -

In future, our application overcome the flaws if occurred and attains new features offered for the flexible and easy use. The project is designed in such a way that future modifications can be done easily.

- In future we will enhance user interface.
- Mobile application can also be created for this System.
- We can attach this system to Social Networking.
- In future, we can provide the website space for advertisements purpose.
- We will enhance the searching feature with multiple searching options.
- We will provide an online payment facility.

- In future, we will provide to send an OTP on mobile and password recovery mail.
- In future, other peoples can give their personal car on rent on this web application.
- This web application will expand for multiple cities.

6.1.4 Applications: -

There are some areas in which our application work effectively are as follows: -

- The main scope of Car Renting Service is used for travelers (and tourists) and visitors having small groups or individuals.
- Car Rental Service website can be used in transport services trucks, loading etc.
- This can be used as a cab service and public transport etc.
- It can be used in marriage, family functions and meetings etc as a pickup service.

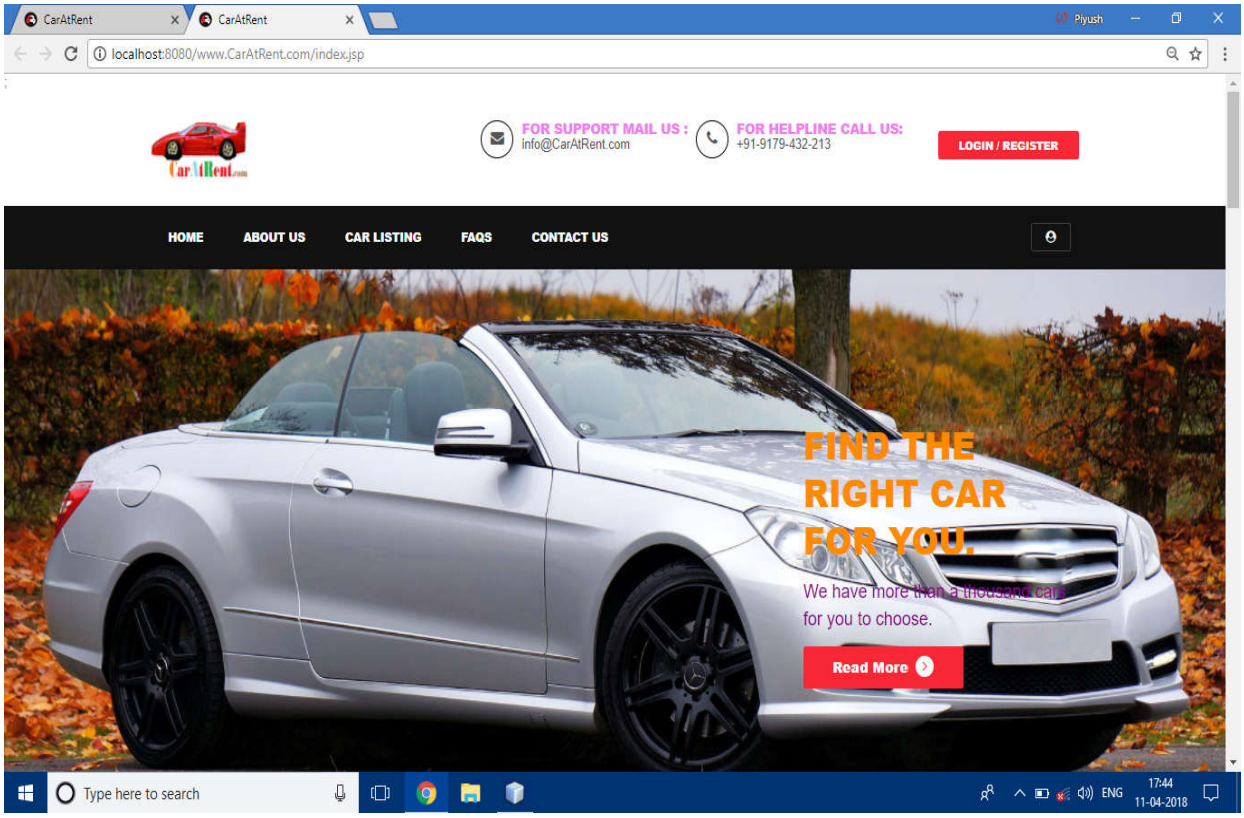
6.1.5 Learning and Achievements: -

It was a wonderful and learning experience for me while working on this project. This project took us through the various phases of project development and gives me real insight into the world of network engineering.
It was due to this project we came to know how professional servers are configured.
We enjoyed each and every bit of work I and my friends had put into this project. The project is further expandable as we could include our own software features.

