PES University, Bengaluru

(Established under Karnataka Act 16 of 2013)

Department of Computer Science & Engineering

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Object Oriented Analysis and Design with Java - Laboratory
UE19CS353

Mini Project

Report on

Hyre Car Rental

By:

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6th Semester, G section

1. Project Description

The transport sector faces numerous challenges in urban areas such as:

- Traffic Congestion and Parking Difficulties: The lack of adequacy and connectivity offered by public transport has led to extreme growth in the number of automobile owners. However, limited infrastructure has not been able to keep up with the same.
- Environmental Impacts: Air and noise pollution are the products of increasing consumption of traditional, unsustainable fuel driven by urban mobility systems. These impede the quality of life and health of the local population.
- Energy Prices: High demand for energy resources has led to an exorbitant costs of transportation. This is not feasible on a daily basis, in the longer run.
- Liability: Vehicles often require high maintenance and expenditure in terms of repair, insurance, fuel costs and loans.

Our project aims to address the above concerns by proposing a car rental solution. It will provide a platform for people to rent cars for short periods of time. These services are an attractive, cost-effective option for those who do not own cars and make use of it only occasionally - to take a trip with loved ones or to run errands, by offering convenience, mobility, and independence.

The car rental system facilitates booking of a car with just a couple of clicks, includes a plethora of models for different needs and comforts, and delivers and picks up the car from locations around the country.

The purpose of this project is to design a user-friendly system that enables clients to check for availability of vehicles and book/reserve a vehicle, make payments and develop a system to keep track of bookings, reservations and payment transactions. This will help ease fleet and staff management and support a smooth experience.

FUNCTIONALITIES

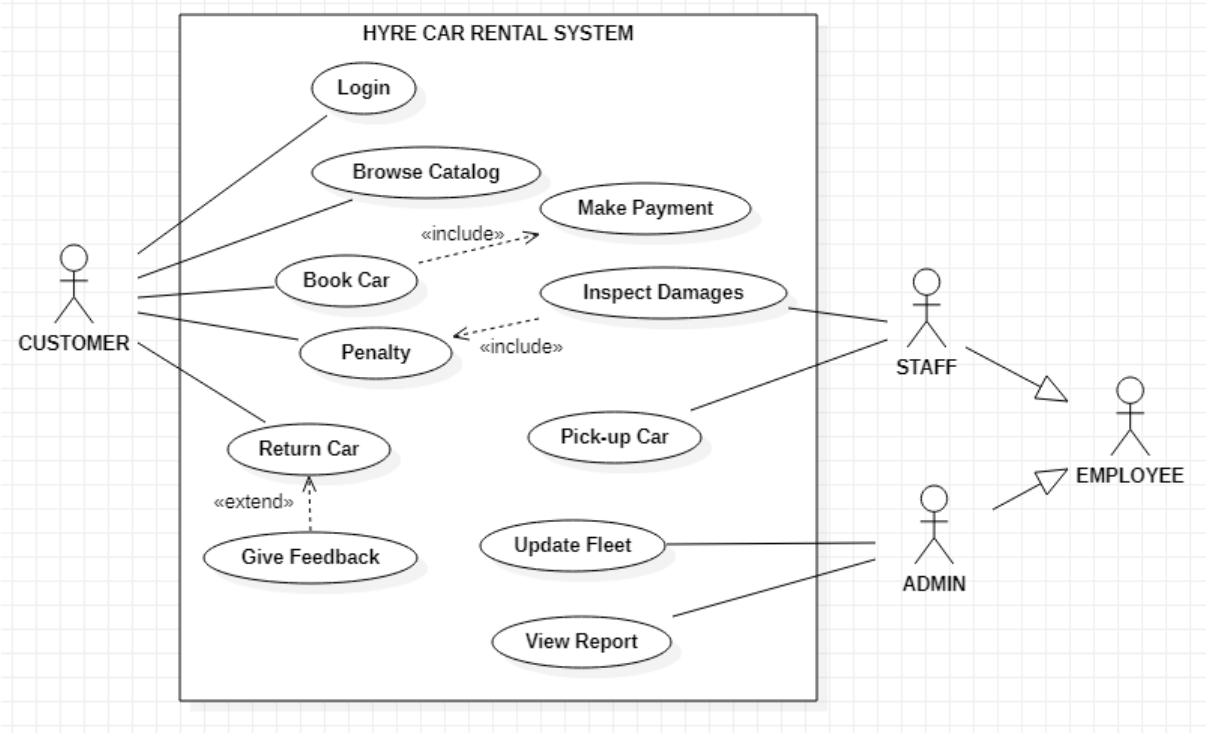
- Car Rental Interface: Clients can visit the website and choose a car of their choice and booking can be done as per their requirements. Feedback can also be provided on avail of the car rental service.
- Payment Portal: Order placing and cancellation are maintained by the admin. Amount is generated based on the type of car and duration of rental.
- Staff: Data about the repair/replacement of any parts of the car are maintained by the staff post inspection on pick up.

