**COSC2081 GROUP ASSIGNMENT AUTO168 CAR DEALERSHIP MANAGEMENT SYSTEM**

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## Introduction

**Project Overview:** The Auto136 Car Dealership Management System is a software solution developed for a family-owned car dealership, Auto136, which has been in operation for over 20 years. The system is designed to replace their outdated manual records with a digital platform that efficiently manages their sales transactions, services, auto parts, and customer interactions.

**Objective:** The primary objective of this project is to streamline the internal operations of Auto136, improving the dealership's productivity by automating processes for sales, services, and part management. The system allows employees to manage service appointments, record sales transactions, track inventory, and offer customer support.

## Scope:

* + Sales and services management.
  + Customer information management, including membership programs.
  + Inventory control for cars and auto parts.
  + Roles-based access control for managers, employees, and clients.
  + Reporting and analysis of sales and service data.

## Stakeholders:

* + Manager: Oversees operations, manages employees, reviews transactions and services, and handles inventory.
  + Salesperson: Records sales transactions and handles customer interactions.
  + Mechanic: Manages service operations and records details of services performed.
  + Client: Purchases cars and parts, and requests services.

This document details the project's objectives, technical specifications, implementation details, team contributions, and future considerations.

## Project Description

**System Architecture:** The Auto136 system follows a multi-role architecture that provides role-specific functionalities:

* + **Salesperson role:** Manages sales transactions and views personal sales records.
  + **Mechanic role:** Manages service appointments and records completed services.
  + **Manager role:** Has full access to view, add, update, and delete records of cars, services, parts, and transactions. The manager can also generate reports.

## Core Features:

1. **Inventory Management:**
   * **Cars:** Tracks cars with details like make, model, year, mileage, price, and sale status.
   * **Auto Parts:** Manages auto parts with features like warranty, condition, cost, and manufacturer.
   * **CRUD operations** for adding, updating, and removing cars and parts.

## Sales Transactions:

* + Salespersons can record car and part sales.
  + The system tracks sales, including transaction details like salesperson, client, sale date, and revenue.
  + Clients are upgraded to different membership levels (Silver, Gold, Platinum) based on their total spending.

## Service Management:

* + Mechanics can add and update services, track parts used during services, and calculate the total cost.
  + The manager can calculate service revenue generated by each mechanic over specific time periods.

## User Authentication and Role-based Permissions:

* + Managers, employees (salespersons, mechanics), and clients have distinct access privileges.
  + Permissions control which operations each user can perform.

## Technology Stack:

* **Language:** Java.
* **Database:** Data stored in .OBJ files (cars.obj, transactions.obj, parts.obj, services.obj, users.obj).
* **User Interface:** Command-line interface with role-based menus.
* **External Libraries:** None (as per project constraints).

## Challenges Addressed:

* Managing data integrity for transactions, parts, and services across multiple roles.
* Implementing proper user authentication and permissions.

1. **Implementation Details**

# Key Components:

## Car Management Module:

* + - Car details are stored and managed, with the ability to add, update, and delete car records. The car sales functionality allows salespersons and managers to update the status of cars when they are sold.

## Auto Part Management:

* + - Tracks parts inventory and allows sales of parts with automatic updates to inventory. Discounts are applied based on customer membership level.

## Service Management:

* + - Allows mechanics to log service details, track parts used, and generate reports on service revenues.

## Sales Transactions:

* + - Records sales of cars and parts. The system generates a unique transaction ID and logs details like sale date, client, and salesperson.

## Role-based Menus:

* + - Depending on the user role (manager, salesperson, or mechanic), the system provides specific operations and access to data.

# Key Methods:

* + **sellCarOperation(User user, Scanner scanner):** This method allows a salesperson or manager to sell a car, asking for the car ID and sale date. It updates the car’s status and records the sale in the transactions file.
  + **calculateSalespersonRevenue(salespersonId, startDate, endDate):** This method calculates the total revenue generated by a salesperson within a specified period.
  + **calculateMechanicRevenue(mechanicId, startDate, endDate):** Calculates the revenue generated by a mechanic through services performed during a specified period.

# Error Handling:

* + Input validation for dates, numeric fields, and proper error messages for invalid operations, such as selling unavailable cars or parts.
  + Graceful handling of invalid CSV file formats with detailed error messages for debugging.

## Conclusion

I have managed to complete part of this project by myself, after much research, I find myself more confident in performing different tasks with Java. Hope I will be able to maintain and update this system in the future.