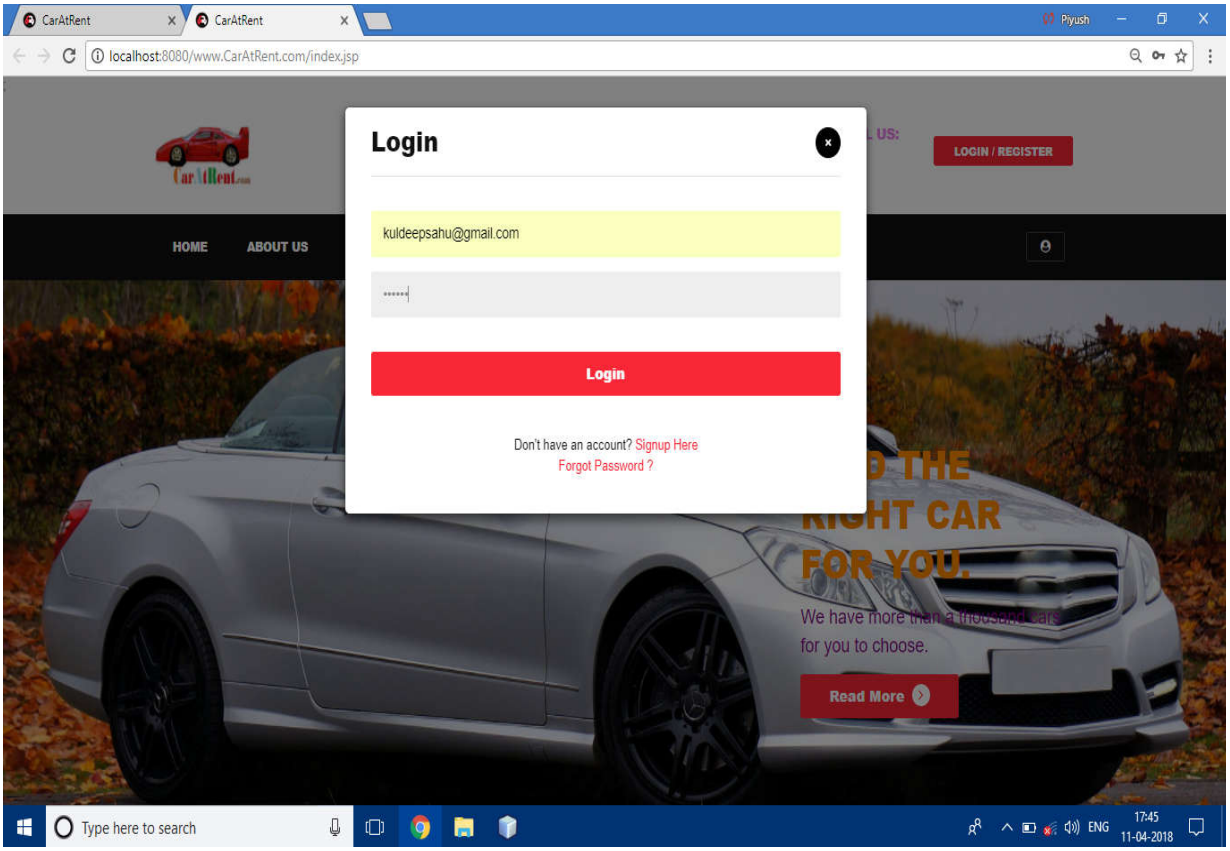
Appendix : User Manual and Screenshots

The user manual is drafted in such a way that every common man can understand that how to use this application.