Link to Github repository:

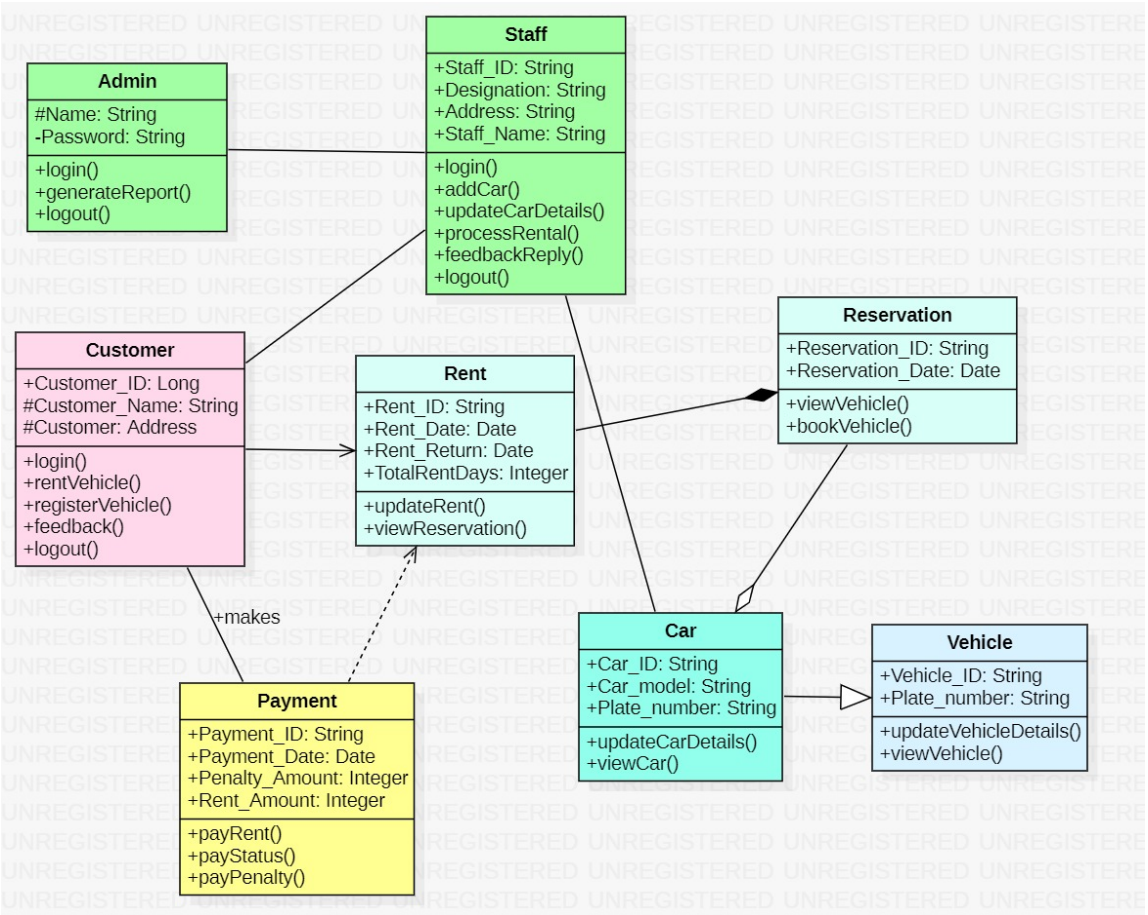
https://github.com/sheetal104/OOADJ-Project---CarRental

