Object Oriented Analysis and Design COSC 4250

Application Design for Swan’s Automobile Dealership

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## Summary

Swan’s Automotive Dealership is an establishment that is designed to sell automobiles and automobile services. They have dealerships all over the country and make their own vehicles. Their current system is outdated and is having difficulty operating efficiently, resulting in lower customer satisfaction. Due to a large amount of employee complaints and lack of sales, management would like new software to be developed for the business. Our goal is to develop a system to replace the current one and solve the problems that the employees are facing to increase efficiency by processing orders in a timely manner, manage inventory effectively, and accurately help salesmen find the wants/needs of customers.

## List of Features

1. **Add Vehicle**
   1. Manager/Employees can add new vehicles and their information to inventory
2. **Add Customer** 
   1. Employees can enter customer information to records
3. **Add Order** 
   1. Employees can send out an order to the factory for a car from a customer
4. **Edit Customer** 
   1. Employees can edit customer information
5. **Calculate Finance** 
   1. Finance manager can use customer financing and other variables to calculate a sales contract for the customer
6. **Add Work Order** 
   1. Technicians can schedule an appointment for a customer to do maintenance on their vehicle
7. **Order Parts** 
   1. Technicians can order automobile parts to be shipped to the dealership
8. **Cancel Order** 
   1. Employees can cancel orders if the customer desires to
9. **Sell Vehicle** 
   1. Manager can declare vehicles that were sold from inventory that they were sold
10. **Trade In Vehicle** 
    1. Employees can get approval from management to be able to trade-in a customer’s vehicle for another one
11. **View Vehicle Information**
    1. Employees can look up vehicle information
12. **Search Vehicles** 
    1. Employees are able to search vehicles in the inventory based on vehicle properties.

## Actors

1. Salesmen
2. Sales Manager
3. Receptionist
4. Finance/Insurance Manager
5. Service Technicians
6. Customers
7. Credit Unions
8. Manufacturer

