CS/CYCS1120 (Python) –Fall 2022

Programming Project #4

Due Date (Two-week Project) 200 points	
Tuesday Labs	**10/25/22 @ 11:59pm**

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.

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

ImportCar
__Country __Tax
get_country() set_country() get_tax() set_tax() print_info()

DomesticCar
__State
get_state() set_state() print_info()

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 carsCatagoryWise.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 appropriate print_info() method. The print_info() method in the subclasses should be redefined to override the print_info() method in the superclass.

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:
  - Program files
  - 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
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

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
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%
Toyota        Avalon        2012   14,000.00   Sedan     Japan          7%
Honda         AccordEX      2013   12,500.00   Coup      Japan          7%

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
Ford          Mustang       2010   10,000.00   Sedan     MI

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

Step Three

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

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
```