2. Analysis and Design Models

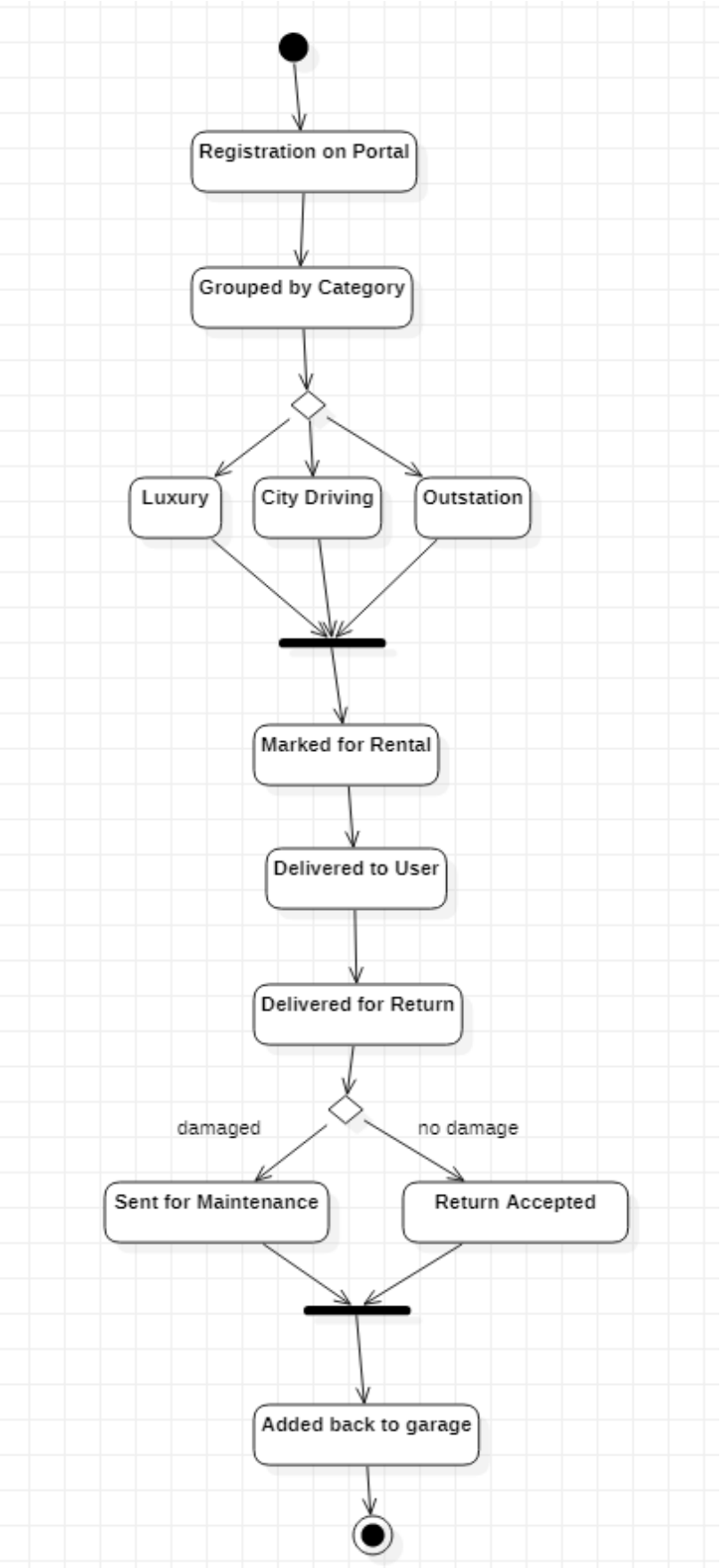
Use Case Diagram



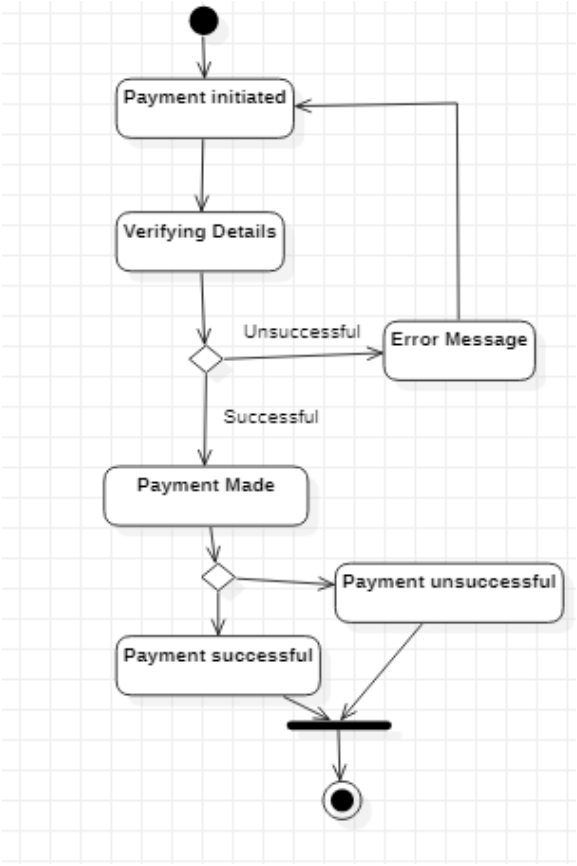
Class Diagram



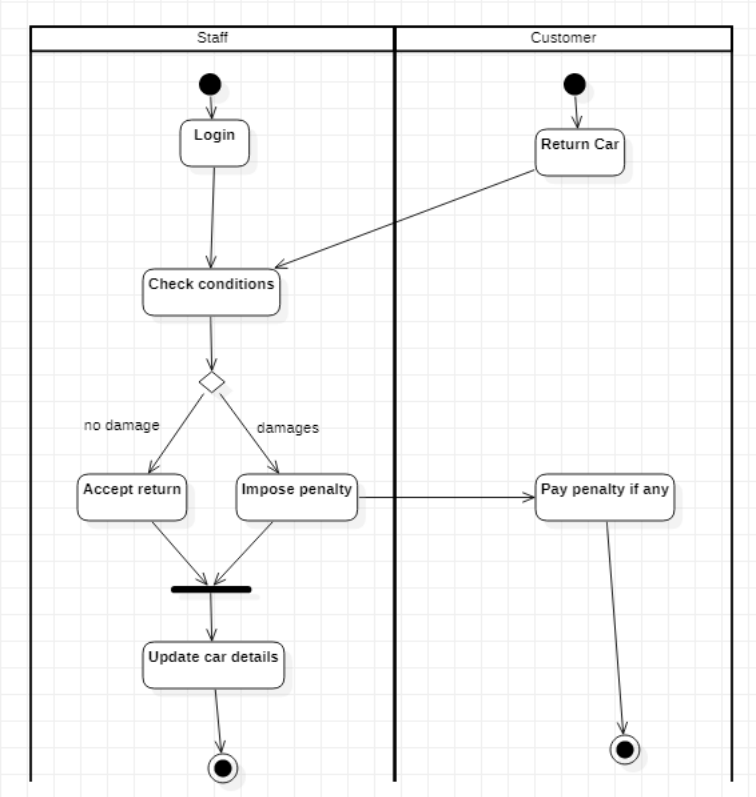
State Diagram-01 - Car



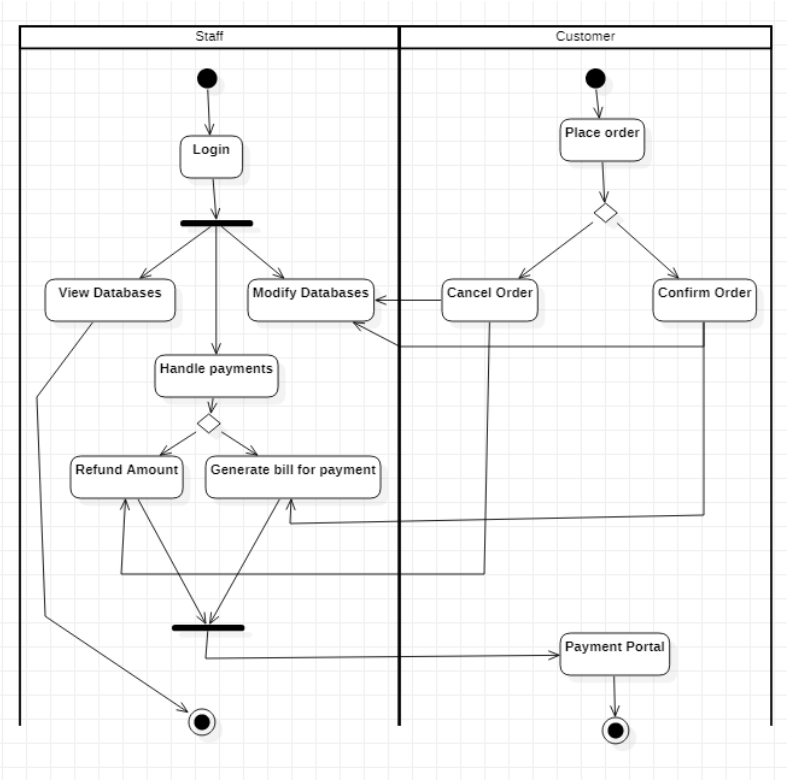
State Diagram-02- Payment