## Use Cases

|  |  |  |
| --- | --- | --- |
| **USE CASE NAME** | Add Vehicle | |
| **USE CASE #** | 1 | |
| **BRIEF DESCRIPTION** | A process where an automobile gets added to the system. | |
| **PRIMARY ACTOR** | Employee | |
| **SECONDARY ACTOR** | N/A | |
| **PRECONDITIONS** | N/A | |
| **MAIN FLOW** | **Step** | **Action** |
|  | 1 | Employee requests to enter a car in the system |
|  | 2 | System asks for details about the vehicle |
|  | 3 | Employee enters vehicle information |
|  | 4 | If the lot is not full  System displays that the vehicle has entered the system successfully |
|  | 5 |  |
|  | 6 |  |
|  | 7 |  |
|  | 8 |  |
|  | 9 |  |
|  | 10 |  |
| **POSTCONDITIONS** |  | **N/A** |
| **ALTERNATIVE FLOWS** |  |  |
|  | **1** | Lot is full |
|  |  |  |
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| --- | --- | --- |
| **USE CASE NAME** | Add Customer | |
| **USE CASE #** | 2 | |
| **BRIEF DESCRIPTION** | A process where a customer gets added to the system. | |
| **PRIMARY ACTOR** | Employee | |
| **SECONDARY ACTOR** | Customer | |
| **PRECONDITIONS** | N/A | |
| **MAIN FLOW** | **Step** | **Action** |
|  | 1 | Employee requests to enter a customer in the system |
|  | 2 | System asks for details about the customer |
|  | 3 | Customer gives their information to the employee |
|  | 4 | Employee enters the customer into the system |
|  | 5 | System acknowledges customer |
|  | 6 |  |
|  | 7 |  |
|  | 8 |  |
|  | 9 |  |
|  | 10 |  |
| **POSTCONDITIONS** |  | **N/A** |
| **ALTERNATIVE FLOWS** |  | N/A |
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| --- | --- | --- |
| **USE CASE NAME** | Add Order | |
| **USE CASE #** | 3 | |
| **BRIEF DESCRIPTION** | A process where either a part or car is ordered from the manufacturer. | |
| **PRIMARY ACTOR** | Employee or Service Technician | |
| **SECONDARY ACTOR** | Manufacturer | |
| **PRECONDITIONS** | N/A | |
| **MAIN FLOW** | **Step** | **Action** |
|  | 1 | If a customer requests a specific vehicle:  1.1 Employee requests that vehicle from the system  1.1 Technician requests parts to service vehicle from the system |
|  | 2 | System acknowledges the order |
|  | 3 | System sends the order to the manufacturer |
|  | 4 |  |
|  | 5 |  |
|  | 6 |  |
|  | 7 |  |
|  | 8 |  |
|  | 9 |  |
|  | 10 |  |
| **POSTCONDITIONS** |  | An Invoice of the order must be given to the Technician or Employee by the system |
| **ALTERNATIVE FLOWS** |  | N/A |
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| --- | --- | --- |
| **USE CASE NAME** | Sell Vehicle | |
| **USE CASE #** | 4 | |
| **BRIEF DESCRIPTION** | A process where a salesman sells the vehicle to the customer and fills out the proper documentation. | |
| **PRIMARY ACTOR** | Salesman | |
| **SECONDARY ACTOR** | Customer, Finance Manager, Credit Union | |
| **PRECONDITIONS** | Vehicle must be at the dealership | |
| **MAIN FLOW** | **Step** | **Action** |
|  | 1 | If the customer needs a loan to pay for the automobile:   * 1. Salesman hard inquires credit score from the credit union and checks documents   2. Salesman sends credit score and documents to the finance manager for loan approval   3. If the finance manager approves loan:   1.31 Manager approves sale and sends loan plan to customer  1.32 Customer receives automobile  1.33 Salesman confirms sale with the system and automobile is taken off the lot with its sale recorded  1.4 Else: Customer does not get approved, and sale is terminated |
|  | 2 | Else: Customer pays in cash and follows steps 1.32 – 1.33 |
|  | 3 |  |
|  | 4 |  |
|  | 5 |  |
|  | 6 |  |
|  | 7 |  |
|  | 8 |  |
|  | 9 |  |
|  | 10 |  |
| **POSTCONDITIONS** |  | An Invoice of the order is created by the system |
| **ALTERNATIVE FLOWS** |  | N/A |
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| --- | --- | --- |
| **USE CASE NAME** | Edit Vehicle | |
| **USE CASE #** | 5 | |
| **BRIEF DESCRIPTION** | A process where an existing vehicle’s information gets updated. | |
| **PRIMARY ACTOR** | Employee | |
| **SECONDARY ACTOR** | N/A | |
| **PRECONDITIONS** | N/A | |
| **MAIN FLOW** | **Step** | **Action** |
|  | 1 | Employee searches the vehicle in the system that needs to be updated |
|  | 2 | If vehicle is found:  2.1 System pulls up details of vehicle  2.2 Employee makes necessary changes  2.3 System acknowledges changes |
|  | 3 | Else: System displays that this vehicle could not be found |
|  | 4 |  |
|  | 5 |  |
|  | 6 |  |
|  | 7 |  |
|  | 8 |  |
|  | 9 |  |
|  | 10 |  |
| **POSTCONDITIONS** |  | N/A |
| **ALTERNATIVE FLOWS** |  | N/A |
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| --- | --- | --- |
| **USE CASE NAME** | Search Vehicles | |
| **USE CASE #** | 6 | |
| **BRIEF DESCRIPTION** | A process where a list of vehicles is searched in the system based on characteristics. | |
| **PRIMARY ACTOR** | Employee, Customer | |
| **SECONDARY ACTOR** | N/A | |
| **PRECONDITIONS** | N/A | |
| **MAIN FLOW** | **Step** | **Action** |
|  | 1 | Customer or Employee requests to see a vehicle from the system based on a characteristic |
|  | 2 | If vehicles are found:  2.1 System displays vehicles |
|  | 3 | Else System displays that vehicles of those types are not found in the lot or are not in transit |
|  | 4 |  |
|  | 5 |  |
|  | 6 |  |
|  | 7 |  |
|  | 8 |  |
|  | 9 |  |
|  | 10 |  |
| **POSTCONDITIONS** |  | N/A |
| **ALTERNATIVE FLOWS** |  | N/A |
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## Use Case Diagram

Diagram

Description automatically generated

## Requirements and Use Case Connections

Requirements

1. System will add vehicles
2. System will edit vehicles
3. System will add customers
4. System will search vehicles
5. System will record sales of vehicles
6. System will request vehicle orders

