

Use Case Diagram for the Car Rental System

Learn how to define use cases and create the corresponding use case diagram for the car rental system.

We'll cover the following



- System
- Actors
 - Primary actors
 - Secondary actors
- Use cases
 - Member
 - Receptionist
 - System
- Relationships
 - Generalization
 - Associations
 - Include
 - Extend
- Use case diagram

Let's build the use case diagram for the car rental system and understand the relationship between its different components.

First, we'll define the different elements of our system, followed by the complete use case diagram of the system.

System

Our system is “rent a car.”

Actors

Now, we'll define the main actors of our car rental system.

Primary actors

- **Member:** This is the primary actor of the system who can reserve a vehicle, make payment, and change or cancel the reservations of the vehicle.

Secondary actors

- **Receptionist:** This actor acts as the system's admin and can perform any task a "Member" can perform. This can also add, remove, or modify the vehicle or its reservations and update logs.
- **Worker:** This actor can update logs, return vehicles, and pay bills.
- **System:** This can send notifications related to reservation to members.

Use cases

This section will define the use cases for "Rent a car." We have listed the use cases according to their respective interactions with a particular actor.

Note: You'll see some use cases occurring multiple times because they are shared among different actors in the system.

Member

- **Create a new account:** To create a new account on the system
- **Update/cancel account:** To update account information or to cancel an account
- **Login/Logout:** To log in and out of the car rental system
- **Search vehicle inventory:** To search for vehicles from the inventory
- **Make a reservation:** To make a reservation for a vehicle
- **Cancel reservation:** To cancel the reservation of the vehicle

- **Update reservation:** To update the reservation information of the vehicle
- **Return vehicle:** To return the vehicle to the car rental facility
- **Pickup vehicle:** To pick up the vehicle from the car rental facility
- **Pay bill:** To pay vehicle rent

Receptionist

- **Create a new account:** To create a new account on the system
- **Update/cancel account:** To update account information or to cancel an account
- **Login/Logout:** To log in and out of the car rental system
- **Search vehicle inventory:** To search for vehicles from the inventory
- **Make a reservation:** To make a reservation for a vehicle
- **Cancel reservation:** To cancel the reservation of the vehicle
- **Update reservation:** To update the reservation information of the vehicle
- **Add vehicle:** To add a new vehicle to the car rental system
- **Remove vehicle:** To remove a vehicle from the car rental system
- **Modify vehicle:** To modify a vehicle status or information from the car rental system
- **Update log:** To update the vehicle log

System

- **Send overdue notification:** To send a notification if the date and time for vehicle return are passed
- **Send reservation notification:** To send a notification of the reservation made
- **Send reservation canceled notification:** To send a notification of any canceled reservation

Relationships

We describe the relationships between and among actors and their use cases in this section.

Generalization

We'll use the generalization relationship if we want to add, remove, or modify a vehicle. We also need to specify the vehicle type we want to add, remove or modify.

- “Add vehicle” has a generalization relationship with the “Add car,” “Add truck,” “Add van,” and “Add motorbike” use cases.
- “Remove vehicle” has a generalization relationship with the “Remove car,” “Remove truck,” “Remove van,” and “Remove motorbike” use cases.
- “Modify vehicle” has a generalization relationship with the “Modify car,” “Modify truck,” “Modify van,” and “Modify motorbike” use cases.

Associations

The table below shows the association relationship between actors and their use cases.

Member	Receptionist	System
Create a new account	Create a new account	Reservation canceled notification
Update/cancel account	Update/cancel account	Send reservation notification
Login/Logout	Login/Logout	Overdue notification
Search vehicle inventory	Search vehicle inventory	
Make a reservation	Make a reservation	
Cancel reservation	Cancel reservation	
Update reservation	Update reservation	
Pickup vehicle	Add vehicle	
Return vehicle	Remove vehicle	

Pay bill	Modify vehicle	
	Update log	

Include

When a car is returned, the bill is paid. Therefore, “Return vehicle” has an include relationship with “Pay bill.”

Extend

Whenever a reservation is made, we need to add its details like rental insurance, additional driver, service, and equipment. Therefore, the “Add rental insurance,” “Add additional driver,” “Add service,” and “Add equipment” use cases have an extend relationship with “Make a reservation.”

Use case diagram

Here’s the use case diagram for the car rental system:

