

# 1.INTRODUCTION

The growing demand for efficient and reliable car rental systems has highlighted the need for a streamlined and user-friendly platform. The Commercial Car Rental System is designed to facilitate car owners in renting out their vehicles to organizations under a contract-based arrangement. This platform enables users to provide details about their cars and personal information, which is then used to establish rental agreements with organization for a minimum period of three months. The system is designed to ensure transparency, efficiency, and security for both car owners and renting organizations.

## 1.1 Existing System

The current system focuses on a Car Rental System where cars are rented to customers or organizations. However, traditional systems lack features for smooth management of customers, cars, and rental details. There is also limited automation, which increases manual effort. Our new system uses advanced technology to manage the car rental process more efficiently. It ensures accuracy, saves time, and provides an intuitive interface for admins, customers, and organizations. Key features

- User Registration and Login: Admins, customers, and organization employees can log in securely to access personalized features.
- Car Management: Register cars, upload images, and track their availability and rental status.
- Rental Process Automation: Simplifies customer and organization rental requests, with contract duration tracking.
- Database Integration: Stores all details securely in a database for easy retrieval and updates.

## 1.2 Need for the System

The new system addresses limitations of the existing manual processes and introduces:

- **Accurate Data Management:** Automated collection and storage of user and car details ensure accuracy.
- **Smarter Operations:** Tracks rental contracts and rental history efficiently.
- **Improved User Engagement:** A dashboard for admins and login features for customers improves accessibility.
- **Integration with Databases:** Ensures secure storage and retrieval of data for seamless operations.

## 1.3 Scope of Work

The proposed system covers:

- **User Management:**
  - o Admin and customer logins with a personalized dashboard.
  - o Features to update or retrieve user details.
- **Car Management:**
  - o Adding, updating, deleting, and showing car details.
  - o Storing images and tracking conditions of cars.
- **Rental Process:**
  - o Managing contracts with organizations (minimum 3 months to a maximum of 5 years).
  - o Admin approval or rejection of rental requests.
- **Customer Access:** o Allows customers to track rental status and view organization details for their rented cars.

## 1.4 Software and Hardware Requirements

### Hardware Requirements:

- **Processor:** Intel Core i3 or equivalent (2.0 GHz or higher).
- **RAM:** 4 GB (8 GB recommended for smooth performance).
- **Storage:** 500 GB HDD or 128 GB SSD (for faster performance).
- **Graphics:** Integrated graphics card (no high-end graphics needed).
- **Monitor:** Minimum resolution of 1366x768.
- **Peripherals:** Keyboard, Mouse, and Internet connectivity.

### Software Requirements:

- **Operating System:** Windows 10/11, macOS, or Linux (Ubuntu 20.04 or later).
- **Database:** MySQL
- **Database Design Tool:** MySQL Workbench.
- **Dependencies:** JDBC Driver for Java-MySQL integration.

## 1.5 Detail Description of Technology Used

- **Used Java and Swing:**

The application is built using Java and Swing for a robust, user-friendly GUI. These technologies allow cross-platform functionality and seamless database integration.

- **MySQL:**

Used for managing all database operations, including storing and retrieving customer, car, and rental details.

- **Development Environment:**

The system is developed using tools like NetBeans or IntelliJ IDEA, offering debugging and testing features to ensure smooth functionality.

## **2.PROPOSED SYSTEM**

### **2.1 Proposed of System**

The Commercial Car Rental System is designed to store and manage all user, car, and rental data efficiently within the application. The system automates the process of data storage, retrieval, and management, significantly reducing manual effort and the risk of data loss. Backup options ensure that no critical data is lost, even in unforeseen circumstances. For example, if an admin needs to search for a specific car's rental history, the system provides this information within seconds. Additionally, data backups can be created daily and stored on external devices like USB drives, CDs, or hard disks for added security.

### **2.2 Objective of System**

#### **a) User-Friendly Experience**

- The proposed system offers an intuitive interface for both admins and customers, making it easy to store, retrieve, and manage data.

#### **b) Quick and Accurate Report Generation**

- Monthly or on-demand reports, such as car rental history or customer activity summaries, can be generated with minimal effort.

#### **c)Reduced Paperwork**

- All records are digitized, eliminating the need for physical files. This streamlines data entry and retrieval processes, reducing the risk of misplaced or damaged documents.

#### **d)Efficient Car Management**

- The system includes features to register new cars, track rental statuses, and update car conditions dynamically.