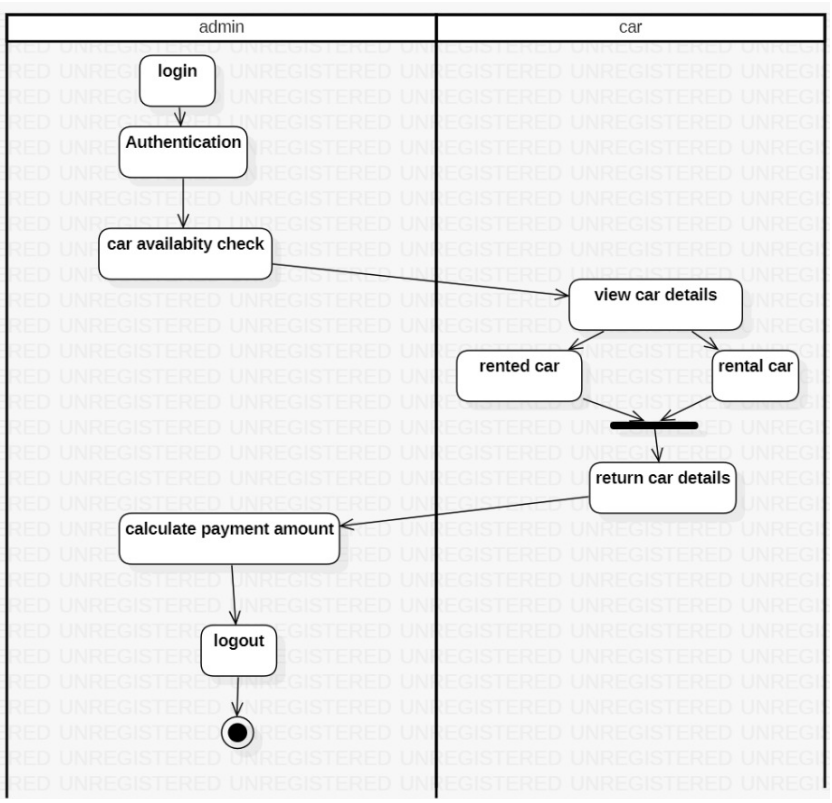
Activity Diagram-01 - Penalty



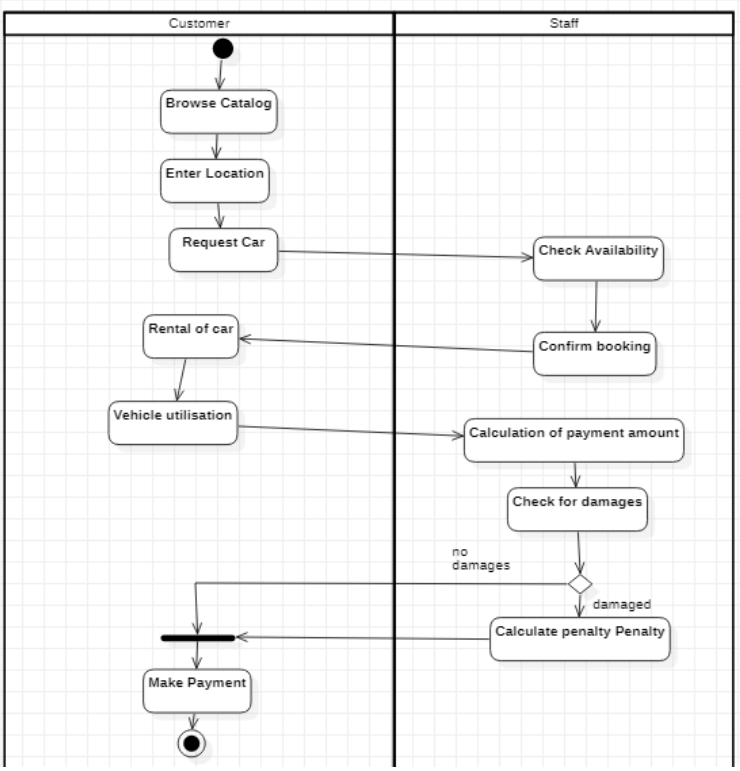
Activity Diagram-02 - Databases



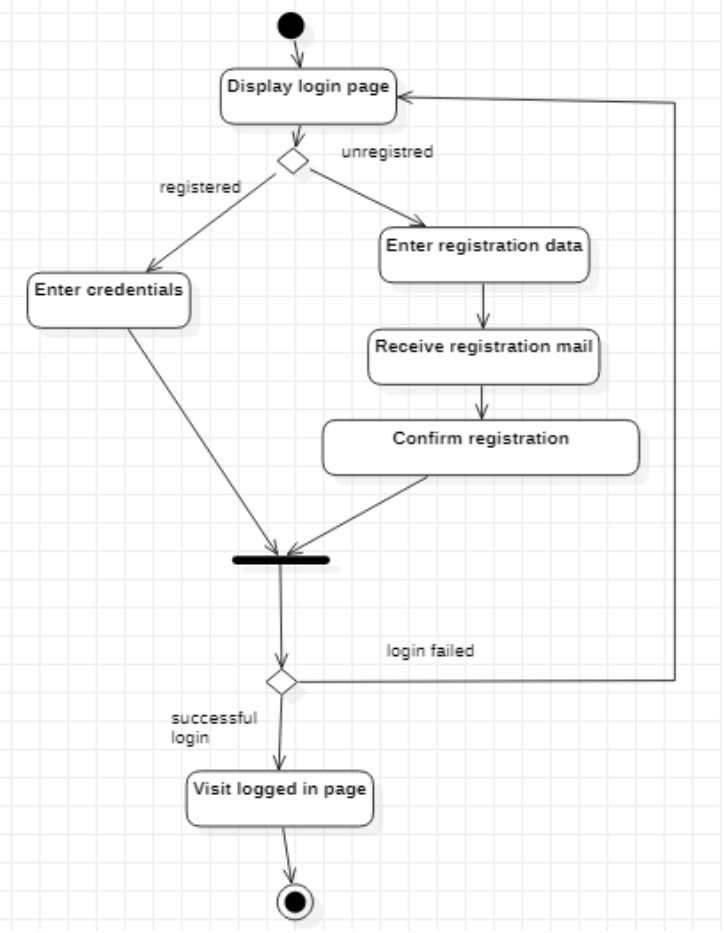
Activity Diagram-03 - Administration



Activity Diagram-04 - Customer Booking



Activity Diagram-05 - Customer Login



3. Tools and Frameworks Used:

a) **Design - StarUML**
StarUML is an open source software modelling tool that supports the UML (Unified Modelling Language) framework that can be used to represent use case, activity, state and class diagrams.

