American International University-Bangladesh (AIUB)

Department of Computer Science and Engineering

Faculty of Science &Technology (FST)

Summer 2023-24

CSC 00191- Object Oriented Analysis And Design (OOAD)

Section: [P]

Project Title: Rent-A-Car Management System

Submitted by:

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Project Title:

Rent-A-Car Management System.

Project Overview:

The Rent-A-Car Management System is robust software designed specifically to facilitate the seamless rental of automobiles. Whether for a quick weekend getaway or an extended trip, this system streamlines the process. With multiple local branches strategically located near airports and bustling city centers, users can easily rent and return vehicles.

Justification:

- ***Enhanced Operational Efficiency***:
  - The system automates critical processes, including reservation procedures, contract generation, cost calculation, and fleet monitoring.
  - By minimizing errors and streamlining order processing, it ensures smoother operations.
  - Staff can focus on high-value tasks rather than manual paperwork.
- ***Improved Customer Experience:***
  - Online booking options, vehicle selection, and transparent rental details create a comfortable and user-friendly experience.
  - Customers can interact seamlessly, leading to higher satisfaction and repeat business.
- ***Resource Optimization:***
  - Efficient management of vehicles, contracts, and financial data optimizes resource utilization.
  - The system helps allocate resources effectively, reducing idle time and maximizing revenue.
- ***Risk Mitigation:***
  - Automation minimizes human errors, ensuring accurate contracts and reliable tracking.
  - Compliance with legal requirements and industry standards is easier to maintain.
- ***Business Growth and Adaptability:***
  - A well-implemented system adapts to changing market dynamics and customer demands.

System Requirements:

We will focus on the following set of requirements while designing our Car Rental System:

- The system will support the renting of different automobiles like cars, trucks, SUVs, vans, and motorcycles.
- Each vehicle should be added with a unique barcode and other details, including a parking stall number which helps to locate the vehicle.
- The system should be able to retrieve information like which member took a particular vehicle or what vehicles have been rented out by a specific member.
- The system should collect a late-fee for vehicles returned after the due date.
- Members should be able to search the vehicle inventory and reserve any available vehicle.
- The system should be able to send notifications whenever the reservation is approaching the pick-up date, as well as when the vehicle is nearing the due date or has not been returned within the due date.
- The system will be able to read barcodes from vehicles.
- Members should be able to cancel their reservations.
- The system should maintain a vehicle log to track all events related to the vehicles.
- Members can add rental insurance to their reservation.
- Members can rent additional equipment, like navigation, child seat, ski rack, etc.
- Members can add additional services to their reservation, such as roadside assistance, additional driver, Wi-Fi, etc.

Use Case Diagram:

We have four main Actors in our system:

Receptionist: Mainly responsible for adding and modifying vehicles and workers. Receptionists can also reserve vehicles.

Member: All members can search the catalog, as well as reserve, pick-up, and return a vehicle.

System: Mainly responsible for sending notifications about overdue vehicles, canceled reservation, etc.

Worker: Mainly responsible for taking care of a returned vehicle and updating the vehicle log.

Here are the top use cases of the Car Rental System:

Add/Remove/Edit vehicle: To add, remove or modify a vehicle.

Search Catalog: To search for vehicles by type and availability.

Register new account/Cancel membership: To add a new member or cancel an existing membership.

Reserve vehicle: To reserve a vehicle.

Check-out vehicle: To rent a vehicle.

