COMP 225-hybrid: Software Engineering Methodologies

Software Requirements Specification (SRS)

Name of project : Car Rental Mobile Application

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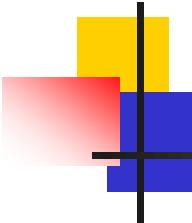
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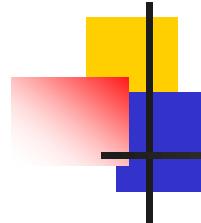
Introduction

- ## Purpose
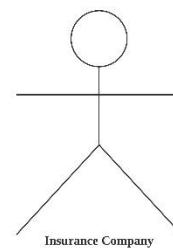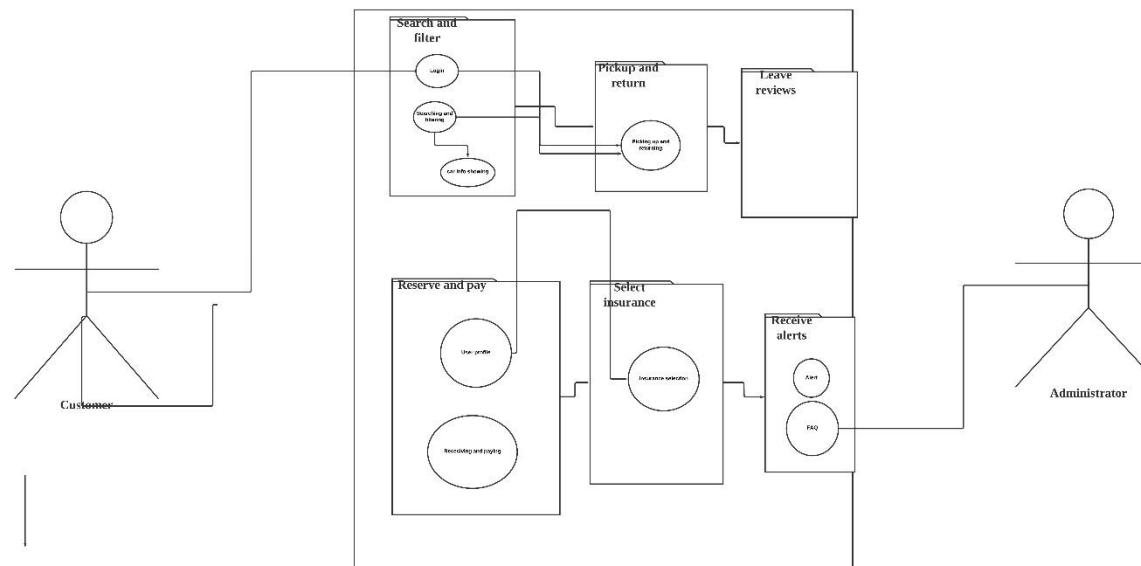
This new software product, a car rental mobile application, will address the need for a seamless and efficient car rental process. The application will allow users to sign up, browse available cars, manage their chosen car, and pay rental fees, all from the convenience of their mobile device. Additionally, it will provide navigation and route suggestions, user reviews, and a Q&A section for user support. This comprehensive solution aims to simplify the car rental experience for customers, rental agents, and administrators alike, making car rental more accessible and user-friendly.
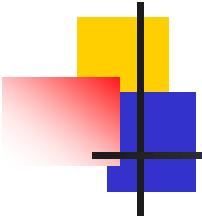
- ## Project scope

The Car Rental Mobile Application project aims to create a user-friendly platform for seamless car rental processes. Key features include user registration, car browsing and management, payment processing, navigation support, and integration with hardware like GPS sensors. Target audiences include customers, rental agents, administrators, and other stakeholders. Marketing strategies will involve social media promotion and targeted advertising. The project's success relies on a reliable internet connection and adherence to legal requirements related to the services.
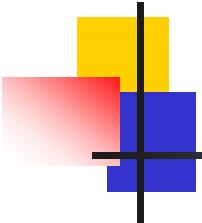
Packaged Use Case Diagram
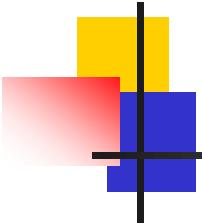
Use Cases Brief Descriptions

Goal Use Case name	Actors	Use Case Brief Description
1. Create Profile	Customer, Registration System	The actor will navigate to the registration page and fill out a form with personal details such as name, email, and password. After submitting the form, the system will validate the information, create a new user profile, and store this information securely for future reference.
2. View Car Information	Customer, Inventory Database	The customer will navigate to the car listings page. The system will display a list of available cars with detailed information for each car, including specifications, pricing, availability, images, and any additional features.
3. Search and Filter Cars	Customer, Search Engine	The customer will use the search bar and filter options on the car listings page to find cars based on specific criteria such as location, dates, car type, and price range. The system will display the cars that match these criteria.

