CMPT 1020

Midterm Exam 1

Summer 2020

TIME LIMIT: 120 MINUTES

Last Name: _____

First Name: _____

Student ID: _____

Total Points: _____ /25

WRITING CODE:

No comments or named constants are required.

Question 1- (17 marks = 10 marks for class definition and 7 marks for main function)
Upload this program as Q1.cpp
Define a class for Money with three integer member variables:

- dollars (a non-negative integer)
- cents (an integer number between 0-99)
- a static variable named counter that stores the number of objects.

Your class definition must include the following 11 functions:

- three accessors and two mutators (1 mark)
- one input function (1 mark) with input validation for dollars and cents (0.5 mark)
- one output function (that shows the Money with this format $17.08) (0.5 mark)
- default constructor that initializes an object to $0.0 (0.5 mark)
- one constructor which receives one integer number and uses the received argument as dollars, then, sets the cents to 0 (0.5 mark)
- one constructor that receives two integer arguments (0.5 mark)
- one destructor that updates the number of objects (0.5 mark)

Overload these operators, you must use non-member (non-friend) function definitions for operator overloading.

- + (addition of two Money objects)
- - (subtraction of two Money objects),
- * (multiplication of a Money object and an integer number)
- = =
- <
- >

(1 mark for each operator)

Write a main function.

1- Your main function declares an array of ten Money objects (let's name the array A). (0.5 mark)
2- Your main function then declares one individual Money object (let's name it X). (0.5 mark)
3- These objects (elements of array A and the individual object X) are initialized by the user using input function. (1 mark)

4- Your program uses the overloaded = = operator to search for the individual object X in the array A. That means your programs determines the number of the array elements which are equal to X and displays the number. (2 mark)
5- Your program also shows the number of elements in the array A which are greater than X. (1 mark)
6- Your main function declares another object named SUM. Your main function will initialize this object with appropriate value. (0.5 mark)
7- Your main function uses overloaded + to calculate sum of all elements of the array and stores the result in SUM. Then SUM is displayed using output function. (1 marks)
8- Your program also displays the number of Money objects that are used in the main function (0.5 mark)

Question 2- (8 marks = 6 marks for class definition and 2 marks for main function)
Upload this program as Q2.cpp

Copy and paste the money class you defined in Question 1.

Define a class named Inventory with these member variables:
- retailer: a string that is used to store the name of retailer (such as Walmart)
- capacity: maximum number of items (an integer)
- numItems: actual number of items (an integer)
- itemNames: a pointer to string (which is used for an array with names of the items sold at the retailer)
- prices: A pointer to Money (which is used to create an array of prices of the items sold at the retailer)

Member function include:

- 3 accessor functions (for the first three member variables)
- 1 mutator functions (for retailer)
- Default constructor that sets: retailer=Walmart, capacity=100, numItems=0 and allocates memory for itemNames and prices
- A constructor that accepts: retailer, and capacity. It set numItems=0 and allocates memory for for itemNames and prices
- A destructor to free allocated memory for itemNames and prices
- A function named add which adds an item (1 mark)

- A function named display (to display all available items and their prices), this function has no input argument (1 mark)

There is no need for any other member function such as removing or sorting items. Write a test main function that adds 3 items and displays available items at the store.