b) **Version Control - GitHub**
GitHub is an online software development platform used for storing, tracking, and collaborating on software projects. It enables developers to upload their own code files and view changes made by other developers.

c) **IDE - Apache NetBeans**
NetBeans is an integrated development environment for Java. It allows Java web or desktop applications to be developed from a set of modular software components called modules.

d) **Database - MySQL**
MySQL is an open-source relational database management system based on Structured Query Language. The application is used for a wide range of purposes, including data warehousing, e-commerce, and logging applications.

e) **GUI - Swing**
Swing is a GUI widget toolkit for Java. It is part of Oracle's Java Foundation Classes – an API for providing a graphical user interface for Java programs.

4. Design Principles and Design Patterns Applied

1. **Factory Design Pattern -** Applied to instantiate different models of rental cars. The Vehicle super-class, which is extended by all Car models sub-classes (Audi, Mercedes, Creta, Innova). This allows us to utilise the common methods of the Vehicle super-class.
2. **Decorator Pattern -** Add discounts to booking of rental based on run-time criteria like booking time, additional offers for new users and festive discounts.
3. **Command Pattern -** For user inputs, like submit and cancel buttons.

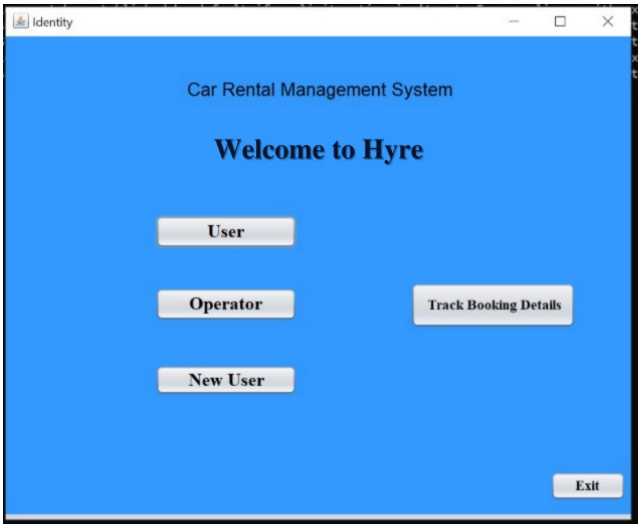
SOLID Design Principles were followed in the development of different parts of this project.

- Single Responsibility Principle: Every class in the design has a single responsibility. For example, the Payment class is responsible only for getting and setting the data of the Payment Object (details like payment id, amount, and payment status).

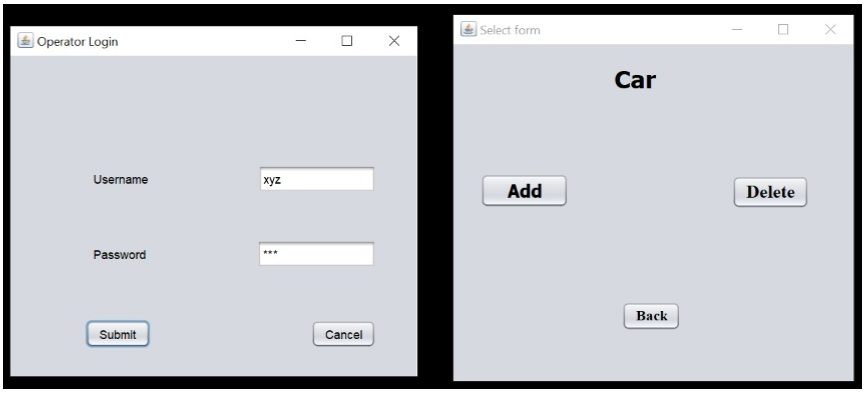
- Using factory design patterns for creating different models of cars, the open-close principle was followed. The Vehicle super-class, was extended by all Car models sub-classes (Audi, Mercedes, Creta, Innova). New car models can extend from the Car super-class without modifying Vehicle class.