Use Cases Brief Description

Goal Use Case Names	Actors	Use Case Brief Description
4. Reserve and Pay for Car	Customer, System Administrator, Payment Gateway, Inventory Database	The customer will select a car and rental dates, then navigate to the payment page. The customer will enter payment details, and the system will process the payment through a secure gateway. After successful payment, the system will confirm the reservation and send a confirmation receipt to the customer.
5. Select Pickup and Return Location	Customer, Location Database	During the reservation process, the customer will select the pickup and return locations for the rented car from a list of available options. The system will confirm these locations and include them in the reservation details.
6. Receive Alerts	Customer, Notification System	The system will send alerts to the customer about important updates, such as reservation confirmations, payment reminders, or changes to rental details. These alerts can be sent via email, SMS, or in-app notifications, depending on the customer's preferences.

Use Case Full Description

Use case: Reserve and Pay for Car

Iteration: 1, last modification: June 26 by Adilet

Primary actor: Car renter

Goal in context: To reserve a car and complete payment for the rental

Preconditions: The renter must have a valid user profile and must have selected a car for rental.

Trigger: The renter decides to reserve a car and proceed to payment.
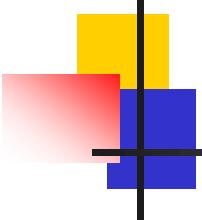
Scenario:
1. The renter selects a car from the car listings page.
2. The renter selects the desired rental dates.
3. The system displays the total cost based on the rental period and chosen car.
4. The renter navigates to the payment page.
5. The renter enters his or her payment details.
6. The system validates the payment details and processes the payment through a secure gateway.
7. Upon successful payment, the system confirms the reservation.

The system sends a confirmation receipt to the customer's registered email.

Exceptions:
1. Payment details are incorrect or not recognized — see use case Validate Payment Details.
2. The selected car is not available for the chosen dates — system displays appropriate error message; see use case Check Car Availability.
3. The renter's account has insufficient balance or credit limit — system displays appropriate error message.
4. The renter's session times out during the reservation process — system prompts the renter to log in again.
5. The system experiences a technical issue and cannot process the reservation—system displays an error message and asks the renter to try again later.

Use Case Full Description (Continued)

Priority: High priority, to be implemented in the first increment

When available: First increment

Frequency of use: Frequent

Channel to actor: Via PC-based browser/mobile app, and Internet connection

Secondary actors: System Administrator, Payment Gateway, Inventory Database
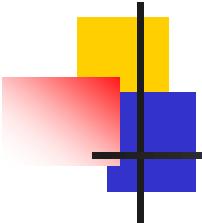
Channels to secondary actors:

1. System Administrator: PC-based system
2. Payment Gateway: Secure internet connection
3. Inventory Database: Internal system connection
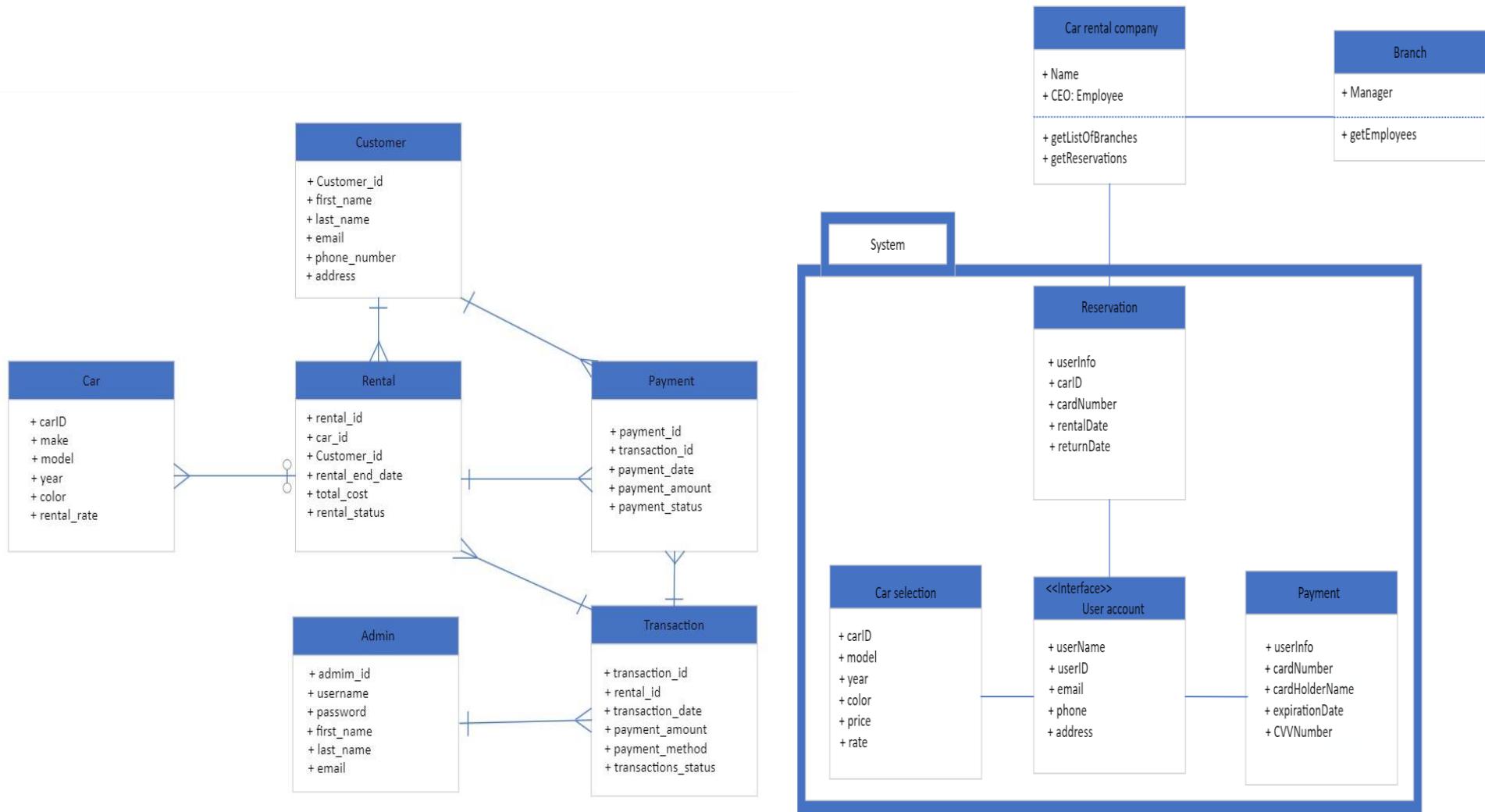
Open issues:
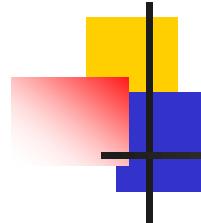
1. What mechanisms protect unauthorized use of the customer's payment information?
2. Is the system's response time during the payment process acceptable given the potential for high traffic?
3. How will the system handle high demand periods where multiple customers may be trying to reserve the same car at the same time?
4. How will the system ensure that the reservation process is user-friendly and intuitive, especially for first-time users?
5. Will the system offer a feature to save customer preferences for future reservations?
6. Will the system provide a feature for customers to modify or cancel their reservation after payment has been made?