#### **e) Automated User Management**

- The system simplifies the management of customer profiles, including contact details, rental preferences, and driving license status.

#### **f) Real-Time Updates**

- Users and admins can view real-time updates on car availability, rental status, and contract durations.

#### **g) Secure Authentication**

- The system includes role-based authentication, ensuring only authorized personnel can access or modify sensitive data

## **2.3 User Requirements**

### **Functional Requirements:**

1. User Registration:
  - Users (customers and organizations) must be able to register with their details, including car details and personal information.
2. Login and Authentication:
  - Users should be able to securely log in using their credentials.
3. Car Registration:
  - Users must be able to provide car information for rental purposes.
4. Contract Creation:
  - The system should allow the creation of contracts between the user and the organization for a minimum of 3 months.
5. Rental Management:
  - The system must manage rental requests, approvals, and cancellations efficiently.

### **Non-Functional Requirements:**

1. Performance:
  - The system should process user requests (e.g., car registration, login) within 2-3 seconds.
2. Scalability:
  - The system must handle multiple users simultaneously without performance degradation.
3. Reliability:

- The system should operate 24/7 with minimal downtime (99.9% uptime).

4. Usability:

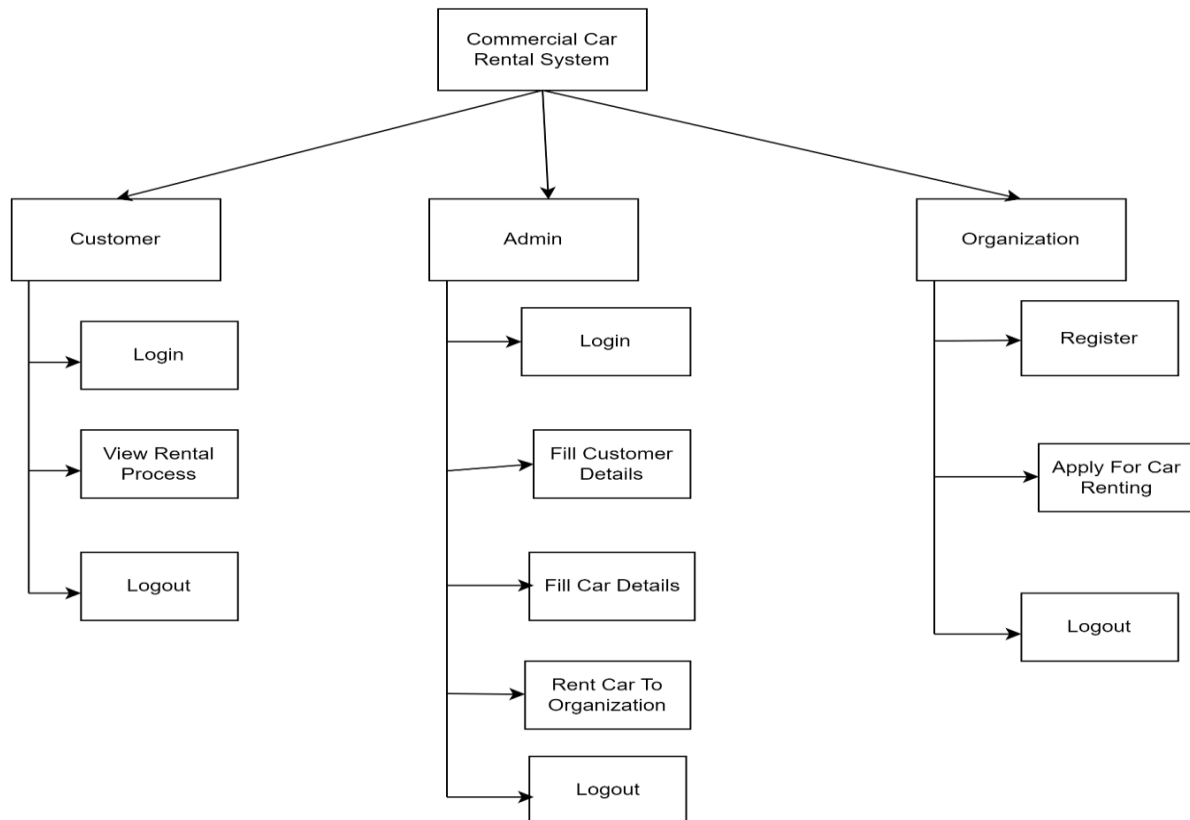
- The user interface should be intuitive and easy to navigate, with clear instructions.