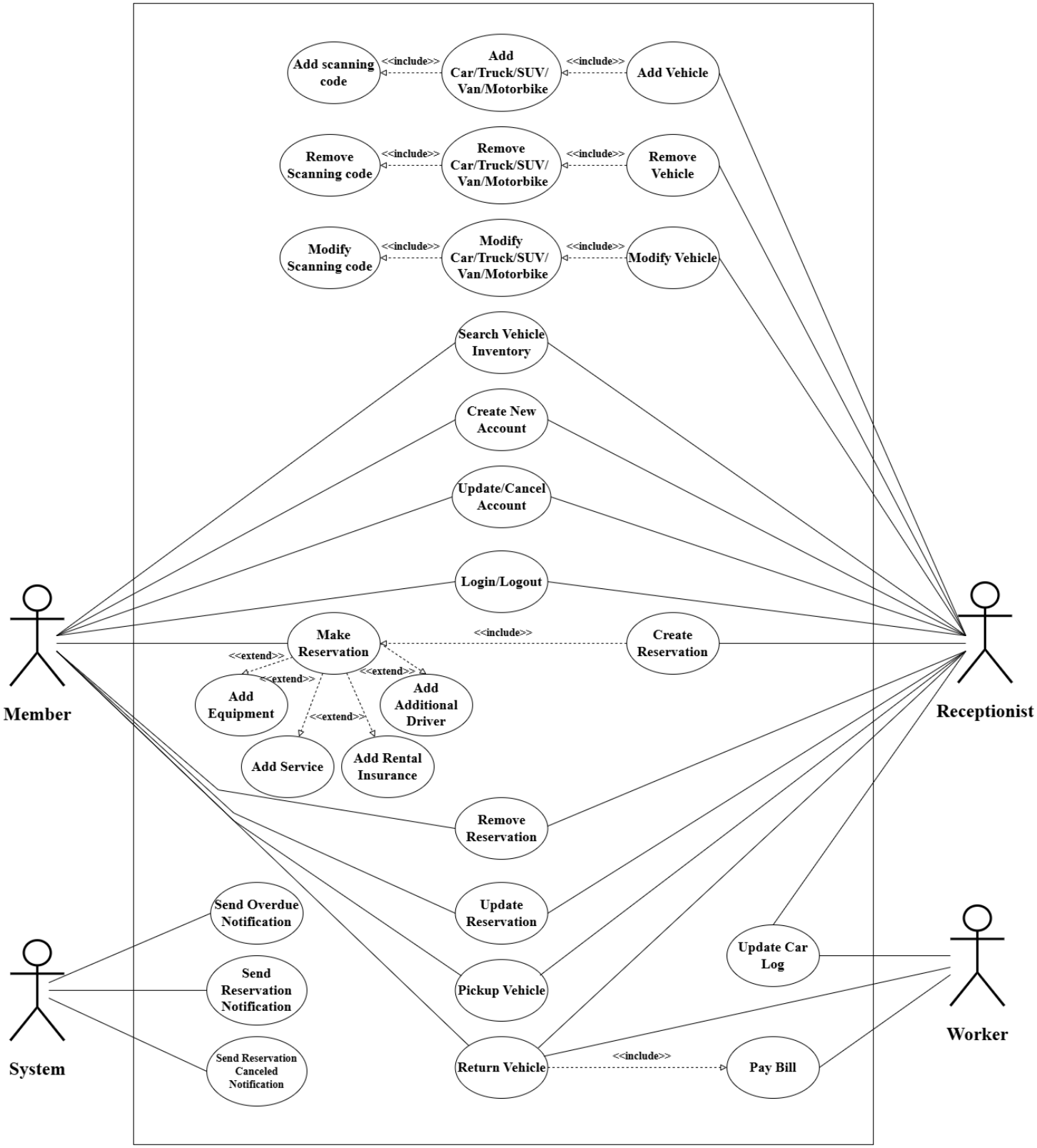
Return a vehicle: To return a vehicle which was checked-out to a member.

Add equipment: To add an equipment to a reservation like navigation, child seat, etc.

Update car log: To add or update a car log entry, such as refuelling, cleaning, damage, etc.

The Use Case Diagram is given as follows-

Rent-A-Car Management System



Class Diagram:

Here are the main classes of our Car Rental System:

CarRentalSystem: The main part of the organization for which this software has been designed.

CarRentalLocation: The car rental system will have multiple locations, each location will have attributes like ‘Name’ to distinguish it from any other locations and ‘Address’ which defines the address of the rental location.

Vehicle: The basic building block of the system. Every vehicle will have a barcode, license plate number, passenger capacity, model, make, mileage, etc. Vehicles can be of multiple types, like car, truck, SUV, etc.

Account: Mainly, we will have two types of accounts in the system, one will be a general member and the other will be a receptionist. Another account can be of the worker taking care of the returned vehicle.

VehicleReservation: This class will be responsible for managing reservations for a vehicle.

Notification: Will take care of sending notifications to members.

