Car Rental Management System – Merlion Car Rental

**CaRMS Management Client**

Logical Data Model

The below was our initial conceptualization of the management client and reservation client.

Diagram

Description automatically generated

Figure 1: Logical data model for management client and reservation client

Changes Made to Initial Logical Data Model

A large amount of attributes were modified, such as transportCarAvailability.

Data Initialization

We initialized Category, Employee, Outlet and Partner into our singleton session bean.

EJB Timer

1. Allocating Cars to Current Day Reservation:

The timer will trigger every day at 2am. When it is triggered, the system will retrieve a list of all reservations for that day (using the method retrieveReservationByDate).

1. If the reservation does not contain a specific model, the system will still retrieve a list of all cars under that category. If the car wanted is enabled and not reserved, the possibilities are (in order of priority):
   1. The car is available and in the pickup outlet. The system will then assign the car to that reservation and reservation to that car (according to its bidirectional association), then mark it as reserved.
   2. If the car is reserved but can come back on time to the desired pickup outlet, the system will then assign the car to that reservation and reservation to that car (according to its bidirectional association), then mark it as reserved.
   3. The car is available but not at the desired pickup outlet. In this case, a new dispatch record must be generated.
   4. If the car is reserved and the return outlet is not the desired pickup outlet. In this case, a new dispatch record Is also generated.
2. If the reservation has a specific model, the system will retrieve a list of cars under this (make and) model and category. If car wanted is enabled and not reserved, the possibilities are (in order of priority):
   1. The car is available and in the pickup outlet. The system will then assign the car to that reservation and reservation to that car (according to its bidirectional association), then mark it as reserved.
   2. If the car is reserved but can come back on time to the desired pickup outlet, the system will then assign the car to that reservation and reservation to that car (according to its bidirectional association), then mark it as reserved.
   3. The car is available but not at the desired pickup outlet. In this case, a new dispatch record must be generated.
   4. If the car is reserved and the return outlet is not the desired pickup outlet. In this case, a new dispatch record Is also generated.
3. Generate Transit Driver Dispatch Records for Current Day Reservations:

A dispatch record is generated in the latter possibilities when a car about to be reserved is not at its pickup outlet. A dispatch record is linked to a reservation record. After the operation manager has assigned an employee as the transit driver for the dispatch record, it will be associated with the Employee entity.

Modules

As the management client is being used by employees, it will first authenticate if the user logging in is a registered and verified employee, and then authorize them based on their role.

The management client was split into 3 modules:

1. Sales Manager Module
   1. CRUD for rental rates
2. Operations Manager Module
   1. CRUD for car model
   2. CRUD for car
   3. View Transit Driver Dispatch Records for Current Day Reservations

* Retrieves via current date
  1. Assign Transit Driver:
* After entering the outlet, a list of dispatch records for the day will be shown. The manager will then input the desired dispatch record ID. A list of available employees will then be shown, and the system will assign the employee as the dispatch driver after manager inputs the employee he/she wants. Status of dispatch record will be updated from unassigned to assigned.

1. Customer Service Module
   1. Pickup Car
   2. Return Car

**CaRMS Reservation Client**

Relevant Use Cases

All visitors to the reservation client can become customers, and they have to first register as customers and be logged in to use the reservation client.

1. Search Cars

However, visitors can also search cars to see the list of cars within Merlion. The customer/visitor can search all cars using make and model.

The customer first begins by entering date and time of pickup and return. Afterwards, they enter the pickup and return outlet. Then the system will return whether a car is available (Boolean method).

1. Reserve Cars

The first few steps will be the same as Search. Afterwards, the system will prompt the user whether they want to search by make and model. Then the system will return whether a car is available (Boolean method). The Reservation session bean would then calculate the total cost of the rental. Once calculated, it will check whether the customer already has a credit card associated with him/her. If not, the system will prompt the user to input their credit card details. Afterwards, the system will ask if they want to pay now. If yes: transact and persist reservation. If not: pay at pickup and client will be asked to pay then.

**Holiday Reservation Client**

Logical Data Model

The below was our initial conceptualization of the holiday reservation client.

**Diagram

Description automatically generated**

Figure 2: Logical data model for holiday reservation client

Changes made to Initial Logical Data Model

We removed PartnerCustomer and decided to make Partner an optional attribute of the original Customer entity by associating them.

Relevant Use Cases

A partner can login, using one account shared amongst all the employees of the partner.

1. Partner Search Car
2. Partner Reserve Car

* The details of the customer on the partner’s side are also recorded

1. Partner Cancel Reservation

* The partner will have to pay the same penalty fees