**Software Requirements Specification (SRS) for Car Rental System**

**1. Introduction**

The Car Rental System is a web-based application designed to facilitate the car rental process for customers and streamline vehicle management for Car Rental Staff. The system provides an intuitive interface for customers to browse and book rental cars online. It also offers a comprehensive management platform for Car Rental Staff to handle car inventory, rental bookings, and generate reports. The aim is to enhance the overall efficiency and user experience of the car rental business.

**2. Scope**

The Car Rental System encompasses the following key features:

* User Registration and Authentication
* Car Inventory Management
* Rental Booking Management
* Vehicle Status Tracking
* Rental Invoicing and Payment Processing
* Rental Reports Generation
* Admin and Staff Management

**3. Functional Requirements**

**A diagram of a company

Description automatically generated3.1. Use Case Diagram**

**3.2. Use Case Description**

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| **Use Case Number: 1** | | |
| **Name** Rent a Car | | |
| **Brief description:** the process of a Car Renter renting a car from the Car Rental System. The Car Renter interacts with the system to search for available cars, select a car, provide necessary details, and complete the rental process. | | |
| **Actors** Car Renter | | |
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| **Preconditions** | | |
| The Renter is logged in | | |
| **Flows of Events:** | | |
| **1. Basic Flows** | | |
| **1.1.0 Process rent** | | |
| **Step** | **User Actions** | **System Actions** |
| 1 | The Car Renter accesses the Car Rental System through the user interface | The system presents the Car Renter with a search form to find available cars based on criteria such as location, dates, and vehicle type. |
| 2 | The Car Renter enters search criteria and initiates the search. | The system retrieves and displays a list of available cars that match the search criteria. |
| 3 | The Car Renter reviews the list of available cars and selects a car for rental. | The system prompts the Car Renter to provide additional rental details, such as the rental duration and any optional extras (e.g., GPS, child seat). |
| 4 | The Car Renter provides the required details and confirms the rental request. | The system verifies the availability of the selected car for the specified rental duration and generates a rental agreement and presents it to the Car Renter for review. |
| 5 | The Car Renter reviews the rental agreement, including the rental terms, pricing, and any additional fees and confirms rental and agrees to the terms | The system processes the payment transaction securely through the payment gateway. |
| **Postconditions** | | |
| The system confirms the rental reservation and provides the Car Renter with a rental confirmation, including rental details and instructions for car pickup. | | |
| **Business Rules** | | |
| * A car can only be rented if it is available for the specified rental period. * The system will require a security deposit from the Car Renter before the rental period begins. * The rental request is considered valid only after the payment is successfully processed | | |

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| **Use Case Number: 2** | | |
| **Name** Return a Car | | |
| **Brief description:** This use case represents the process of a Car Renter returning a rented car to the Car Rental System at the end of the rental period. The Car Renter interacts with the system to initiate the return process and complete the necessary procedures. | | |
| **Actors** Car Renter | | |
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| **Preconditions** | | |
| The Renter is logged in | | |
| **Flows of Events:** | | |
| **1. Basic Flows** | | |
| **1.1.0 Process return a car** | | |
| **Step** | **User Actions** | **System Actions** |
| 1 | The Car Renter accesses the Car Rental System through the user interface | The system prompts the Car Renter to initiate the return process. |
| 2 | The Car Renter confirms the intention to return the car. | The system retrieves the rental details and presents a checklist of items for the Car Renter to review before returning the car (e.g., fuel level, vehicle condition). |
| 3 | The Car Renter reviews the checklist and completes any necessary actions, such as refueling the car if required. | The system displays the return location to the user with respective directions with a link to google maps. |
| **Postconditions** | | |
| The renter will go to the designated location and returns the car | | |
| **Business Rules** | | |
| * The Car Renter must return the rental car within the agreed-upon rental period. * The system should record the final odometer reading when the car is returned. * The car should be returned in the same condition as documented during the initial rental pick-up. * The rental car should be returned with the same fuel level as provided at the start of the rental period. * The car should be returned to the designated return location specified during the rental agreement. | | |

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| **Use Case Number: 3** | | |
| **Name** Check Availability | | |
| **Brief description:** This use case represents the process of a Car Renter checking the availability of cars for a specific location and rental period. The Car Renter interacts with the Car Rental System to obtain information on available cars that match their desired criteria. | | |
| **Actors** Car Renter | | |
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| **Preconditions** | | |
| The Renter is logged in | | |
| **Flows of Events:** | | |
| **1. Basic Flows** | | |
| **1.1.0 Availability check** | | |
| **Step** | **User Actions** | **System Actions** |
| 1 | The Car Renter accesses the Car Rental System through the user interface | The system presents the Car Renter with a search form to find available cars based on criteria such as location, dates, and vehicle type. |
| 2 | The Car Renter enters the desired location and rental period for the car search. | The system validates the input and initiates the search for available cars and retrieves and displays a list of available cars that match the specified location and rental period. |
| **Postconditions** | | |
| The Car Renter reviews the list of available cars and their corresponding details, such as car models, rental rates, and additional features. | | |
| **Business Rules** | | |
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| **Use Case Number: 4** | | |
| **Name** View Rental History | | |
| **Brief description:** This use case represents the process of a Car Renter viewing their rental history with the Car Rental System. The Car Renter interacts with the system to access details of their past car rentals. | | |
| **Actors** Car Renter | | |
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| **Preconditions** | | |
| The Renter is logged in | | |
| **Flows of Events:** | | |
| **1. Basic Flows** | | |
| **1.1.0 View History** | | |
| **Step** | **User Actions** | **System Actions** |
| 1 | The Car Renter accesses the Car Rental System through the user interface | The system presents the Car Renter with options for various account-related actions. |
| 2 | The Car Renter selects the "View Rental History" option. | The system retrieves and displays the Car Renter's rental history, including past rental dates, car details, rental duration, and total charges. |
| 3 | The Car Renter reviews the list of available cars and selects a car for rental. | The system prompts the Car Renter to provide additional rental details, such as the rental duration and any optional extras (e.g., GPS, child seat). |
| **Postconditions** | | |
| The Car Renter can scroll through the rental history to view additional details or return to the main menu. | | |
| **Business Rules** | | |

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| **Use Case Number: 5** | | |
| **Name** Manage Rental Bookings | | |
| **Brief description:** This use case represents the process of Car Rental Staff managing rental bookings within the Car Rental System. The Car Rental Staff interacts with the system to view, modify, and handle various rental bookings efficiently. | | |
| **Actors** Car Rental Staff | | |
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| **Preconditions** | | |
| The Car Rental Staff member has logged into the Car Rental System with valid credentials. | | |
| **Flows of Events:** | | |
| **1. Basic Flows** | | |
| **1.1.0** | | |
| **Step** | **User Actions** | **System Actions** |
| 1 | The Car Rental Staff member accesses the Car Rental System through the staff portal. | The system presents a dashboard or menu with options for rental booking management. |
| 2 | The Car Rental Staff member selects the "Manage Rental Bookings" option. | The system displays a list of current and upcoming rental bookings, including details such as rental dates, car details, and the names of the Car Renters. |
| 3 | The staff member selects a specific rental booking to view its details and manage the booking. | The system presents detailed information about the selected rental booking, including the Car Renter's contact information, rental duration, car details, and any additional services requested. |
| 4 | The Car Rental Staff member modify the rental booking details based on the Car Renter's request or any necessary changes | The system sends a notification to the Car Renter about any changes made to their rental booking |
| **Postconditions** | | |
| The system sends a confirmation or cancellation email to the Car Renter, along with any updated rental details or refund information. | | |
| **Business Rules** | | |
| * Rental bookings can be modified or updated within a predefined time window before the start of the rental period. * Rental bookings can be canceled within a specified time frame before the rental period begins. * If a customer requests a car upgrade, the system should provide information about available car options, associated costs, and confirmation from the customer before proceeding with the upgrade. | | |