5. Security:

- Sensitive user data (e.g., personal details and contracts) must be securely stored using encryption.

### 3. ANALYSIS AND DESIGN

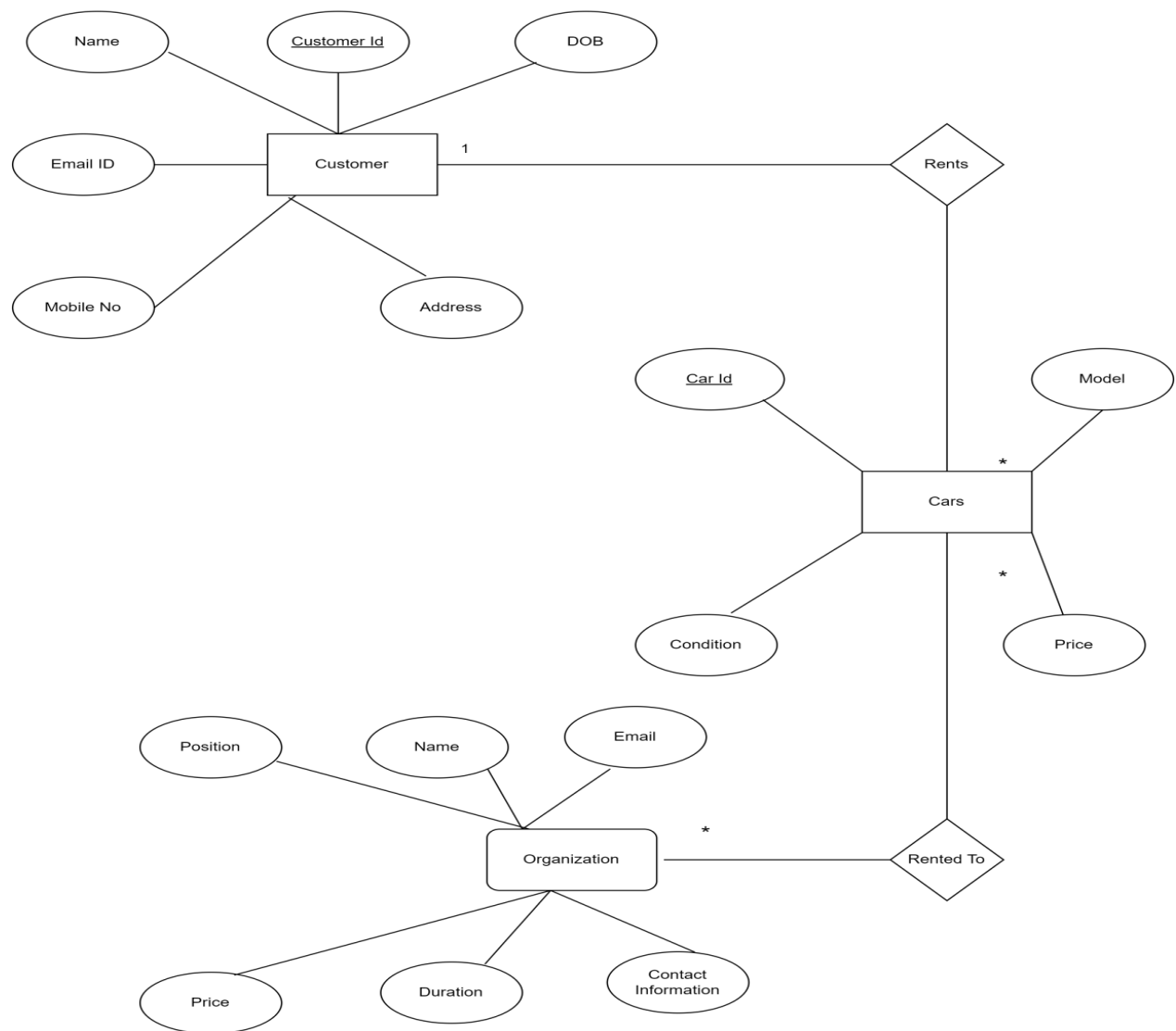
#### 3.1 Module Hierarchy diagram



#### 3.1 Module Hierarchy Diagram of Commercial Rental System

The module hierarchy diagram of the Commercial Car Rental System outlines three main user roles: Customer, Admin, and Organization, each performing specific tasks to ensure smooth operations. The Customer Module allows users to log in, view the rental process to check available car details, and log out, enabling basic access to monitor their rental journey. The Admin Module acts as the system's central control, where admins can log in, input customer details, register car information, and rent cars to organizations, ensuring efficient management of data and processes. The Organization Module enables organizations to register, apply for car rentals based on their needs, and log out after completing their requests, focusing on managing rental contracts and workflows. This hierarchical structure ensures a streamlined flow of responsibilities, clear task distribution, and effective interaction among all user roles, enhancing the system's overall usability and functionality.