5. Application Screenshots

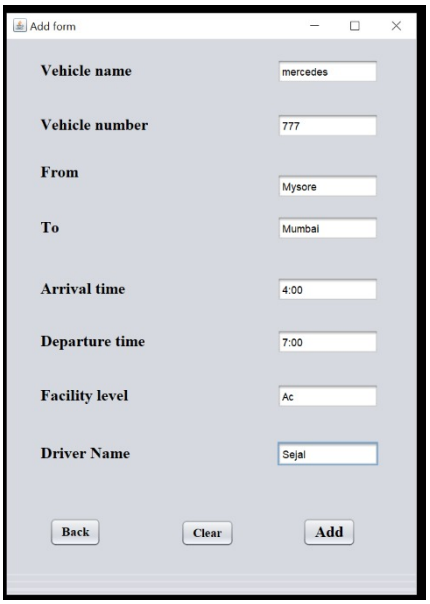
1. Landing Page



2. Operator Login

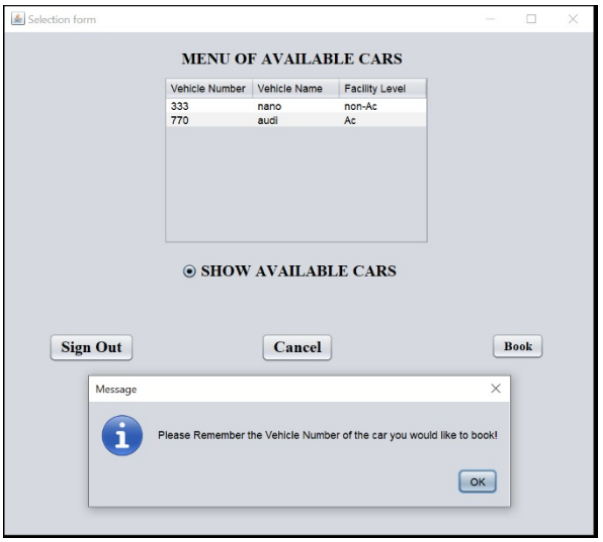


3. Add Car to Fleet



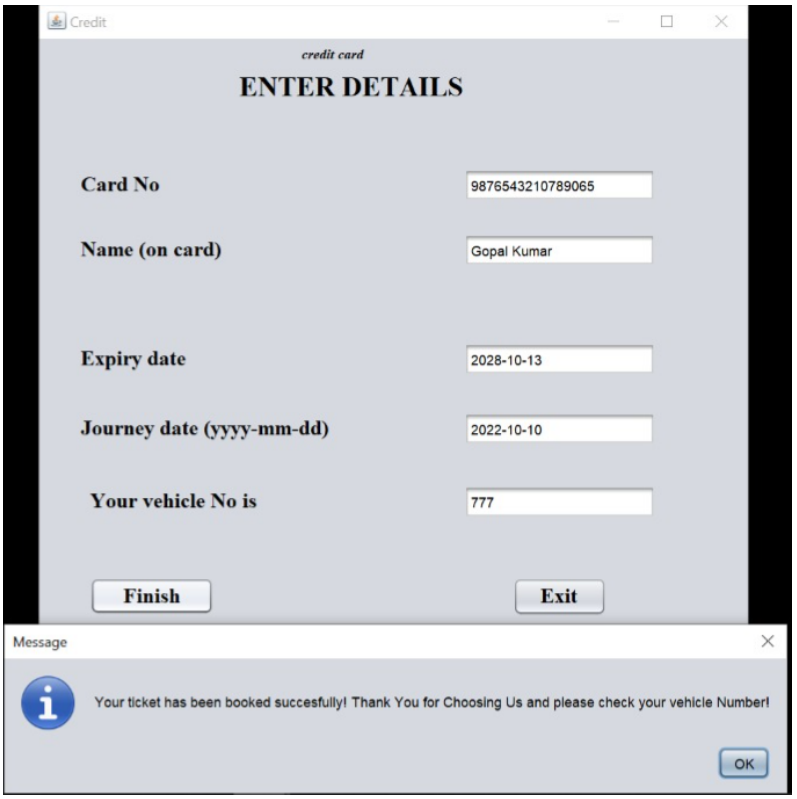
4. Remove Car from Fleet

5. User Functionality



6. Car Booking

7. Payment



8. Database Updation

```
mysql> show tables;
+--------------------------+
| Tables_in_e_reservations |
+--------------------------+
| bill                     |
| card                     |
| credit                   |
| debit                    |
| details                  |
| ope                      |
| user                     |
| vehicles                 |
+--------------------------+
8 rows in set (0.05 sec)

mysql> select * from details;
+--------+------------+----------+----------------+---------+------------+-----------+--------------+------------+
| name   | from_place | to_place | facility_level | price   | phno       | qty_seats | journey_date | vehicle_no |
+--------+------------+----------+----------------+---------+------------+-----------+--------------+------------+
| Zayn   | Delhi      | Mumbai   | Ac             | 2000.00 | 9898989802 |         2 | 2022-04-03   | 753        |
| priya  | Bangalore  | Mumbai   | non-ac         | 4000.00 | 7890477771 |         4 | 2022-03-01   | 007        |
| priyaa | Mumbai     | Bangalore| Ac             | 4000.00 | 789477333  |         4 | 2022-09-20   | 017        |
| maurya | Delhi      | Mumbai   | Ac             | 1000.00 | 1209384765 |         1 | 2022-08-08   | 770        |
| Gopal  | Mysore     | Mumbai   | Ac             | 2000.00 | 6758393788 |         2 | 2022-10-10   | 777        |
+--------+------------+----------+----------------+---------+------------+-----------+--------------+------------+
```

```
mysql> select * from details;
+--------+------------+----------+----------------+---------+------------+-----------+--------------+------------+
| name   | from_place | to_place | facility_level | price   | phno       | qty_seats | journey_date | vehicle_no |
+--------+------------+----------+----------------+---------+------------+-----------+--------------+------------+
| Zayn   | Delhi      | Mumbai   | Ac             | 2000.00 | 9898989802 |         2 | 2022-04-03   | 753        |
| priya  | Bangalore  | Mumbai   | non-ac         | 4000.00 | 7890477771 |         4 | 2022-03-01   | 007        |
| priyaa | Mumbai     | Bangalore| Ac             | 4000.00 | 789477333  |         4 | 2022-09-20   | 017        |
| maurya | Delhi      | Mumbai   | Ac             | 1000.00 | 1209384765 |         1 | 2022-08-08   | 770        |
| Gopal  | Mysore     | Mumbai   | Ac             | 2000.00 | 6758393788 |         2 | 2022-10-10   | 777        |
+--------+------------+----------+----------------+---------+------------+-----------+--------------+------------+
5 rows in set (0.00 sec)

mysql> select * from ope;
+----------+----------+
| username | password |
+----------+----------+
| abc      | abc      |
| xyz      | xyz      |
| jkl      | jkl      |