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| **Use Case Number: 6** | | |
| **Name** Manage Inventory | | |
| **Brief description:** This use case represents the process of Car Rental Staff managing the inventory of available cars within the Car Rental System. The Car Rental Staff interacts with the system to track car availability, update car status, and ensure a well-maintained and organized fleet. | | |
| **Actors** Car Rental Staff, Car rental Admin | | |
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| **Preconditions** | | |
| The user must provide correct credentials | | |
| **Flows of Events:** | | |
| **1. Basic Flows** | | |
| **1.1.0** | | |
| **Step** | **User Actions** | **System Actions** |
| 1 | Car Rental Staff, Car rental Admin accesses the Car Rental System through the staff portal. | The system presents a dashboard or menu with options for inventory management. |
| 2 | Car Rental Staff, Car rental Admin selects the "Manage Inventory" option. | The system displays a list of all cars in the rental fleet, including details such as car models, vehicle identification numbers (VINs), availability status, and current location. |
| 3 | Car Rental Staff, Car rental Admin can select a specific car from the inventory list to view its detailed information and manage its status. | The system presents comprehensive car details, including rental history, current status, maintenance records, and any pending or completed service requests. |
| 4 | Car Rental Staff, Car rental Admin can update the availability status of the selected car, marking it as "Available," "In Maintenance," or "Out of Service" based on its current condition. | The system logs all status changes for future reference, fleet tracking and applies the change on the vehicle record. |
| **Postconditions** | | |
| The system sends notifications to relevant staff members about any changes in car status or maintenance requests. | | |
| **Business Rules** | | |

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| **Use Case Number: 7** | | |
| **Name Manage Staff** | | |
| **Brief description:** This use case represents the process of the Car Rental Admin managing staff members within the Car Rental System. The Car Rental Admin interacts with the system to add new staff, update existing staff information, and handle staff assignments and permissions. | | |
| **Actors** Car rental Admin | | |
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| **Preconditions** | | |
| The user must provide correct credentials | | |
| **Flows of Events:** | | |
| **1. Basic Flows** | | |
| **1.1.0** | | |
| **Step** | **User Actions** | **System Actions** |
| 1 | The Car Rental Admin logs into the Car Rental System using their admin credentials. | The system presents a dashboard or menu with options for staff management. |
| 2 | The Car Rental Admin selects the "Manage Staff" option. | The system displays a list of all current staff members, including their names, roles, and contact information. |
| 3 | The Car Rental Admin can sort and filter the staff list based on criteria such as role, department, or status (active/inactive). | The admin can add new staff members to the system by providing essential details, such as name, email, role, and access permissions. |
| 4 | the Car Rental Admin can update the staff member's information or deactivate the staff account or assign specific roles and permissions to staff members based on their responsibilities and areas of work. | The system ensures that staff members have appropriate access privileges to perform their assigned tasks without compromising sensitive data or system settings |
| **Postconditions** | | |
| The system log of staff management actions, recording updates to staff profiles, role changes, and account activations or deactivations and allows the Car Rental Admin to export staff data or reports in various formats for further analysis or record-keeping purposes. | | |
| **Business Rules** | | |