### 3.2 ER Diagram

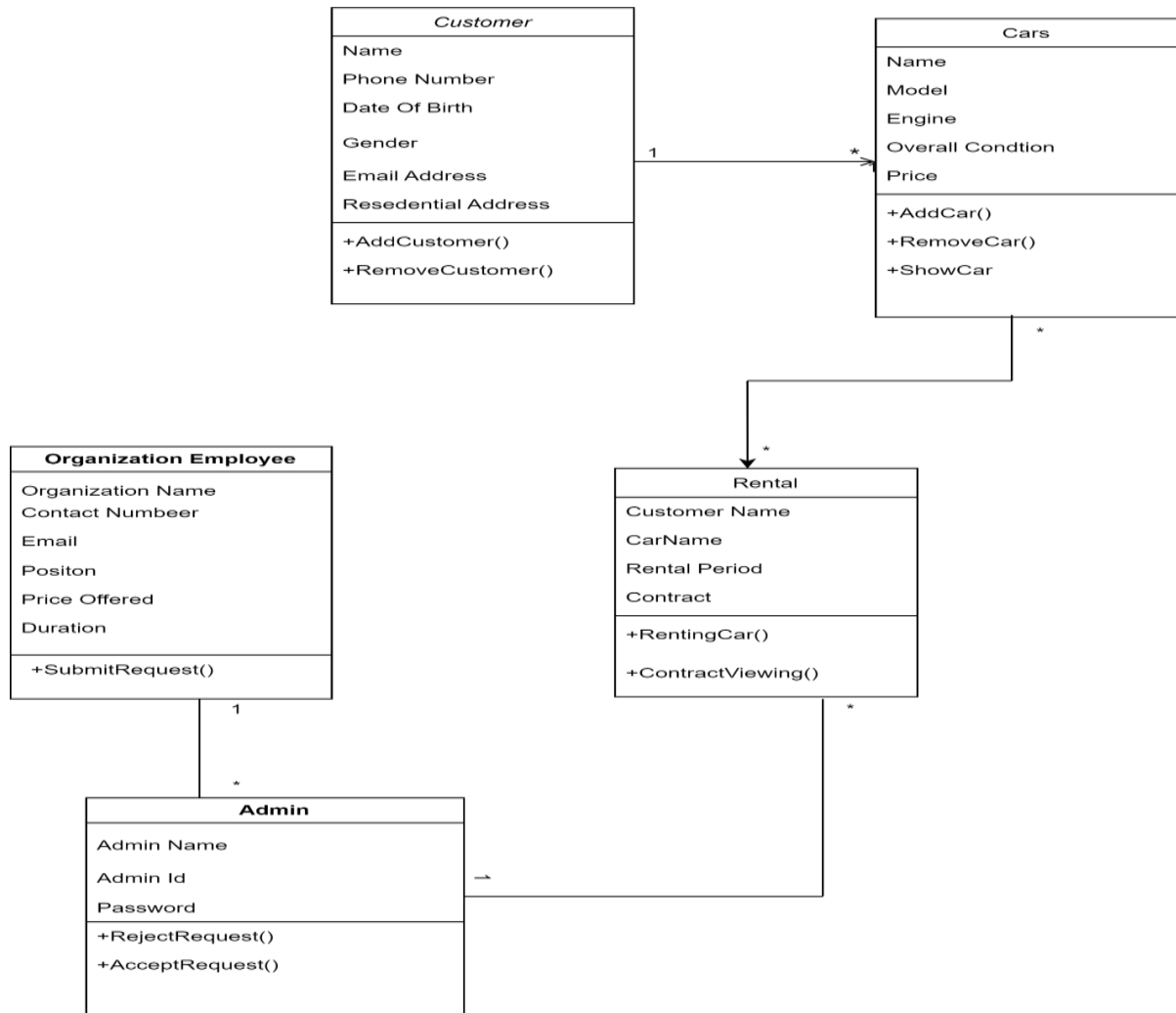


### 3.2 ER Diagram of Commercial Car Rental System

The ER Diagram for the Commercial Car Rental System visually represents the relationships among the main entities: Customer, Cars, and Organization, along with their attributes and interactions. The Customer entity includes attributes such as Customer Id, Name, DOB, Email ID, Mobile No, and Address to uniquely identify and manage customer details. The Cars entity holds details like Car Id, Model, Condition, and Price, representing car information available for rent. The relationship Rents connects the Customer and Cars entities, showing that a customer can rent one or more cars. The Organization entity contains attributes such as Name, Email, Contact Information, Position, Duration, and Price, focusing on organizations that rent cars. The Rented To relationship connects the Cars and Organization entities, indicating the car rental process to organizations. This diagram effectively captures the data flow, relationships, and attributes needed to implement a contract-based car rental system, ensuring clarity and efficient management of users, vehicles, and rentals.



