ENGR:2730 Computers in Engineering
Bell and Christensen, Spring 2022, Homework #6

Deadline: Wednesday, April 6, 2022 by 11:59pm
Early turn in bonus deadline: Monday, April 4, 2022 by 11:59pm

In this homework, you will practice writing copy constructors, copy assignment operators, destructors and inheritance. Download hw6 from the _Public directory to your homework directory.

[20pts] Document all parts of the existing program and all code that you add to the program.

[80pts] For this part, you must keep the original instructions of the main at the top of the main. Add new code to main after the original code that tests each feature that you add to your program. Use the print functions defined in steps 6 & 7 to test your code in steps 3, 5, 8-9 and 12-13. The original main program should work without any changes to it as it did before you started modifying the code. Your program must be free of memory leaks. Your program should not crash or end because of a segmentation fault.

1. Change the program so that all objects are passed to functions using constant aliases.
2. Change **cpuUsage** and **internetStatus** from protected to private variables in the **Computer** class. This will break your code.
3. Add getters and setters to the **Computer** class for all the member variables and then use them in the **Laptop** class to make the code compile and run.
4. Add a private float pointer member variable called **memorySize** to the **Computer** class. Important: make sure to initialize **memorySize** to the **nullptr**. Assume this number is in Gbytes.
5. Add a getter and setter to the **Computer** class for **memorySize.** The getter should return the floating-point value that **memorySize** points to if **memorySize** is not the nullptr or zero otherwise. The setter should take a float as an input parameter. Model your code on the example in Participation Activity 9.10.1 in your textbook. The setter should allocate memory for **memorySize** if it is a **nullptr**. If the new command returns the nullptr, then the setter should call return without doing anything.
6. Modify the **print()** function in the **Computer** class so that it prints the values of all its member variables.
7. Modify the **print()** function in the **Laptop** class to use the **print()** function in the Computer class to print the values of all its member variables.
8. Add an **explicit** constructor to the **Computer** class that has default values for all member variables. This constructor must allocate memory to store the **memorySize** and then set this value to 0. Hint: use getters and setters.
9. Add an explicit constructor to the **Laptop** class that has default values for all the member variables. This constructor must use the initializer list to pass the parameters to the **Computer** class constructor.
10. Add a destructor to the **Computer** class that (1) prints that you are in the **Computer** destructor, (2) calls **print()** to print out the information of the object being destroyed and (3) frees the **memorySize** memory.
11. Add a destructor to the **Laptop** class that (1) prints that you are in the **Laptop** destructor and (2) calls the **print()** to print out the information of the object being destroyed.
12. Add a copy constructor to the **Computer** class. Hint: use getters and setters.
13. Add a copy assignment operator to the **Computer** class. Hint: use getters and setters.

Submission Instructions
You must make a CLion project called "hw6" under your SVN homework directory. Check your homework into SVN.

Hint: you can see the current version of your submission by opening this link in a web browser:
https://class-svn.engineering.uiowa.edu/cie/projects/spring2022/