Year 11 Computer Science Transitional Project

Problem Description

You are a freelance software engineer and have been contracted by a car dealership to write them a program to help their sales teams calculate the price of a selected car.

Write a program to do the following:

1. Accept the following: Car model, cost, year of manufacture and emissions
2. If the year is earlier than 2016 then there is no emission discount applied unless the emission is lower than 4 in which case emission discount is 2% of cost
3. All BMW's are model discounted at 5% of cost
4. All other cars are model discounted at 3% of cost
5. Ask the user if the car has extras
6. If the extra is "Silver Paint" then it will add sales extra of 6% of cost
7. If the extra is "Alloy Wheels" then it will add a sales extra of 5% of cost
8. No extras = no sales extra
9. Calculate the final price by subtracting the discounts (model discount and emission discount) from cost and adding sales extra
10. Display: model, cost, year of manufacture, emission discount, model discount, sales extra and final price
11. Save all sales to a file and reload them when the program is restarted

Test Data

Model	Year	Emission	Extras	Cost
BMW	2012	2	Silver Paint	5000
Volvo	2015	4	None	6000
Citroen	2016	6	Alloy Wheels	4000
Citroen	2016	3	None	12000
Ford	2012	4	Alloy Wheels	3500
Tesla	2018	0	Silver Paint	75000

Year 11 Computer Science Transitional Project

Notes

1. Start with an algorithm
2. Create a menu for the tasks
3. Subdivide your program into the following functions/procedures:
    a. AcceptDetails
    b. CalculateDiscount
    c. CalculateTax
    d. Calculate Final
    e. DisplayDetails
4. Include comments in your program to explain how it works
5. Include validation of all manual inputs
    a. length check, format check, type check etc
        i. while loop approach or
        ii. try/except approach
    b. keep inputs as strings first and then convert to ensure program doesn't crash when a number is entered

Extension 1:

The sales person earns commission based on the car model and the value of the extra's.
If the car is a Citroen they earn 2% commission, otherwise it is 1%.
They earn an additional commission on all extra's at a rate of 5%

For each sale, allow the sales person to display the amount of commission they will earn as well as the sales information.

Extension 2:

Allow the salesman to display a list of all the cars they have sold since starting the application along with the total amount of commission they have earned.

Extension 3:

Try to implement using tkinter for example creating a form with input boxes and a submit button for data entry.

Extension 4:

How could you make this application very useful to the owner of the car dealership?

Year 11 Computer Science Transitional Project

Analysis

Variables:

Inputs: model, cost, year, emission, extras

Calculations and Logic:

```
emissionsDiscount = 0
If year < 2016 then
        If emissions < 4 then
                emissionsDiscount = cost * 0.02
        endif
endif

modelDiscount = 0
If model == "BMW" then
        modelDiscount = cost * 0.05
else
        modelDiscount = cost * 0.03
endif

salesExtra = 0
if extras == "Silver Paint" then
        salesExtra = cost * 0.06
else if extras == "Alloy Wheels" then
        salesExtra = cost * 0.05
endif

finalPrice = cost – modelDiscount – emissionDiscount + salesExtra
```

Outputs: model, cost, year, emissionDiscount, modelDiscount, salesExtra, finalPrice

File handling required:

```
fileA = open("filename.dat","r")   # to open a file in read mode
fileA = open("filename.dat","w")   # to open a file in write mode

fileA.read()  # to read the file
fileA.write(<line of content>)   # to write a line of data to a file

fileA.close()  # to close and commit data to the file
```

Success Criteria:

Must work for all the test data listed in the worksheet.
Therefore, I will need to calculate the **Final Price** manually and confirm through testing.

Year 11 Computer Science Transitional Project

Resources:

https://www.w3schools.com/python/default.asp
https://www.youtube.com/user/AdvancedICT
https://techwithtim.net/tutorials/python-programming/

Further Computer Science Bridging Project work

Isaac Computer Science (https://isaaccomputerscience.org/) is a fantastic resource for helping you progress on your computer science journey and they will be running some online booster events during July that will give some insights into various areas of Computing as well as help you prepare for starting your A-Level Computer Science.

Below is some information about the July events:

Discovery events: our large-scale, online events are designed to inspire A level students and inform them about the career possibilities that computer science opens up. Teachers are welcome to attend too!

05 July - Southampton University (online event): find out how important and influential Big Data is to the modern world, from what Netflix suggests you watch to how we use the internet. You will hear about the topic of Big Data from an expert in the field, take part in a workshop where you will have the opportunity to manipulate a dataset, and finish with a panel discussion about studying computer science at university.

Prepare for your A level studies with our GCSE booster events: We are running a special series of booster events this summer for GCSE students to get a head start on studying A level Computer Science.

- **1 July: Programming Concepts**
- **2 July: Networking**
- **6 July: Introduction to Object-oriented programming**
- **7 July: Data Representation**
- **9 July: Boolean Logic**
- **9 July: Computer Systems**

Year 11 Computer Science Transitional Project

PLEASE NOTE: If you are planning to do the Computing course at Kimberley college, but **you have never done any Python coding, you will need to contact Mr Harris urgently so that he can direct you to an online beginners Python course.** His email address is bharris@wootton.beds.sch.uk