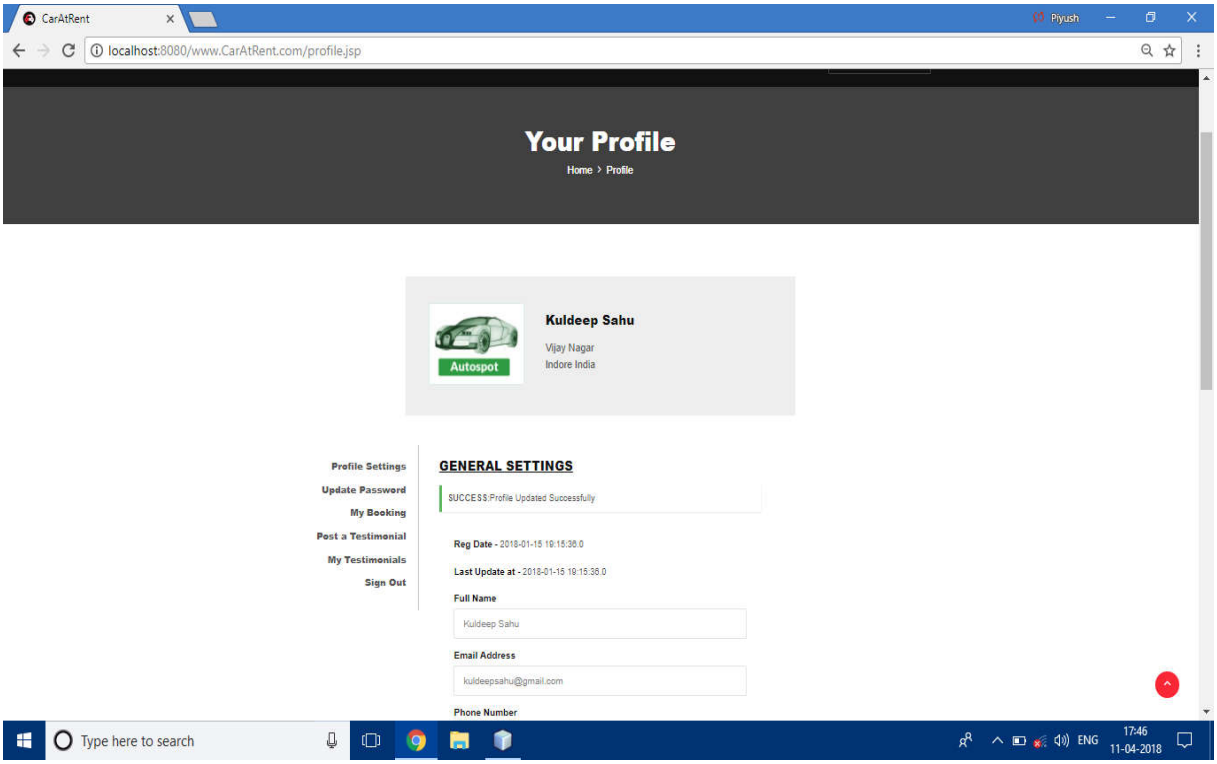
Screenshots: -



