Final Exam - Programming Exercise

Start Assignment

Due Friday by 11:59pm **Points** 60 **Submitting** a text entry box or a file upload
Available May 14 at 12am - May 27 at 11:59pm 14 days

C++ Project Name: CS150_FinalExam_ComputerDepot

In this assignment, you will be creating a C++ console application to maintain an inventory of computers and laptops for a fictional company named ComputerDepot. You will be creating 2 classes to represent this data, the Computer (Computer.h/Computer.cpp) base class and the Laptop (Laptop.h/Laptop.cpp) derived class.

****Please begin by downloading and extracting the attached* CS150_FinalExam_ComputerDepot.zip (https://miracosta.instructure.com/courses/28925/files/6201537/download?download_frd=1) *file****

Problem Statement: In this exercise, you will be utilizing a menu-driven console application in C++ to demonstrate knowledge of the recent content from CS 150, including object-oriented programming with inheritance. Inside the project, the ComputerDepot.cpp file will display a menu, similar to the one below:

```
**************************************************************************
**                  Welcome to the Computer Depot                       **
**************************************************************************
** Please enter choice :                                                **
** 1) Add computer to inventory                                         **
** 2) Display entire inventory                                          **
** 3) Quit                                                              **
**************************************************************************
```

For the first part of this exercise, you will be implementing and testing two classes, using inheritance. The base class is named Computer and the derived class is named Laptop. Here are the specifications:

Create a base class called Computer, with both a header file (.h) and implementation file (.cpp). Be sure to include #ifndef, #define and #endif preprocessor directives where appropriate.

Computer: This is the parent (base) class. Here are the specifications:

[2 points] Member Variables (accessible to all dervied classes):

m_id - an int used to store the id of the computer (which must be unique)
m_make - a string used to store the make of the computer (e.g. Apple)
m_model - a string used to store the make of the computer (e.g. iMac Pro)
m_price - a double used to store the computer's price (e.g. 4499.00)

Static Variable:

[2 points] s_nextId - an int used to store the next id number to assign to a computer. The first computer should have an id of 100, the second computer should be 101, etc.

Member Functions:

[2 points] Computer( ) - default constructor which assigns the id to 0, make and model to an empty string and price to 0.0
[3 points] Computer(string make, string model, double price) - parameterized constructor which assigns the order number to a unique number, then initializes make, model and price.

[2 points] Accessors for all member variables. Be sure to promise C++ the object will not change.

[2 points] Mutators for all member variables (except m_id, since this number is unique and should never be changed. Do not provide a setId mutator function)

[5 points] Overload the equality == operator so that all member variables are compared for equality between two Computer objects

[6 points] Overload the stream insertion << operator (used for cout) so that a Computer object can be printed as shown in the screen shots below. For example:
Notice: the widths are 6 for id, 7 for make, 15 for model and 8 for price. Use setw() to accomplish this task.

"|100 |Apple |iMac Pro |4499.00 |"

Next, define a class named Laptop with both a header file (.h) and implementation file (.cpp). It should be derived from the Computer class. Be sure to include #ifndef, #define and #endif directives where appropriate.

Laptop: This is the child (derived) class. Here are the specifications:

[1 point] Member Variables:

m_batteryLife - a double used to store the battery life (in hours)
m_weight - a double used to store the laptop weight (in pounds)

Member Functions:

[2 points] Laptop( ) - default constructor which assigns the id to 0, make and model to an empty string and all others to 0.0
[3 points] Laptop(string make, string model, double price, double batteryLife, double weight) - parameterized constructor which assigns the id number to a unique number, then initializes all other member variables.

[2 points] Accessors for all member variables. Be sure to promise C++ that member variables will not change.

[2 points] setBatteryLife - modifies the value of m_batteryLife
setWeight - modifies the value of m_weight

[6 points] Overload the stream insertion << operator (used for cout) so that a Laptop object can be printed as shown in the screen shots below. For example:
Notice: the widths are 6 for id, 7 for make, 15 for model, 8 for price, 15 for battery life and 15 for weight. Use setw() to accomplish this task.

