Object-Oriented Programming
Assignment 2 (100 Marks)

Cairo University, Faculty of Computers and Artificial Intelligence

Instructions

1- Students will form teams of **2** students **from the same group.**
2- Deadline of submission is **Saturday Dec.4th at 11:55 pm.**
3- Submission will be on Blackboard.
4- No late submission is allowed.
5- No submission through e-mails.
6- You will write a cpp file with the name GroupNum_firstStudentID_SecondStudentID.cpp . **No folders or zip or rar files are allowed**. ZIP/RAR submissions will receive a **zero**. Students who attend the same lab slot can form a group like S7 and S8. In this case name the file with any of the 2 groups (S7 or S8 for ex.).
The group number CAN ONLY BE from S1 to S40.
For example if you have an ID 20202020 and in group S1 and your partner has the ID 19191919 and in group S2, then your cpp file will have the name S1_20202020_19191919.cpp . The character separating the group name and the ids is an Underscore character. Do not use any other characters like a space, a dash, or a bracket,…etc.

7- **In case of Cheating you will get a negative grade whether you give the code to someone, take the code from someone/internet, or even send it to someone for any reason.**
8- You have to write clean code and follow a good coding style including choosing meaningful variable names.

Task
Online Shopping System

Using classes and arrays, the team will develop a set of functions for an online shopping system. The system is represented by the following structure:

1- Class **Item** having the following private attributes: (ID, name, quantity, price) and the following public methods:

- Constructors (default, parameterized, and copy)
- Setters & Getters
- Operator overloading for the ==, +=,-=, >> and << operators

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Note that the ID member variable is not entered or read from the user. It is automatically set by the class as a serial ID starting with the first item of ID 1 and incrementing with every new object.

2- Class **Seller** having the following private attributes: (name, email, items,maxItems), where items is a dynamic array of objects of type Item with the size maxItems. The class has the following public methods:

- Constructor (parameterized)
- Operator overloading for the >> and << operators
- Add An Item.
    - This will take an Item object as a parameter:
    - If the item already exists in the seller's items you will increase the item's quantity by the quantity of the parameter item using the (+=) in Item class, and the price of the parameter object will be ignored. Use the == operator for this where an item is equal to another if they have the same name.
    - Else you will add it to the seller's items.
    - The member function should return a boolean that indicates the successful addition of item, which will succeed if there is a place in the array and fail otherwise.
- Sell An Item.
    - This will take an item name and a quantity as parameters
    - If the quantity is <= item's quantity you will decrease it from item Using the (-=) in Item class.
    - Else you will print him "There is only {quantity} left for this item".
    - The member function should return a boolean which is true if the item was found, false otherwise.
- Print Items.
    - This will print all the item information for the seller.
    - You will print each item using the (<<) operator.
- Find an Item by ID
    - This returns an Item object (or a pointer to Item) with the specified ID if there is an item with such ID.

- Destructor

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3- In the main function,

- First you'll ask the seller to input his details using the (>>) operator in Seller class.
- Then you'll ask him for his store capacity (maxNumberOfItems).
- Then you will show him a menu to choose from which have the following options:
    1. Print My Info.
        a. This will print the seller info using the (<<) operator in Seller class.
    2. Add An Item.
    3. Sell An Item.
    4. Print Items.
    5. Find an Item by ID
    6. Exit

Writing Good Quality Code

No program stays the same. It will need to change to fix bugs, add new features, etc. So,
It is very important to write high quality readable code, so that you or other developers can be able to review and modify this code in the future. In this task, you will:

1. Add a header to your program saying who the author is, the purpose of the program, etc.
2. Add a header for every function explaining what it does, what parameters it takes
   and what value it returns.
3. Write the code following C++ coding style.
   http://geosoft.no/development/cppstyle.html
4. Add comments to any part that is difficult to understand.

Grading criteria (Total 100 marks)

1- Good Quality Code (10 marks)
2- Class Item (25) :
    Constructors(5)

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Setter and getters(5)
Overloaded functions(15)

3- Class Seller (45):
Constructor(5)
Overloaded >> and << (6)
Print Info (3)
Add Item (9)
Sell Item (9)
Print Items (5)
Find an item by ID (6)
Destructor (2)

4- Menu in Main (20)