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| **Use Case Number: 8** | | |
| **Name** Generate Reports | | |
| **Brief description:** This use case represents the process of Car Rental Staff generating various reports within the Car Rental System. The Car Rental Staff interacts with the system to generate and access reports containing valuable information about the rental business. | | |
| **Actors** Car Rental Staff, Car rental Admin | | |
|  | | |
| **Preconditions** | | |
| The user must provide correct credentials | | |
| **Flows of Events:** | | |
| **1. Basic Flows** | | |
| **1.1.0** | | |
| **Step** | **User Actions** | **System Actions** |
| 1 | The Car Rental Staff, Car rental Admin member accesses the Car Rental System through the staff portal. | The system presents a dashboard or menu with options for report generation |
| 2 | The Car Rental Staff, Car rental Admin selects the "Generate Reports" option. | The system displays a list of available report types or categories that the staff member can choose from (e.g., rental transactions, revenue analysis, fleet status). |
| 3 | The Car Rental Staff, Car rental Admin selects a specific report type based on the desired information. | The system prompts the staff member to input any necessary parameters for the report (e.g., date range, location, car category). |
| 4 | The Car Rental Staff, Car rental Admin enters the required parameters, or the system may provide default values for commonly used reports. | The system processes the input parameters and generates the requested report based on the selected report type and criteria. |
|  | The Car Rental Staff, Car rental Admin can view the generated report on the system's interface. | The system generates report presented in various formats, such as tables, charts, or graphs, to facilitate data analysis and understanding. |
|  | The Car Rental Staff, Car rental Admin can export the report to various file formats (e.g., PDF, Excel) for further analysis, sharing, or printing. | The system may provide options to schedule and automate regular report generation, allowing the staff member to receive reports periodically (e.g., daily, weekly, monthly). |
|  | The Car Rental Staff, Car rental Admin can save specific reports or report configurations for future reference or reuse. | The system ensures that only authorized staff members can access sensitive or confidential reports by implementing appropriate access controls and permissions. |
| **Postconditions** | | |
| The system generates report based on the staff needs | | |
| **Business Rules** | | |

**3.3. User Management**

The system shall allow customers to register and create user accounts with valid credentials.

Users shall be able to log in securely using their registered email and password.

The system shall support role-based access, distinguishing between customers, Car Rental Staff, and administrators.

**3.4. Car Inventory Management:**

Car Rental Staff shall be able to add new cars to the rental fleet, providing essential details such as car model, make, year, and availability status.

Car Rental Staff shall have the capability to update and maintain vehicle information, including registration details, insurance status, and optional accessories.

The system shall facilitate tracking the location of each car in the rental fleet for efficient inventory management.

**3.5. Rental Booking Management**

Customers shall have access to a user-friendly interface for browsing available cars, viewing car details, and checking rental availability.

The system shall allow customers to select desired rental dates, pick-up and drop-off locations, and optional extras for their booking.

Car Rental Staff shall have the authority to review, modify, and approve rental booking requests based on car availability and user preferences.

The system shall provide timely notifications to customers about the status of their booking and any changes made to the reservation.

**3.6. Rental Invoicing and Payment Processing**

The system shall generate detailed rental invoices for customers, including rental charges, optional extras, and applicable taxes.

Car Rental Staff shall be able to process payment transactions securely through integrated and reliable payment gateways.

The system shall support various payment methods, including credit/debit cards, online wallets, and cash payments (if applicable).

**3.7. Vehicle Status Tracking:**

Car Rental Staff shall be able to update the status of each vehicle (e.g., available, in maintenance, out of service) based on its condition and availability.

The system shall provide real-time updates on vehicle availability and location to avoid overbooking and optimize fleet utilization.

**3.8. Rental Reports Generation:**

The system shall offer a comprehensive reporting module that generates various reports, such as rental transactions, revenue analysis, fleet status, and customer feedback.

Car Rental Staff and administrators shall have access to these reports for business analysis, decision-making, and performance evaluation.

**4. Non-Functional Requirements:**

**4.1 Performance:**

The system shall be designed to handle multiple concurrent users with minimal performance degradation.

Response times for critical operations (e.g., rental booking, payment processing) shall be within acceptable limits to ensure a seamless user experience.

**4.2 Security**

The system shall implement secure authentication mechanisms to protect user accounts and sensitive data.

Payment processing shall comply with industry-standard security protocols to ensure the confidentiality of financial information.

**4.3 Usability**

The user interface shall be intuitive, user-friendly, and responsive across various devices and screen sizes.

Clear error messages and helpful prompts shall be provided to guide users during the booking and registration process.

**4.4 Reliability**

The system shall be reliable, with a robust backup and recovery mechanism to safeguard data in case of system failures or crashes.

**5. Constraints**

The development of the Car Rental System shall be based on the specified technology stack and programming languages.

The system shall comply with all relevant laws, regulations, and data protection policies related to the car rental industry.

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Link for my repository

<https://github.com/Genene/SWE-DE>