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **UC1** | **UC2** | **UC3** | **UC4** | **UC5** | **UC6** |
| **RC1** | **X** |  | **X** |  |  |  |
| **RC2** |  |  |  |  | **X** |  |
| **RC3** |  | **X** |  |  |  |  |
| **RC4** |  | **X** |  |  |  | **X** |
| **RC5** |  |  |  | **X** |  |  |
| **RC6** |  |  | **X** |  |  |  |

## Analysis Classes

|  |
| --- |
| Employee |
| -name: String  -salary: int  -age: int |
| +createEmployee(Name, Salary, Age)  +getName(): String  +getSalary(): int  +getAge: int |

|  |
| --- |
| Customer |
| -name: String  -phoneNumber: String  -address: String |
| +createCustomer(Name, Phone Number, Address)  +getName(): String  +getSalary(): int  +getAddress(): String |

|  |
| --- |
| Order |
| -orderId: int  -item: String  -cost: int  -datePlaced: String  -dateArrival: String |
| +createOrder(item, cost)  +getItem(): String  +getCost(): int  +setArrival()  +getArrival(): String |

|  |
| --- |
| Vehicle |
| -make: String  -model: String  -year: int  -price: int |
| +getMake(): String  +getModel(): int  +getYear(): String  -calculatePrice()  +setPrice() |
| Finance Manager |
| -financePlans – String |
| +getFinancePlan(): String  -getCredit(): int  +calculateLoan(): String |

## Class Diagram with inheritance Diagram, engineering drawing Description automatically generated

## Class Diagram relationships

Employee Relationships

A picture containing text, white

Description automatically generated

Dealership and Automobile RelationshipsCalendar

Description automatically generated

Customer Relationships

Diagram

Description automatically generated

## Classes

|  |
| --- |
| Dealership |
| String name  String address  String phoneNumber |

|  |
| --- |
| Lot |
| int capacity  int numberOfCars |

|  |
| --- |
| Storage |
| int numberOfItems |

|  |
| --- |
| *Employee* |
| Int idd (\*)  String name  Int payRate |

|  |
| --- |
| Service Technician |
| Child of Employee  String role |

|  |
| --- |
| Manager |
| Child of Employee  String phone  String email |

|  |
| --- |
| Salesman |
| Child of Employee  int commission  String phone  String email |

|  |
| --- |
| Financial Manager |
| Child of Employee  String phone  String email |

|  |
| --- |
| Loan Policy |
| Int id(\*)  String details |

|  |
| --- |
| Loan |
| Int id(\*)  String description  Int rate  String time |

|  |
| --- |
| Customer |
| Int id  String name  String phone |

|  |
| --- |
| Work Order |
| String date (\*)  Double price  String description |

|  |
| --- |
| Sale |
| Int id (\*)  Double total  String date |

|  |
| --- |
| *Order* |
| Int id (\*)  Int total  String arrivalDate  String dateOrdered |