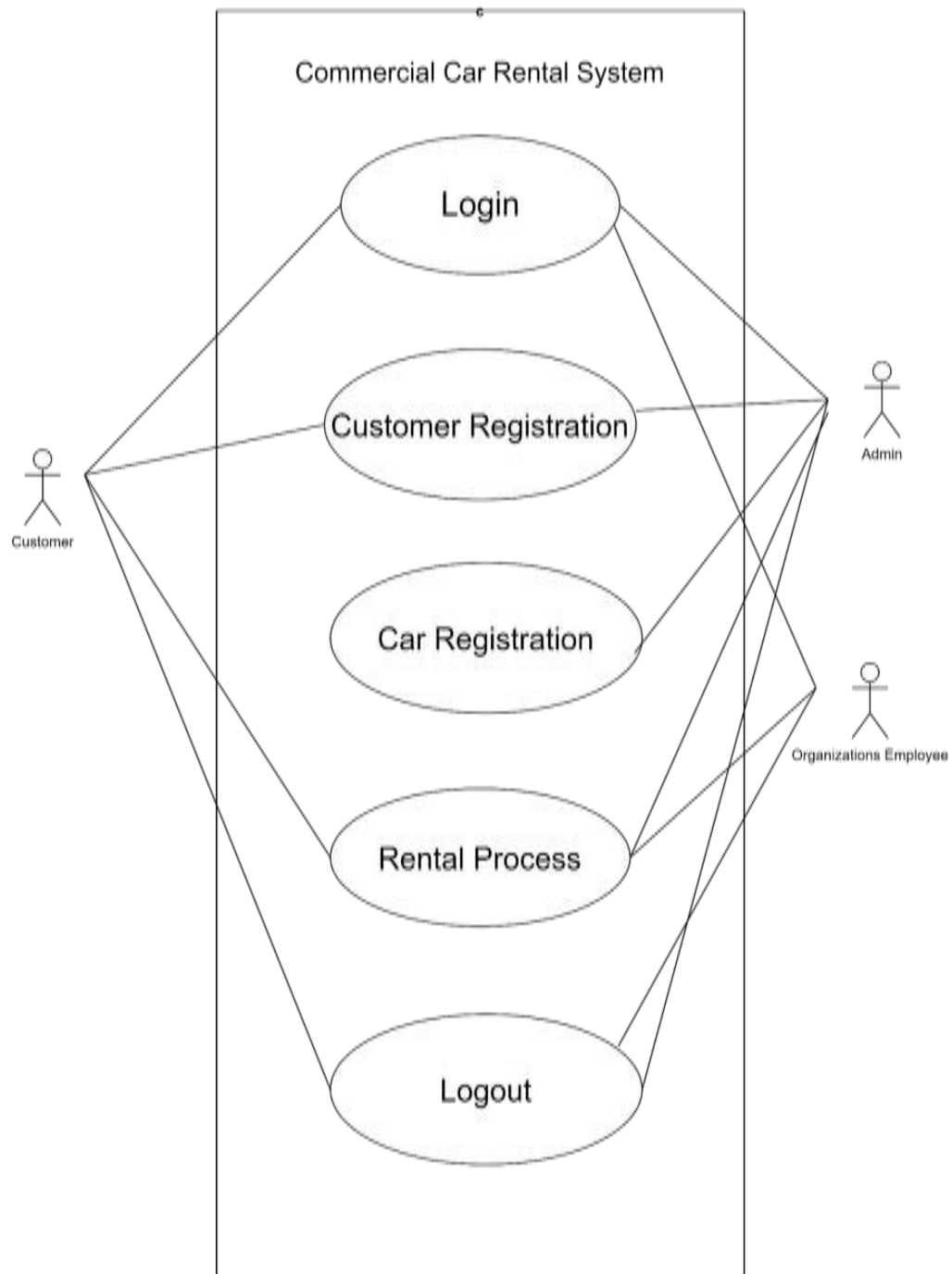
### 3.3 Class Diagram



### 3.3 Class Diagram of Commercial Car Rental System

The class diagram for the Commercial Car Rental System illustrates the key entities and their relationships within the system. The primary classes include Customer, Cars, Rental, Organization Employee, and Admin. The Customer class contains attributes such as name, contact details, and ID, representing individuals renting out their cars. The Cars class manages attributes like car model, condition, and car ID, serving as a repository for car-related data. The Organization Employee class represents employees of organizations renting cars, with attributes like name and contact information. Lastly, the Admin class handles system operations, including customer and car management. The relationships between these classes depict associations like rentals being facilitated by admins and cars being linked to customers and organizations. This structure ensures clear functionality and data flow within the system.