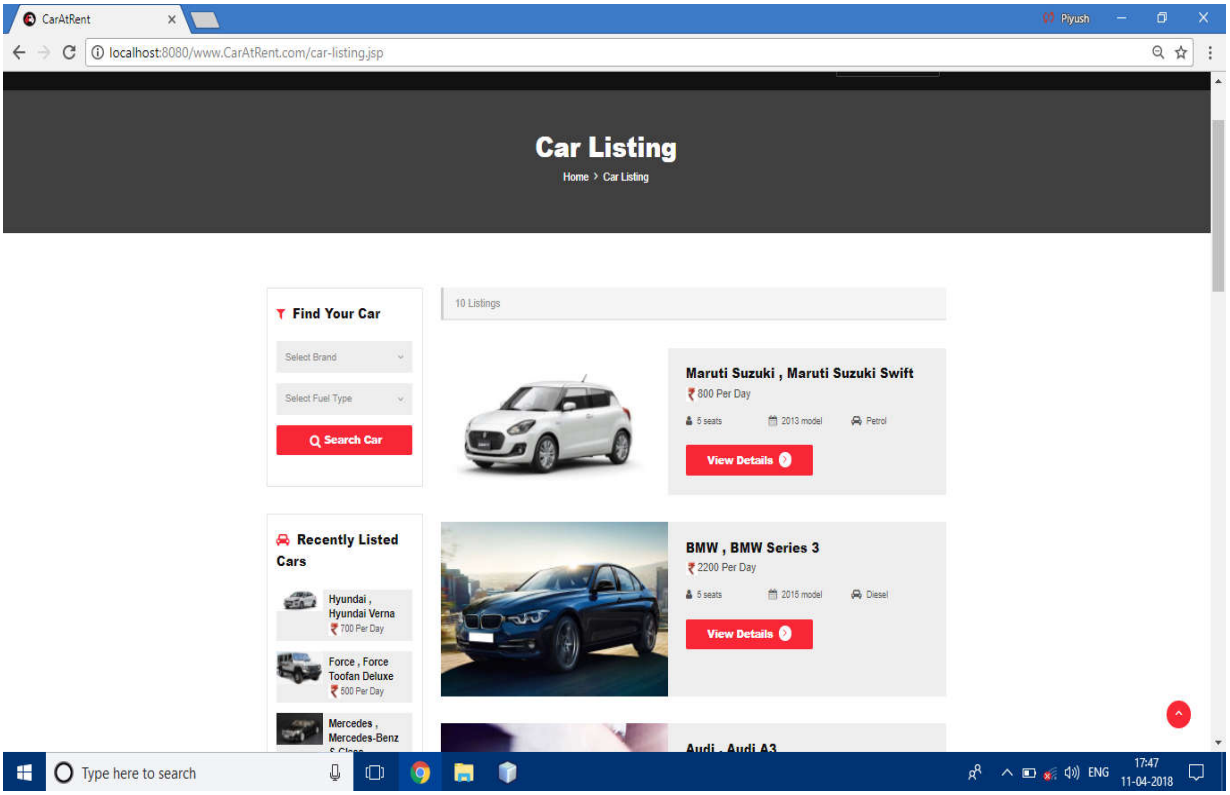
Fig(1) – Main Page of the Car Renting Service