|  |
| --- |
| Car Order |
| Inherits from Order  Int deposit |

|  |
| --- |
| Part Order |
| Inherits from Order  String deliveryType |

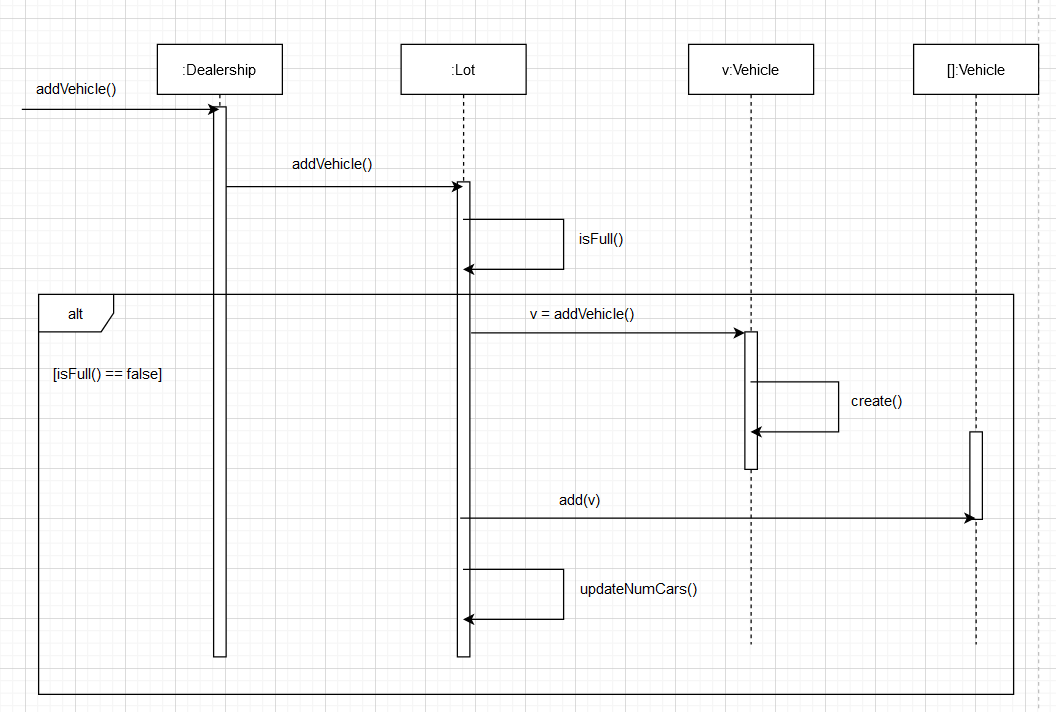
## Controller Classes

|  |
| --- |
| Lot |
| int capacity  int numberOfCars |

|  |
| --- |
| Storage |
| int numberOfItems |

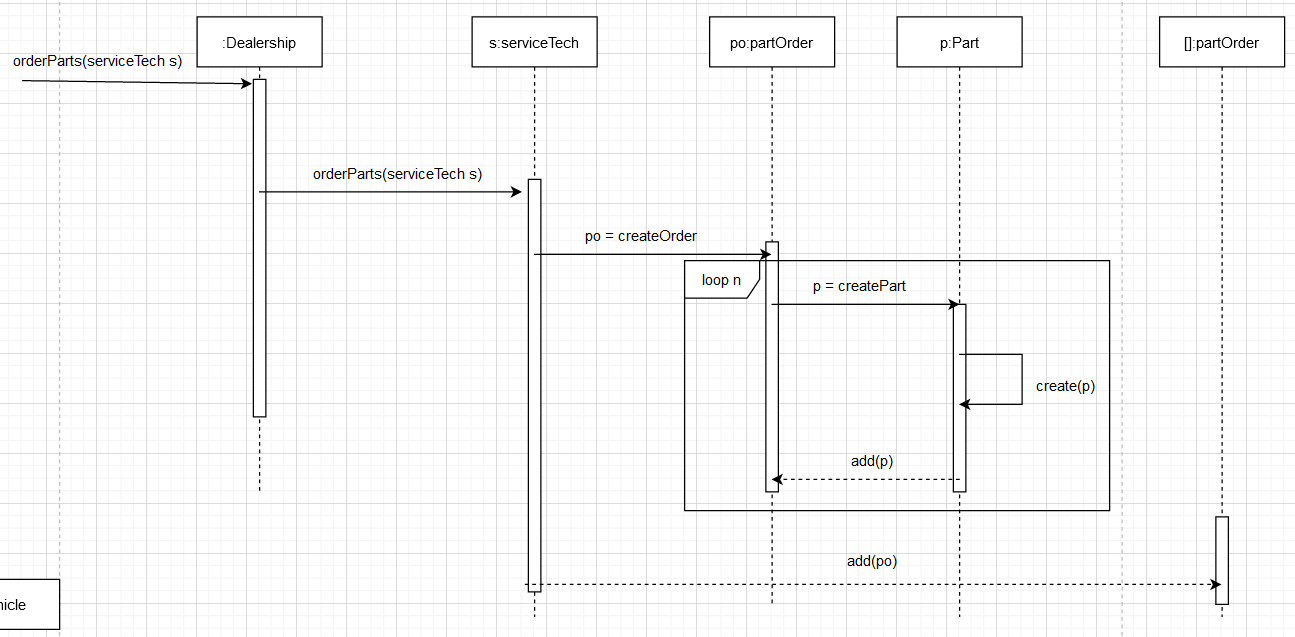
|  |
| --- |
| Dealership |
| String name  String address  String phoneNumber |

## Sequence and Communication Diagrams



Diagram

Description automatically generated



Chart

Description automatically generated

Timeline

Description automatically generated with medium confidence

Diagram

Description automatically generated with medium confidence