VehicleLog: To keep track of all the events related to a vehicle.

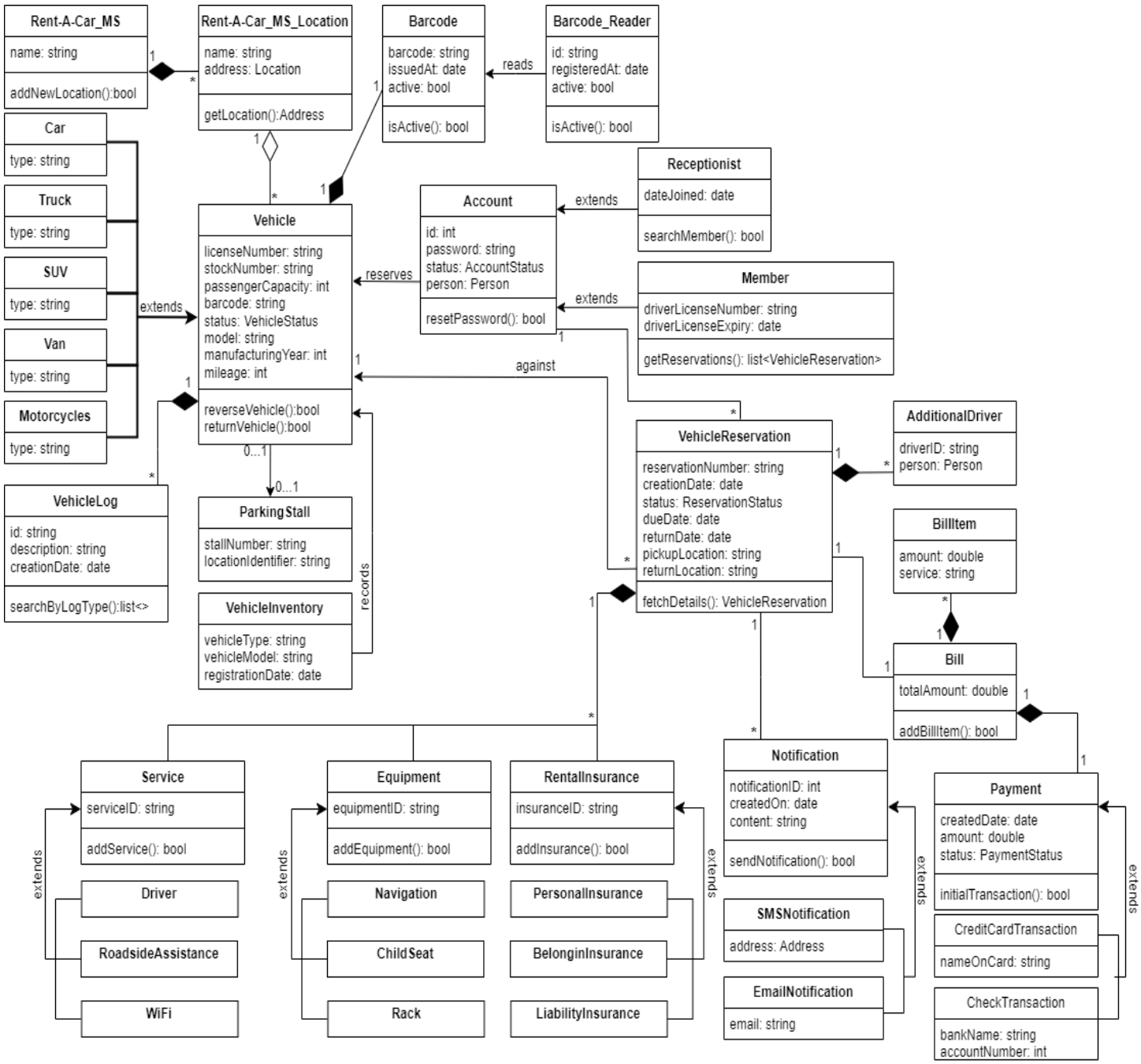
RentalInsurance: Stores details about the various rental insurances that members can add to their reservation.

Equipment: Stores details about the various types of equipment that members can add to their reservation.

Service: Stores details about the various types of service that members can add to their reservation, such as additional drivers, roadside assistance, etc.