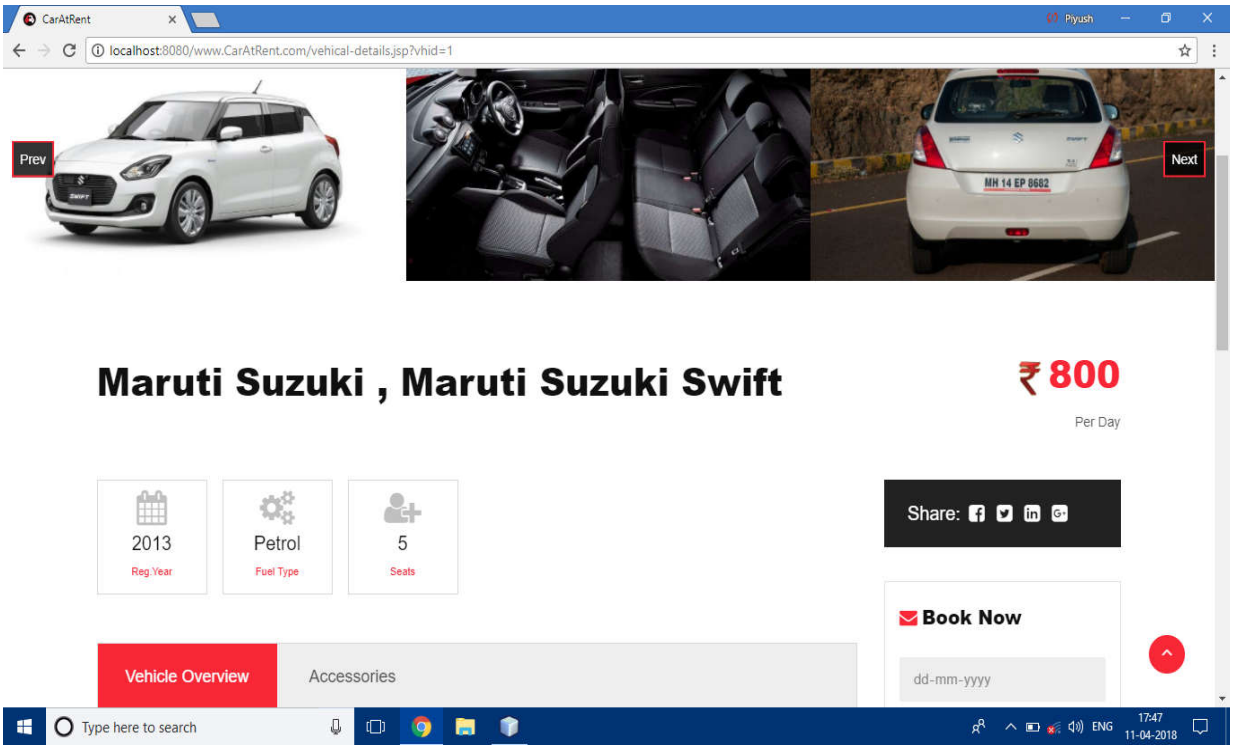
Fig(2) – Login Page for the Users



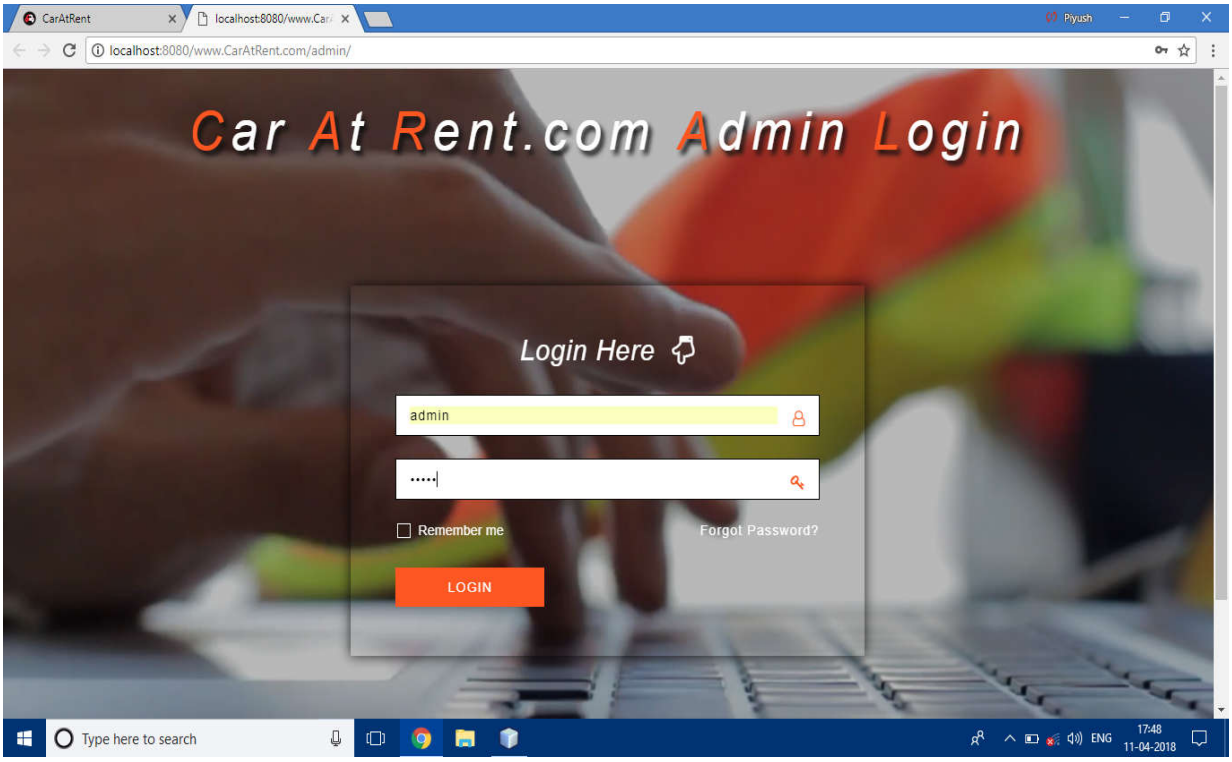
Fig(3) – User Profile Page



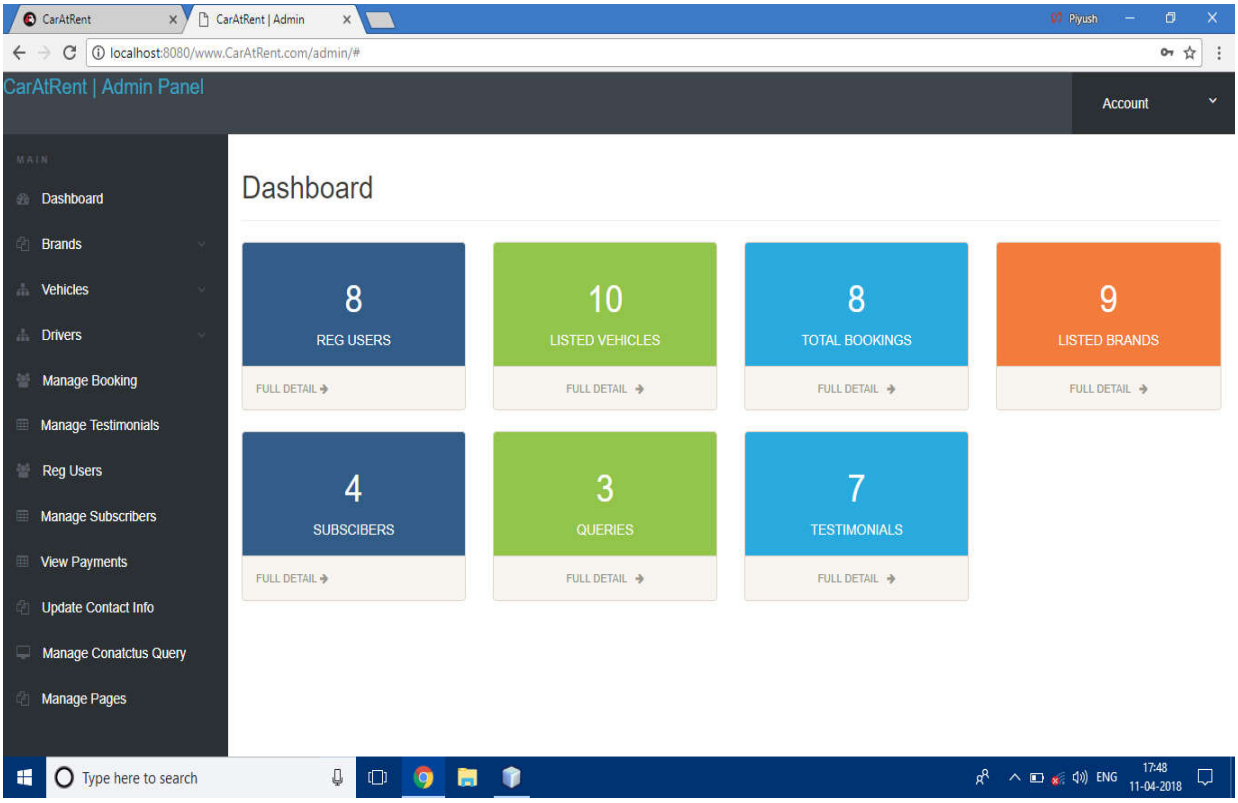
Fig(4) – Car Listing Page



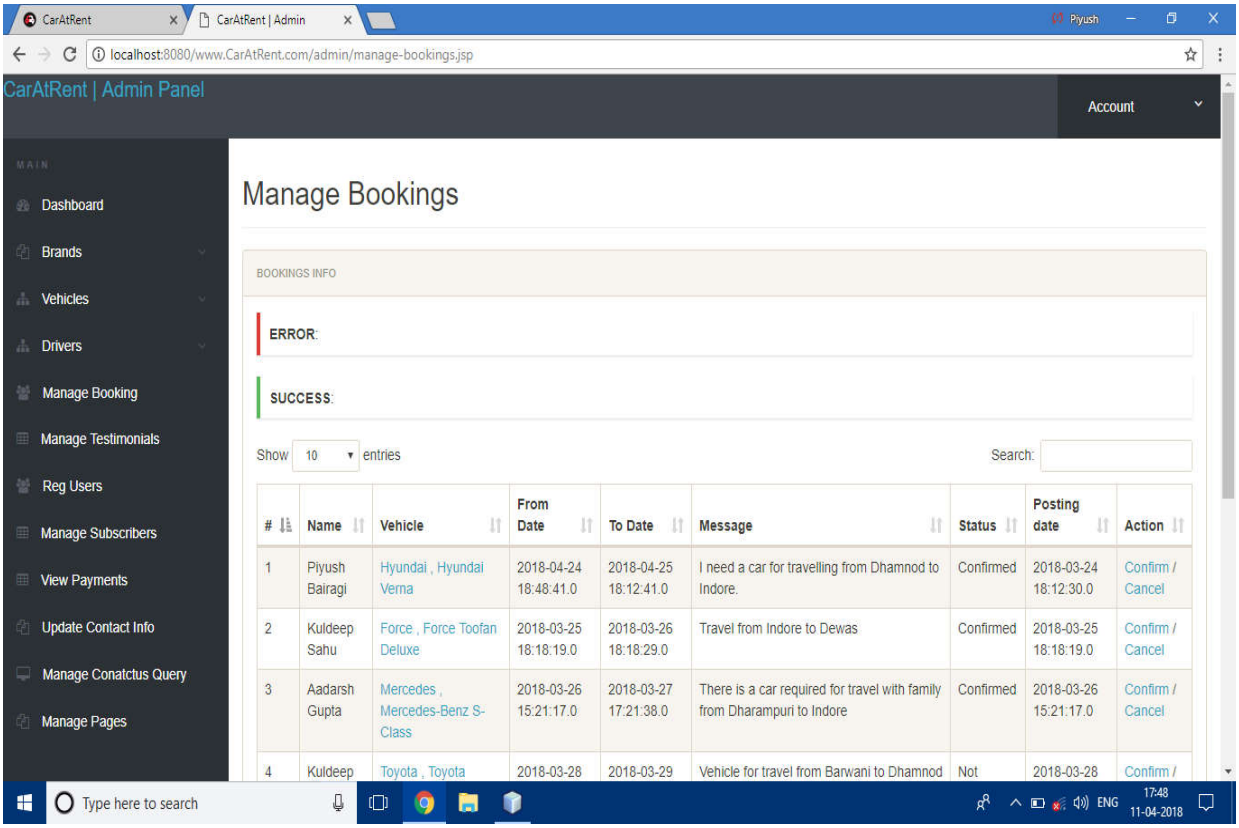
Fig(5) – Car Details Page



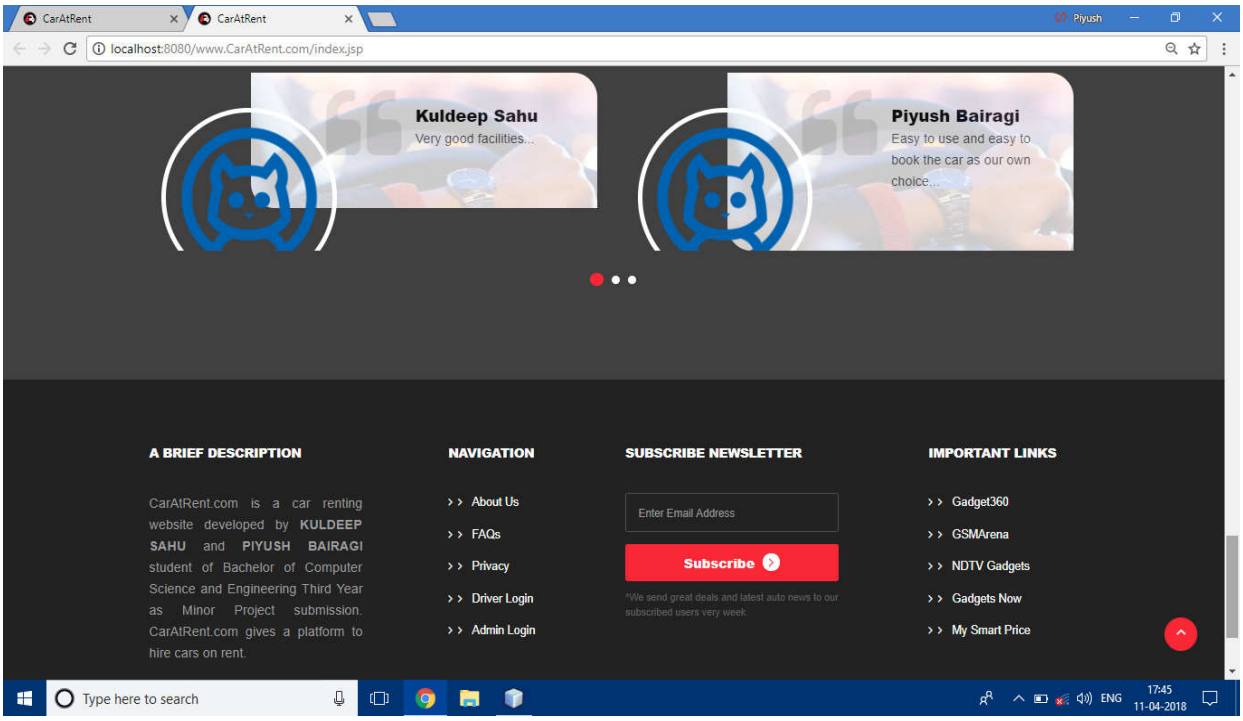
Fig(6) – Admin Login Page



Fig(7) – Admin Dashboard after Login



Fig(8) – Manage Booking page under Admin Dashboard



Fig(9) – Testimonials view and Footer page

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Glossary

ACRONYMS USED: -

JSP	Java Server Pages
HTML	Hyper Text Markup Language
CSS	Cascading Style Sheet
SDLC	Systems Development Life Cycle
IDE	Integrated Development Environment
JDK	Java Development Kit
UML	Unified Modeling Language
MVC	Model View Controller

Table(1) – Acronyms Used

LIST OF ABBREVIATIONS: -

- **Actor:** An actor is someone who is interacting with the system and is external the system. They help in defining the system and makes clear what the system should do. An actor may be a user, any hardware device or any other system.