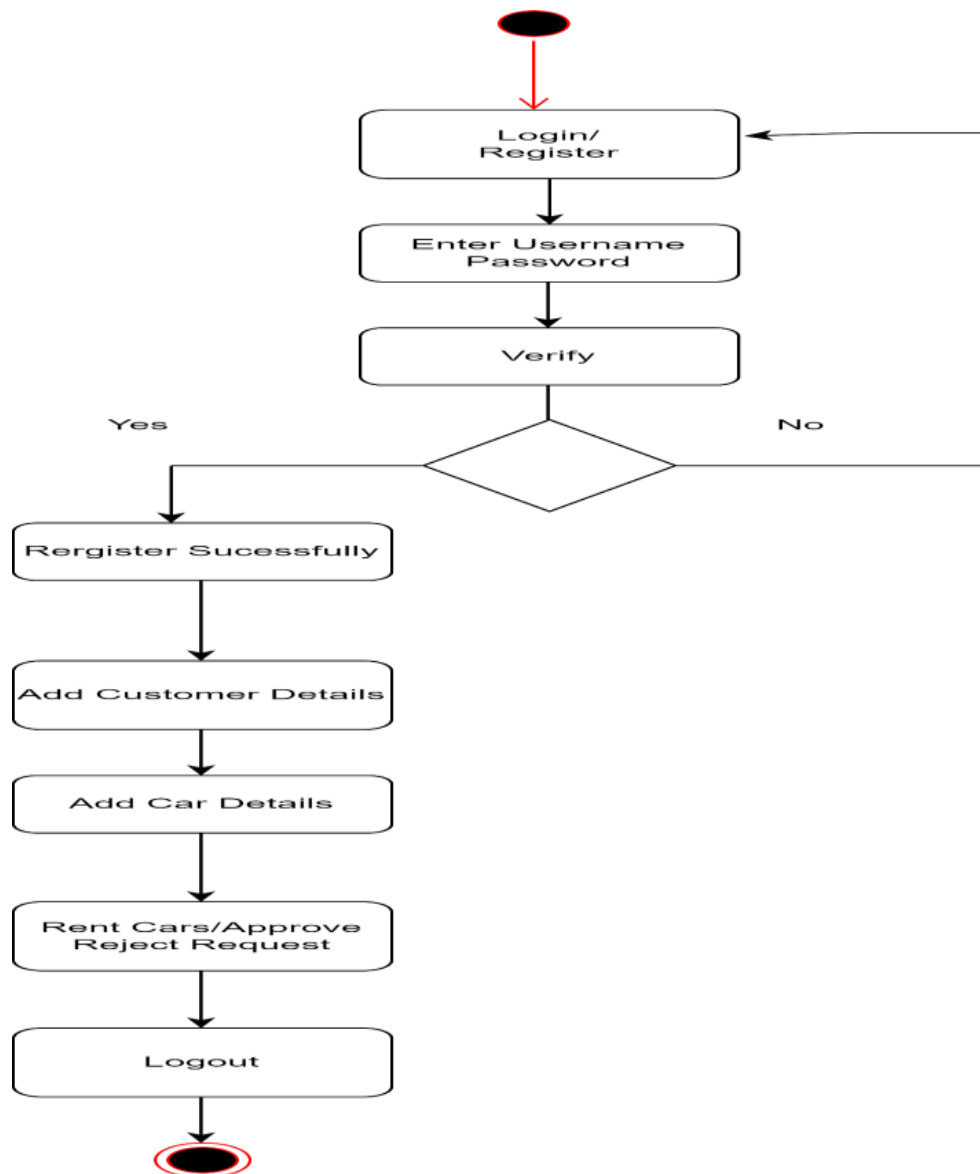
### 3.4 Use Case Diagram



**3.4 Use Case diagram of Commercial Car Rental System**

The use case diagram for the Commercial Car Rental System outlines the key functionalities and interactions between the system and its users. It highlights five primary use cases: Login, Customer Registration, Car Registration, Rental Process, and Logout. The Login use case allows users to access the system securely. Customer Registration enables new users to register their details within the system for identification and rental purposes. Car Registration allows car owners or administrators to input vehicle details, ensuring availability for rental. The Rental Process manages the core functionality, where users or organizations can request and finalize car rentals. Finally, the Logout use case ensures users can securely exit the system after completing their tasks. This diagram provides a concise representation of the system's primary features and their interactions with users, focusing on ease of use and functionality.