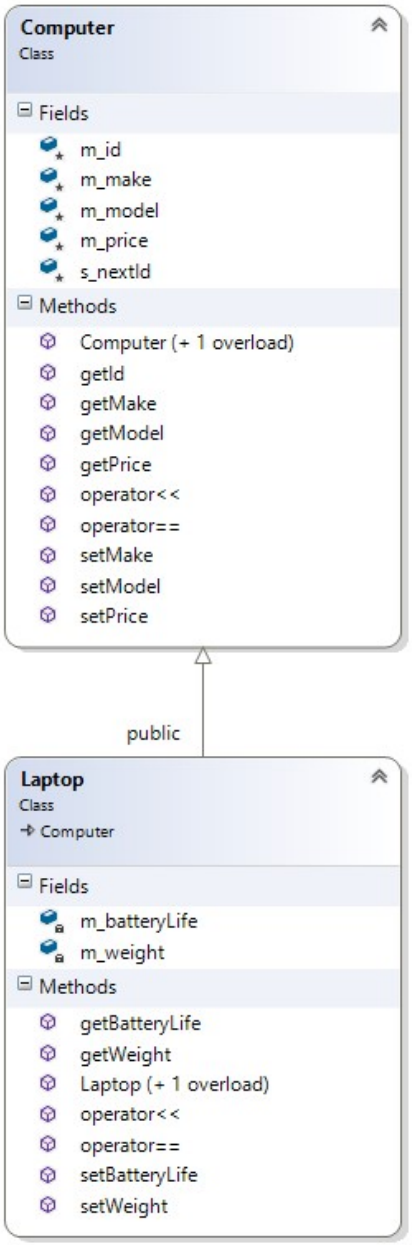
"|103 |Huawei |MateBook Pro X |1199.99 |15.0 | 2.9 |"

Finally, open the **ComputerDepot.cpp** file, and accomplish the following

[4 points] Create two arrays to store the inventory of Computers and Laptops:
One array should store Computer objects
One array should store Laptop objects
Be sure to keep counters for the number of items in each array

[6 points] If the user chose option 1, create a new Computer object and add it to the array.
[6 points] If the user chose option 2, create a new Laptop object and add it to the array.
[4 points] When the user chooses to display entire inventory, first loop through the Computer array and cout (display) each object, then loop through the Laptop array and cout (display) each object.

Below is a class diagram, visually explaining the specifications above.



Below are screen shots demonstrating the expected output.

```
**************************************************************************
**                  Welcome to the Computer Depot                       **
**************************************************************************
** Please enter choice :                                                **
** 1) Add computer to inventory                                         **
** 2) Display entire inventory                                          **
** 3) Quit                                                              **
**************************************************************************
1
Enter 1 for Computer or 2 for Laptop >> 1
Enter make               >> Apple
Enter model              >> iMac Pro
Enter price              >> $4499.00

**************************************************************************
**                  Welcome to the Computer Depot                       **
**************************************************************************
** Please enter choice :                                                **
** 1) Add computer to inventory                                         **
** 2) Display entire inventory                                          **
** 3) Quit                                                              **
**************************************************************************
1
Enter 1 for Computer or 2 for Laptop >> 1
Enter make               >> Dell
Enter model              >> Inspiron
Enter price              >> $599.99

**************************************************************************
**                  Welcome to the Computer Depot                       **
**************************************************************************
** Please enter choice :                                                **
** 1) Add computer to inventory                                         **
** 2) Display entire inventory                                          **
** 3) Quit                                                              **
**************************************************************************
1
```

```
Enter 1 for Computer or 2 for Laptop >> 2
Enter make               >> Apple
Enter model              >> MacBook Pro
Enter price              >> $1299.99
Enter battery life (hrs) >> 10
Enter weight (lbs)       >> 3.0

**************************************************************************
**                  Welcome to the Computer Depot                       **
**************************************************************************
** Please enter choice :                                                **
** 1) Add computer to inventory                                         **
** 2) Display entire inventory                                          **
** 3) Quit                                                              **
**************************************************************************
1
Enter 1 for Computer or 2 for Laptop >> 2
Enter make               >> Huawei
Enter model              >> MateBook Pro X
Enter price              >> $1199.99
Enter battery life (hrs) >> 15
Enter weight (lbs)       >> 2.9

**************************************************************************
**                  Welcome to the Computer Depot                       **
**************************************************************************
** Please enter choice :                                                **
** 1) Add computer to inventory                                         **
** 2) Display entire inventory                                          **
** 3) Quit                                                              **
**************************************************************************
2

**************************************************************************
**                          Entire Inventory                            **
**************************************************************************
| Id # | Make   | Model          | Price   | Battery (hrs) | Weight (lbs)  |
**************************************************************************
|100   |Apple   |iMac Pro        |4499.00 |
|101   |Dell    |Inspiron        |599.99  |
|102   |Apple   |MacBook Pro     |1299.99 |10.0           |3.0            |
|103   |Huawei  |MateBook Pro X  |1199.99 |15.0           |2.9            |

**************************************************************************
**                  Welcome to the Computer Depot                       **
**************************************************************************
** Please enter choice :                                                **
** 1) Add computer to inventory                                         **
** 2) Display entire inventory                                          **
** 3) Quit                                                              **
**************************************************************************
```

Attachments

- **CS150_FinalExam_ComputerDepot.zip** (https://miracosta.instructure.com/courses/28925/files/6201537/download?download_frd=1)

When you're finished, please upload each C++ file (*.cpp files & .h file) and screenshot (*.jpg or *.png files) here on

Canvas. Make sure you submit MULTIPLE screenshots of your project running.

Please be sure to follow the CS 150 Code and Algorithm Style Sheet for full credit.