- **Association:** An association is a kind of relationship among classes that tells one class knows about the other. Instance of one class is made in the other.
- **Attributes:** Attributes of classes are the property of classes. They define the state of the system. Attributes of classes can be found out from the system domain.
- **Availability:** Availability indicates the time interval up to which the system Is available without having to change the system.
- **Class:** A class is collection of objects with common structure, common behaviours, common relationship and common semantics. Classes can be found out by examining the objects in the sequence and the collaboration diagram.
- **Class diagram:** A class diagram models the user requirements in the form of classes and relationships among them. A class diagram shows the existing classes and relationship among them.
- **Constraints:** Conditions under which the system perform accurately.
- **Database:** A collection of data that is treated as a unit composed of logical and physical structure. Databases are designed to store and retrieve related information.
- **Extendibility:** The extent to which architectural, data or procedural design can be extended.
- **Forward engineering:** Forward engineering refers to the process n which skeleton code is generated from the class diagram.

- **GUI:** Graphic user interface.
- **Relational database:** A relational database follows the relational data model. It stores data in the form of relational and relationship among relations.
- **Relationship:** Relationship shows the interaction and communication among the classes. They show how the classes are interacting with each other. Main types of relationship are association, dependency, realization, inheritance.
- **Sequence diagram:** Sequence diagram displays object inheritance with respect to time. Sequence diagram show how step by step objects interact and communicate with each other. These diagrams emphasize the sequence of events what are taking place. These diagrams are used to find the links between the object and thus their behavior.
- **Software:** Software consists of program that when provide desired results, data structures which can be manipulated and documentations that tells the operation and use of the program.
- **Software architecture:** Software architecture refers to the overall structure of the software and the ways in which that structure provides conceptual integrity for the system.
- **UML:** Unified Modeling Language while using the Object Oriented Approach the UML is the standard language for visualizing, specifying, constructing and documenting the artifacts of a software intensive system.
- **Use Case:** A Use Case is a pattern of behavior the system exhibits. Each Use Case shows a series of transaction performed by an actor and the system in a single dialogue there are created to visualize how the actor interact with the system respond to it.
- **User:** A user is someone who is interacting with the system and is external to the system. They help in defining the system and make it clear what the system should do.

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