

CS/CYCS1120 (Python) –Fall 2023

Programming Project #3

Project Objectives

- Reviewing OOP
- Reviewing Inheritance
- Reviewing File I/O

Project Overview

A store has classified type of cars it is selling as either an imported car or a domestic car. Your program should have one superclass called 'Car' and two other derived classes: 'ImportCar' and 'DomesticCar'. The super class Car keeps the common information like: Brand, Model, Year, Type, and Price.

Two sub classes – ImportCar class and DomesticCar class – must extend the super class Car to save and retrieve general information. In the ImportCar subclass two new data attributes Country and Tax are added to keep information about the export country and importTax (%) of this car. In the DomesticCar class the new data attribute State is added to store the state where the car was produced. No additional tax is levied on domestic cars. All data field's accessibility is 'private'. Define and use the accessor methods to access the private members. The super class is realized by sub classes, when they are created and call the super class, __init__() method as a part of their initializations.

<code>__Brand</code>
<code>__Model</code>
<code>__Year</code>
<code>__Price</code>
<code>__Type</code>
<code>get_brand()</code>
<code>set_brand()</code>
<code>get_model()</code>
<code>set_model()</code>
<code>get_year()</code>
<code>set_year()</code>
<code>get_price()</code>
<code>set_price()</code>
<code>get_type()</code>
<code>set_type()</code>
<code>print_info()</code>

ImportCar
<code>__Country</code>
<code>__Tax</code>
<code>get_country()</code>
<code>set_country()</code>
<code>get_tax()</code>
<code>set_tax()</code>
<code>print_info()</code>

DomesticCar
<code>__State</code>
<code>get_state()</code>
<code>set_state()</code>
<code>print_info()</code>

Project Structure

First Step:

Read all car information from the input file (carsInStock.txt) and save it to the correct type of object. In the input file each line will start with either 'I' or 'D' to indicate the classification of the car. You should use lists to save the information about the current collection of cars. Example of 2 lines in the carsInStock.txt and carsExpectedToArrive.txt files are:

```
D Ford F150 2002 17000 Truck MI
I Toyota Camry 2004 20000 Sedan Japan 10
```

"D" indicates a domestic car, and you have to use a DomesticCar object to store its information.
"I" indicates an imported car, and you have to use an ImportCar object.

Output would be a listing of cars in the carsCategoryWise.txt file and console as follows:

Imported Cars:

```
Toyota Camry 2014 20,000.00 Sedan Japan 10% BMW 325i 2013 30,000.00
Sedan Germany 8% Toyota LexusRX30 2015 42,000.00 Sedan Japan 10%
```

Domestic Cars:

```
Ford F150 2012 17,000.00 Truck MI
Chrysler Pacifica 2013 18,000.00 Sedan TX
Chevrolet TahoeLS 2010 7,000.00 Coup TX
Chevrolet Silverado 2011 10,000.00 Van MI
Ford Econoline 2012 16,000.00 Sedan MI
```

```
Number of imported cars = 3
Number of domestic cars = 5
Total = 8
```

Note: Make sure that you are using polymorphism to call the `print_info()` method.
appropriate `print_info()` method
The `print_info()` method in the subclasses should be redefined to override the
in the superclass.

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Second Step:

Add the new cars from the input in carsExpectedToArrive.txt file to the existing list. For example, cars expected to arrive may be

```
I Toyota Avalon 2012 14000 Sedan Japan 10
D Ford Mustang 2010 19000 Sedan MI
I Honda AccordEX 2013 12500 Coup Japan 5
```

Again, print the new list of cars as in Step 1.

Third Step:

For all domestic cars increase their base price by adding 15% to each of them. Since the car market seems to be flooded with Japanese cars, Govt XYZ levies an additional import tax of 5% for cars imported from Japan, so update their tax by adding 5%. In order to do this you MUST create methods in the corresponding classes. Print the list of these cars again with the final pricing and the possibly increased import tax as done in Step 1.

Imported Cars

Toyota Camry 2014 20,000.00 Sedan Japan 15% BMW 325i 2013 30,000.00 Sedan
Germany 8% Toyota LexusRX30 2015 42,000.00 Sedan Japan 15% Toyota Avalon 2012
14,000.00 Sedan Japan 12% Honda AccordEX 2013 12,500.00 Coup Japan 12%

Domestic Cars

Ford F150 2012 19,550.00 Truck MI
Chrysler Pacifica 2013 20,700.00 Sedan TX
Chevrolet TahoeLS 2010 8,050.00 Coup TX
Chevrolet Silverado 2011 11,500.00 Van MI
Ford Econoline 2012 18,400.00 Sedan MI
Ford Mustang 2010 11,500.00 Sedan MI

Number of imported cars = 5

Number of domestic cars = 6

Total = 11

Fouth Step:

print the list of all cars in the store whose price is less than or equal to \$15000. Make sure that your list's format matches the example below and ordered by price: low to high:

Filter price less than: 15000.0

Toyota Avalon 2012 14,000.00 Sedan Japan 12% Honda AccordEX 2013
12,500.00 Coup Japan 12% Chevrolet Silverado 2011 11,500.00 Van MI
Ford Mustang 2010 11,500.00 Sedan MI
Chevrolet TahoeLS 2010 8,050.00 Coup TX

Number of cars = 5

Total price of cars in the Stock: \$236,464.80

Note that the price total includes the sales tax of 6% and an import tax. if

any. Deliverables

- Submit a .zip file that contains all your files (CS1120_Proj04_LastName.zip), including:
 - o Program files
 - o I/O files
- Provides this information in every file in your project:
 - # Project No.:
 - # Author:
 - # Description:

NOTE : You may submit beyond the due date but your submission date/time will be recorded. The penalty for late submissions as stated in the course syllabus will be applied in grading any assignment submitted late.

Design Requirements

You MUST use Inheritance and polymorphism for this project. Your program should have one superclass called 'Car' and two other subclasses: 'ImportCar' and 'DomesticCar', which includes the attributes, methods for filling, updating and printing them.

You should have a separate class containing your main() method, which is the tester of your project.

Design Hints

You may want to use two lists to save car's information. Also, it is possible to have two counters to keep the total number of imported cars and total number of domestic cars loaded.

Additional Requirements

Coding Standards: You must adhere to all conventions applicable to writing programs. This includes the use of white spaces and indentations for readability, the use of comments to explain the meaning of various methods and attributes, and the conventions for naming classes, variables, method parameters and methods.

Example Output

See a sample report below. Use the EXACT format/wording/spacing/labeling/... shown in sample. (use EXACT format – and NO HARDCODING of the data itself)

Welcome to Domestic/Imported Cars Application

Step One:

Please enter a file name (with information about Cars in Stock):
carsInStock.txt Input file name for Cars in Stock: carsInStock.txt

Imported Cars

ToyotaCamry2014 20,000.00 Sedan Japan10%
BMW325i2013 30,000.00 Sedan Germany8%
ToyotaLexusRX30 2015 42,000.00 Sedan Japan10%

Domestic Cars

FordF1502012 17,000.00 Truck MI
Chrysler Pacifica 2013 18,000.00 Sedan TX
Chevrolet TahoeLS 2010 7,000.00 Coup TX
Chevrolet Silverado 2011 10,000.00 Van MI
FordEconoline 2012 16,000.00 Sedan MI

Number of imported cars = 3
Number of domestic cars = 5
Total = 8

Step Two

Please enter a file name (with information about Cars expected to arrive):
carsExpectedToArrive.txt Input file name for Cars expected to arrive:
carsExpectedToArrive.txt

Imported Cars

ToyotaCamry2014 20,000.00 Sedan Japan10%
BMW325i2013 30,000.00 Sedan Germany8%
ToyotaLexusRX30 2015 42,000.00 Sedan Japan10%
ToyotaAvalon2012 14,000.00 Sedan Japan7%
HondaAccordEX 2013 12,500.00 Coup Japan7%

Domestic Cars

FordF1502012 17,000.00 Truck MI
Chrysler Pacifica 2013 18,000.00 Sedan TX
Chevrolet TahoeLS 2010 7,000.00 Coup TX
Chevrolet Silverado 2011 10,000.00 Van MI
FordEconoline 2012 16,000.00 Sedan MI
FordMustang 2010 10,000.00 Sedan MI

Number of imported cars = 5
Number of domestic cars = 6
Total = 11

Step Three

Imported Cars

ToyotaCamry2014 20,000.00 Sedan Japan15%
BMW325i2013 30,000.00 Sedan Germany8%
ToyotaLexusRX30 2015 42,000.00 Sedan Japan15%
ToyotaAvalon2012 14,000.00 Sedan Japan12%
HondaAccordEX 2013 12,500.00 Coup Japan12%

Domestic Cars

FordF1502012 19,550.00 Truck MI
Chrysler Pacifica 2013 20,700.00 Sedan TX

File - CarTester

Chevrolet TahoeLS 2010 8,050.00 Coup TX
Chevrolet Silverado 2011 11,500.00 Van MI
Ford Econoline 2012 18,400.00 Sedan MI
Ford Mustang 2010 11,500.00 Sedan MI

Number of imported cars = 5
Number of domestic cars = 6
Total = 11

Filter price less than: 15000.0
Chevrolet TahoeLS 2010 8,050.00 Coup TX
Chevrolet Silverado 2011 11,500.00 Van MI
Ford Mustang 2010 11,500.00 Sedan MI
Honda AccordEX 2013 12,500.00 Coup Japan 12% Toyota Avalon 2012
14,000.00 Sedan Japan 12%

Number of cars = 5

Total price of cars in the Stock: \$236,464.80

Process finished with exit code 0