Post conditions: The renter's selected car is reserved for the specified rental dates and a confirmation receipt has been sent to the renter's registered email. The reservation details are updated in the system, and the car's availability status is adjusted accordingly.
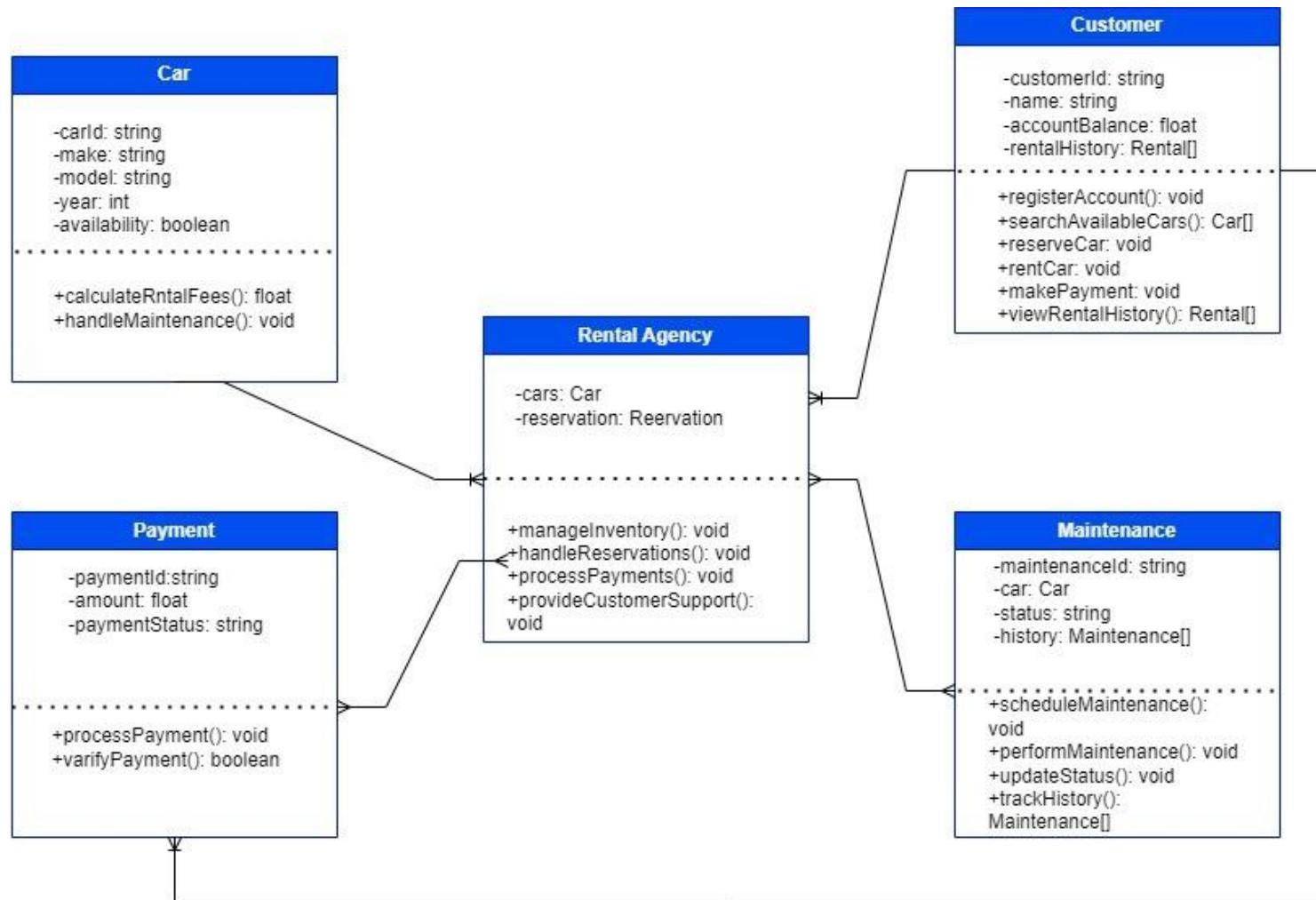
Domain Class Diagram with methods

Car

-carId: string
-make: string
-model: string
-year: int
-availability: boolean

+calculateRntalFees(): float
+handleMaintenance(): void

Customer

-customerId: string
-name: string
-accountBalance: float
-rentalHistory: Rental[]

+registerAccount(): void
+searchAvailableCars(): Car[]
+reserveCar: void
+rentCar: void
+makePayment: void
+viewRentalHistory(): Rental[]

Rental Agency

-cars: Car
-reservation: Reervation

+manageInventory(): void
+handleReservations(): void
+processPayments(): void
+provideCustomerSupport(): void

Payment

-paymentId:string
-amount: float
-paymentStatus: string

+processPayment(): void
+varifyPayment(): boolean

Maintenance

-maintenanceId: string
-car: Car
-status: string
-history: Maintenance[]

+scheduleMaintenance(): void
+performMaintenance(): void
+updateStatus(): void
+trackHistory(): Maintenance[]

Sequence diagram

Use case: Reserve and Pay for Car

State machine diagram

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