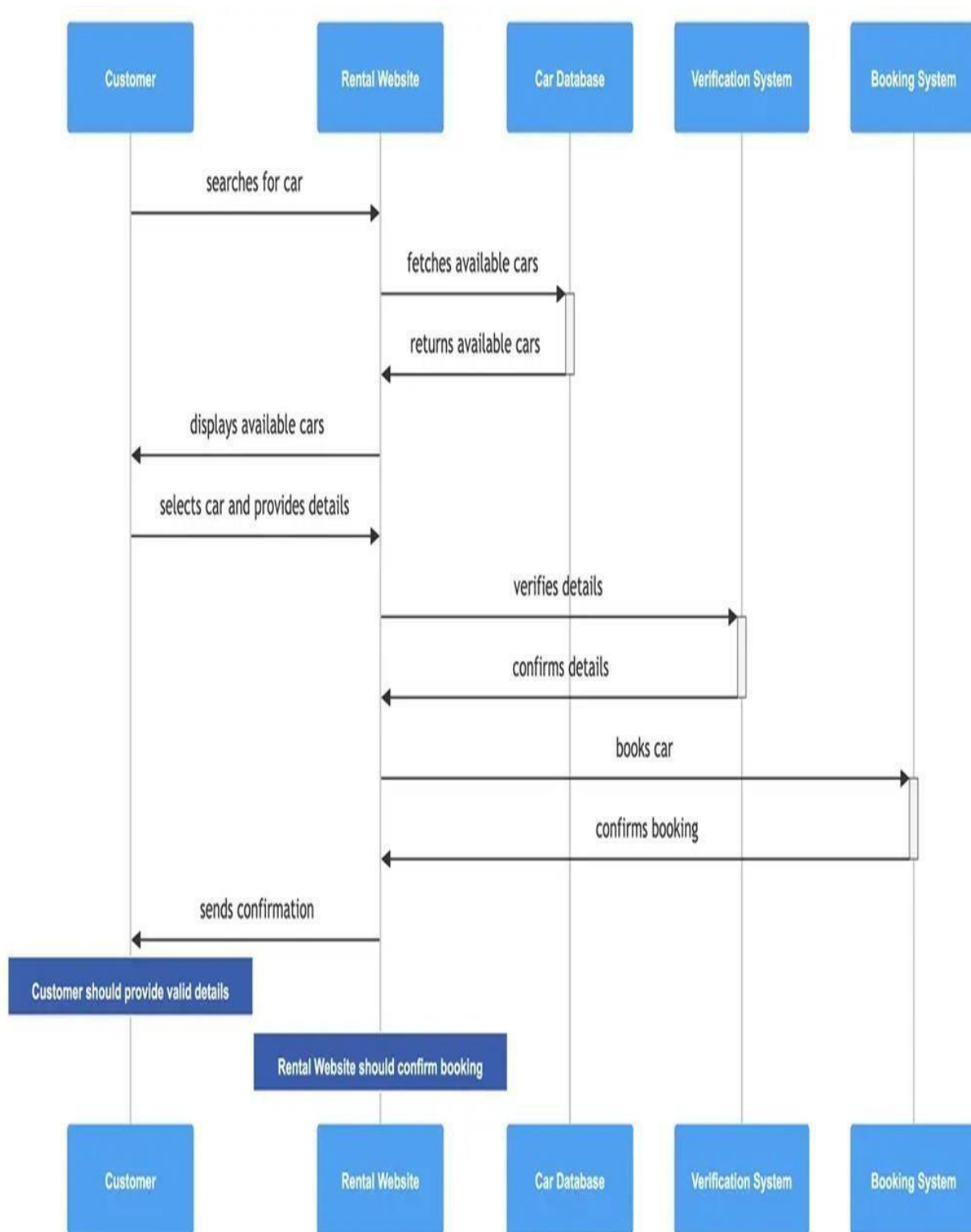
### 3.5 Activity Diagram



### 3.5 Activity Diagram of Commercial Car Rental System

The activity diagram illustrates the workflow of the Commercial Car Rental System, starting with users logging in or registering by entering their username and password, which are then verified by the system. If verification is successful, new users are registered, and existing users proceed to add details such as customer and car information. The process continues with managing car rentals, where requests are either approved or rejected based on availability and other factors. Finally, users log out to complete their interaction with the system. This sequence ensures a streamlined and structured approach to user registration, data entry, and rental processing.

### 3.6 Sequence Diagram



### 3.6 Sequence Diagram of Commercial Car Rental System

The sequence diagram for the Commercial Car Rental System illustrates the step-by-step interaction between the Customer, Rental Website, Car Database, Verification System, and Booking System. Initially, the customer searches for a car on the rental website. The

website fetches the list of available cars from the car database and displays it to the customer. The customer selects a car and provides the required details, which are sent to the verification system for validation. Once the details are verified, the system confirms the information and proceeds to book the car through the booking system. The booking system confirms the reservation and sends a confirmation back to the customer. This diagram highlights the systematic flow of information and ensures that every step, from searching to booking, is validated, and confirmed for a seamless user experience.

### 3.7 Database Structure


#### 1.Users Table

Column	Data Type	Description
adminID	INT	Unique identifier for the admin
username	VARCHAR(40)	Username for the admin
password	VARCHAR(255)	Password for the admin

## 2. Customer Table

Column	Data Type	Description
customerID	INT	Unique identifier for the customer
name	VARCHAR(100)	Customer's full name
mobileNo	VARCHAR(15)	Customer's mobile number
email	VARCHAR(100)	Customer's email address
dob	DATE	Customer's date of birth