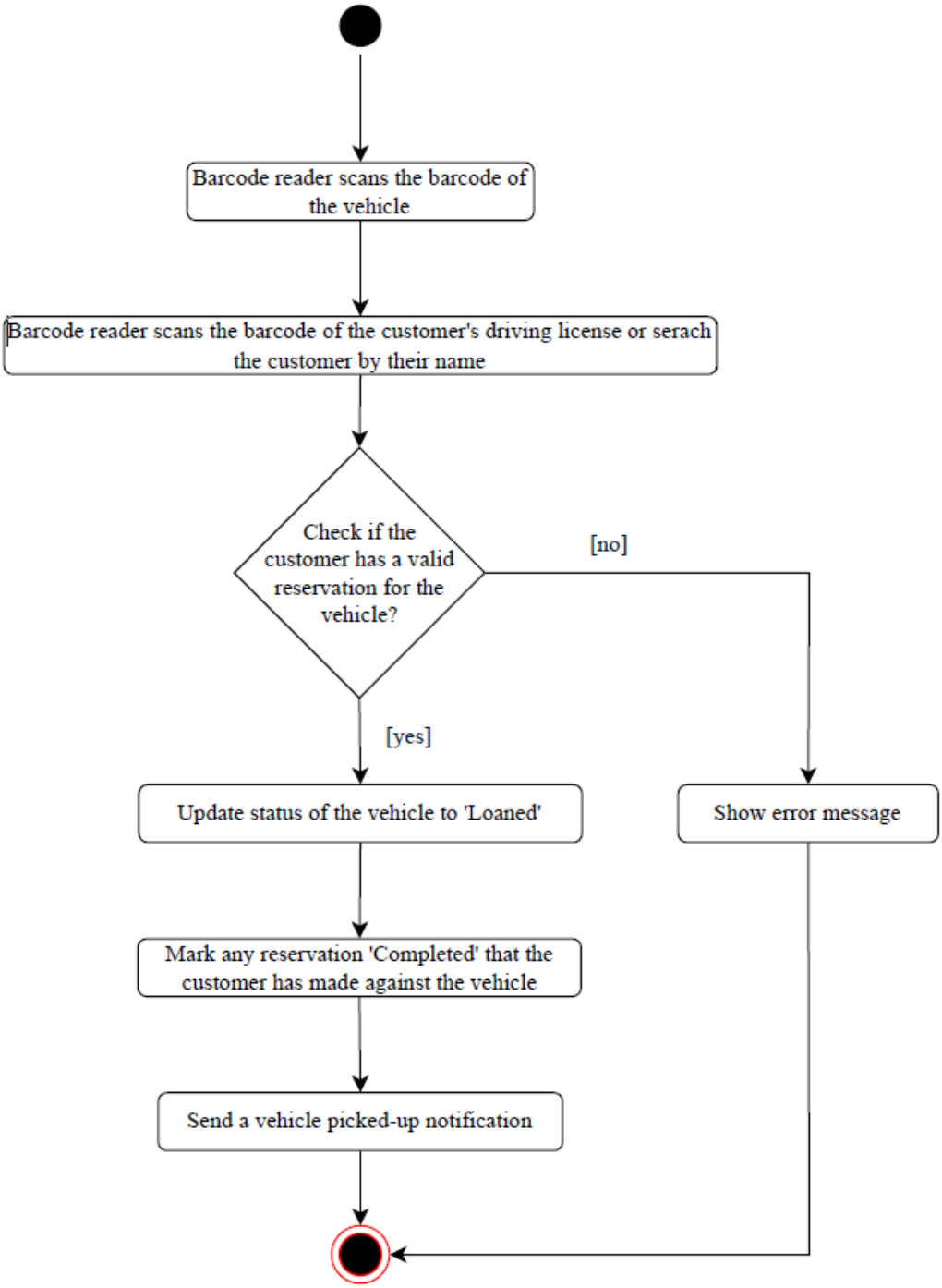
Bill: Contains different bill-items for every charge for the reservation.

