FOP Group Assignment 2023/24

Project 7: LeCars Sales Management System

A. Introduction

Everyone has experienced a buggy system before, right? (Looking at you, MAYA system). Since our LeCars company was just founded in June 2023, we have hired several programmers to write a management system for us. While the look was nice, some essential features were lacking and bugs frequently occurred. Code was messy and new development was difficult with the current codebase. Therefore, the management has planned to scrap the current system and revamp a new one, while keeping existing sales logs for you to import later.

B. Problem Statement

You are required to **develop a sales management system** for a second-hand car company, LeCars. The system will be able to register and log in employees, record and store customer data, receive, record and store sales data, calculate sales insights and allow for different levels of administration (i.e. sales only can insert data, management are able to access insights and generate salary slips etc.)

A sales log will be given to you for the sales before the rewrite of the system, and to ease you to check your calculations of insights with more data availability. The record of customers, record of current employees and record of vehicles will also be given.

The format for the .csv files given will be as follows:

- SALES_LOG(salesId, dateTime, carPlate, custId, employeeId)
- CUSTOMER(custId, custName, phoneNum, postcode)
- EMPLOYEE(employeeId, employeeName, employeeStatus, password)
- VEHICLE(carPlate, carModel, acquirePrice, carStatus, salesPrice)

If employeeStatus of EMPLOYEE is '1', he is under Management access level.

If carStatus for VEHICLE is '1', the car is in stock and salesPrice will be null.

The .csv files are available for download in the following link:

https://github.com/PoisonDarterz/WIX1002_JC/tree/master/fop%20demo

You are not allowed to use a database or a DBMS for this assignment.

C. Basic Requirements (8 marks)

These will be the basic features of this system, and will be essential in the overall function of the system.

Features	Description	Suggestions
Login and Registration [2 marks]	A new user is able to register himself as a sales-level employee in this company by providing a username and initializing a password. An existing user is able to log in with existing credentials. This section should be the main section, i.e. the program should still be able to run after logging out and we can log in with the same/another user without terminating the program. You should also be able to program 2 types of employees with different access: we will discuss which employee gets which access in the features below.	For security purposes, a new user is required to input a secret "key" while registering, which if fails to do so, ends the registration process and terminates the program. You should also be able to store users' credentials offline (or online) so that we do not have to register a user everytime we re-run the program.
Import Data [2 marks]	**This is a feature for Management level employees only.** There are 4 types of data that you should be able to import: Customer, sales and vehicle data – only for the initial import and very occasional use in case of restoring a backup. Employee data – for Management level employee to be able to add more Management level employee (registration is only for Sales level employee.)	Heavy File-I/O usage will be done here, so having a solid understanding of Java File-I/O will be useful here. You can detect the type of data that is going to be inserted, or you can use different options when importing the file (eg. Choose 0 if importing customer data etc.) Do take note that the last field of Vehicle data may be null, so some additional programming may be needed.

Entering New Data [2 marks]	**This is a feature for both Sales and Management level employees.** There are 3 types of data that we are able to enter: Customer data: - Customer ID is automatically incrementally generated. - Customer Name - Phone Number - Postcode Sales data: - Sales ID is automatically incrementally generated. - Date/Time is taken using a method in Java library. - Car Plate - Customer ID - Employee ID is automatically filled in as current logged in user. Vehicle data: - Car number plate - Car model - Acquired price (we are a second hand dealer, right? So, we need to acquire second hand cars in order to sell them) - Car status (Boolean: 0 is sold, 1 is in stock) - Sold price (Can be null)	If you will be using .csv format to store the logs, keep the format the same as the import files to ease the import process. Utilise Object-Oriented Programming concepts will ease management of variables. While this feature is feasible using CLI, I would encourage development of a GUI (which besides ease the usage of the program, also gives you an extra mark under additional features).
View info [2 marks]	**Sales employee can view:** - **Own customer data** - **Own sales records** - **All vehicle data** **Management employee can view:** - **All customer data** - **All sales records** - **All vehicle data** - **All employee data** Of course, if we want to store all of the data, we would want to retrieve it for viewing sometime later right? This section will be for you to retrieve current logs and display them in a tabular form.	The access level might complicate stuff for a little, but you can write a few separate methods and call those methods according to each access level for easier code reading. Different types of info should be displayed in different views, i.e. at one time, only one type of info is being conveyed.