gender	ENUM('Male', 'Female', 'Other')	Customer's gender
address	VARCHAR(255)	Customer's residential address

## 3. Car Table

Column	Data Type	Description
carID	INT	Unique identifier for the car
carName	VARCHAR(100)	Name of the car
modelName	VARCHAR(100)	Model name of the car
purchaseDate	DATE	Purchase date of the car
condition	VARCHAR(50)	Condition of the car (new, used)
insurance	ENUM('Yes', 'No')	Insurance status of the car
photo	VARCHAR(255) 	Image file path of the car

## 4. Car Image Table

Column	Data Type	Description
imageID	INT	Unique identifier for the image
carID	INT	Foreign key to the Car table
imagePath	VARCHAR(255)	Path to the car image

## 5. Organization Employee Table

Column	Data Type	Description
employeeID	INT	Unique identifier for the employee
name	VARCHAR(40)	Name of the employee
organization	VARCHAR(50)	Name of the organization
email	VARCHAR(40)	Email address of the employee
mobile	VARCHAR(15)	Mobile number of the employee
position	VARCHAR(30)	Position within the organization
rentalRequest	INT	Rental request made by the employee (Yes/No)

## 6. Rental Process Table

Column	Data Type	Description
rentalID	INT	Unique identifier for the rental
customerID	INT	Foreign key referencing Customer Table
carID	INT	Foreign key referencing Car Table
employeeID	INT	Foreign key referencing Organization Employee Table
startDate	DATE	Rental start date
endDate	DATE	Rental end date
status	VARCHAR(20)	Rental status (e.g., active, completed)



## **4.CONCLUSION**

The Commercial Car Rental System is a robust and efficient platform designed to streamline the process of renting cars to organizations. It enables users to register their vehicles and personal details, which are then rented out to institutes or stations under a contract-based system, ensuring a minimum engagement period of three months. By leveraging a combination of Java Swing for desktop-based frontend interfaces, Java for backend logic, and MySQL for database management, the system provides a seamless and scalable solution. This project demonstrates a practical implementation of technology to simplify commercial car rental operations while fostering trust and transparency between all stakeholders involved.