Rent-A-Car Management System



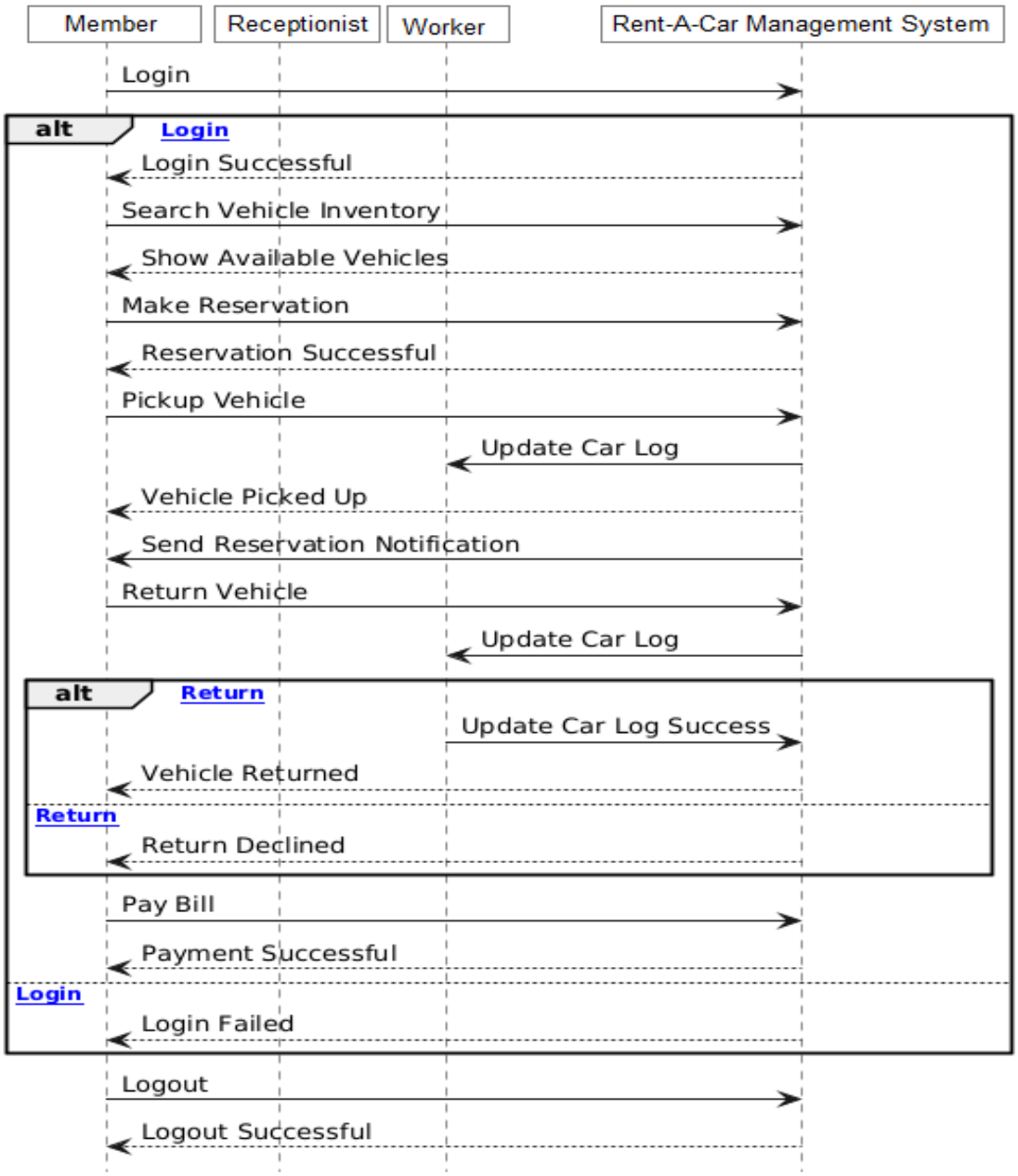
Activity Diagram:

Pick up a vehicle: Any member can perform this activity. Here are the steps to pick up a vehicle:

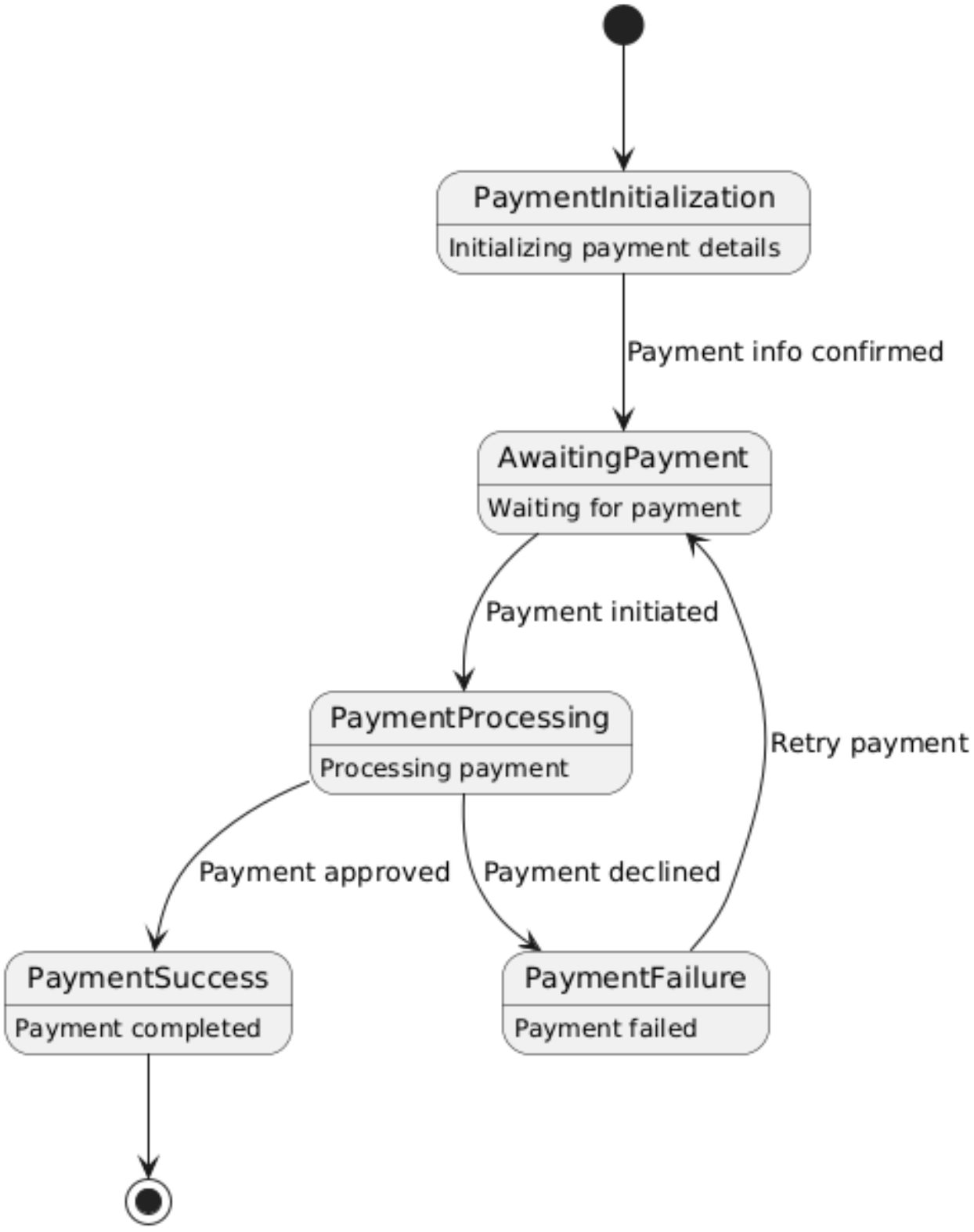


Return a vehicle: Any worker can perform this activity. While returning a vehicle, the system must collect a late fee from the member if the return date is after the due date. Here are the steps for returning a vehicle:

Sequence Diagram:



Statechart Diagram:



Conclusion:

In conclusion, the Rent-A-Car Management System serves as a pivotal solution for the car rental industry. By seamlessly integrating technology and business processes, this system enhances operational efficiency, improves customer experiences, and mitigates risks. Its adaptability ensures scalability and positions car rental businesses for sustained growth. With a focus on resource optimization and customer satisfaction, the Rent-A-Car Management System is a driving force in the modern rental landscape.