D. Additional Features (4 marks)

There are many options for you to do in this system, but here are a few suggestions for you to look at if you are stuck. Most of these additional features give you much more space to express yourself and "show-off" your programming capability.

Do remember to code your stuff primarily in Java.

Features	Description	Suggestions
Sales Insights [1-2 marks]	**This is a feature for Management level employees only.** This section will be room for you to express your creativity. You may think of some insights that you are able to get from the sales log and try to calculate / visualize it. Simple examples include total or average sales by month, slightly more complex ones include month-to-month or quarterly sales / number of cases growth.	Be more creative here, experiment around and play around with available data. You can also try implementing sorting algorithms before displaying general information.
Company profit margin calculation [1 mark]	**This is a feature for Management level employees only.** We would also like to know our profit margin across a range of time in order to gauge our sales performance as a company. Show us the figures, from raw numbers to even percentages and, if you are capable, future projections of the company's finances.	Remember to take into account all employees' salaries in the calculation of operational expenditure. You can make an assumption of a rough figure for miscellaneous expanses (bills/rent etc.)
Graphical User Interface [1 mark]	The graphical user interface, or GUI is a form of user interface that allows users to interact with electronic devices through graphical icons and audio indicators such as primary notation, instead of text-based UIs, typed command labels or text navigation. (Wikipedia)	Examples include using JavaFX or Swing.

| Salary Calculation

[1 mark] | **This is a feature for Management level employees only.**

Assume each Sales employee has a basic salary of RM1200, and a variable amount of allowance capping at RM250, meanwhile each Management employee has a basic salary of RM2200 and a variable amount of allowance capping at RM350.

Base commission is 1% of car sales price.

The formula for salary would be
Basic + Allowance + Commission. | This is one of the easier features to implement, but ensure your calculations and access levels don't go haywire!

If you nailed this feature, you can try the Employee Bonus one too. |
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| Employee Bonus

[1 mark] | **This is a feature for Management level employees only.**

Who doesn't like incentives, right?

For Sales employees, a flat RM500 bonus will be given to employees who manage to have more than 15 car sales records, or more than RM1 million sales amount within a calendar month.

For Management employees, incremental commission style is used:

Sales Amount (RM)	Comm %
800000.00 or less	1.00
800000.01 – 1600000.00	1.15
1600000.01 – 2500000.00	1.25
2500000.01 or more	1.35
This feature is an extension of Employee Salary feature.

Search and Filter [1 mark]	**This is a feature for both Sales and Management level employees, with some twists.** At first glance, there are three types of records that you can search / apply filters: - Customer record - Employees record - Sales record - Vehicle record Sales employees could be able to search for their own customers and sales records, while Management employees can search for, basically anything. You should be able to search for a range of things, with more than 1 result displayed (if there is more than 1 possible result).	You may recycle some codes for the access levels, and add a layer of search for any field in the record. Example for Sales: search customer name / search car models sold Example for Management: Search for car sales with prices of above RM100,000.

E. Tips and Tricks

1. Version control systems
   Using Git and GitHub for code storage would be very useful in ensuring everyone has the same codebase for development and collaboration.

2. Modularity
   Writing all code in one file is messy, convoluted, unreadable, and unmanageable in the long run. Write separate classes in separate files.

3. File I/O references
   Don't put full file locations (i.e. from C:\Users\user\.....). Use relative file paths so that the external files can be used on multiple devices. What are the chances that everyone's stuff is on C:, and their PC username is the same as yours?

F. Contact Me and my last words

For any questions or clarifications, contact me (Jonas Chuan) via WhatsApp 019-5187978 or e-mail at jc.chuan.0303@gmail.com . This assignment is aimed at ensuring mastery of core concepts of flow control, File I/O and Object Oriented Programming. I hope you guys are able to explore and have a good study of programming fundamentals and be a better programmer by the end of this assignment.