

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

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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?

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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.

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Resources:

<https://www.w3schools.com/python/default.asp>

<https://www.youtube.com/user/AdvancedICT>

<https://techwithtim.net/tutorials/python-programming/>

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