+----------+----------+
3 rows in set (0.00 sec)

mysql> select * from user;
+----------+----------+
| username | password |
+----------+----------+
| priya    | priya    |
| sejal    | sejal    |
| sheetal  | sheetal  |
+----------+----------+
```

```
mysql> select * from vehicles;
+--------------+------------+------------+-------------+--------------+----------------+----------------+------+-------------+---------
--+
| vehicle_name | vehicle_no | from_place | destination | arrival_time | departure_time | facility_level | cost | Driver_name | status
  |
+--------------+------------+------------+-------------+--------------+----------------+----------------+------+-------------+---------
--+
| creta        | 007        | Bangalore  | Mumbai      | 03:00:00     | 05:00:00       | Ac             | NULL | shyam       | BOOKED
  |
| innova       | 017        | Mumbai     | Bangalore   | 03:00:00     | 05:00:00       | Ac             | NULL | Priya       | BOOKED
  |
| nano         | 333        | Mumbai     | Bangalore   | 10:30:00     | 12:30:00       | non-ac         | NULL | sejal       | availabl
e |
| Audi         | 753        | Delhi      | Mumbai      | 11:00:00     | 09:00:00       | AC             | NULL | Ram         | BOOKED
  |
| audi         | 770        | Delhi      | Mumbai      | 04:00:00     | 05:00:00       | Ac             | NULL | sheetal     | BOOKED
  |
| mercedes     | 777        | Mysore     | Mumbai      | 04:00:00     | 07:30:00       | Ac             | NULL | Maurya      | BOOKED
  |
+--------------+------------+------------+-------------+--------------+----------------+----------------+------+-------------+---------
--+
```

```
mysql> select * from bill;
+-------------+------------+-------------+------------+-------------+----------------+--------------+---------+--------------+
| name        | vehicle_no | driver_name | from_place | destination | departure_time | arrival_time | price   | vehicle_name |
+-------------+------------+-------------+------------+-------------+----------------+--------------+---------+--------------+
| Zayn        | 753        | rohan       | Delhi      | Mumbai      | 04:00:00       | 07:30:00     | 2000.00 | mercerdes    |
| priya       | 007        | rahul       | Bangalore  | Mumbai      | 07:00:00       | 08:30:00     | 4000.00 | audi         |
| priyaa      | 017        | rahul       | Mumbai     | Bangalore   | 07:00:00       | 08:30:00     | 4000.00 | audi         |
| maurya      | 770        | rohan       | Delhi      | Mumbai      | 09:00:00       | 10:00:00     | 1000.00 | honda        |
| Golap Kumar | 777        | Maurya      | Mysore     | Mumbai      | 04:00:00       | 07:30:00     | 2000.00 | mercerdes    |
+-------------+------------+-------------+------------+-------------+----------------+--------------+---------+--------------+
```

6. Team member contributions

S S Priya	UML Diagrams, Code for User, Report
Sejal Maurya	UML Diagrams, Code for Operator, Report
Sheetal S	UML Diagrams, Code for Payment Portal, Report