COSC 1430 - Homework 4: Classes

1 - Objective

Construction of a class with various features, paired with the use of a dynamic array.

2 - Problem

For this assignment, you will need to turn in **3 files: main.cpp, class.h, and class.cpp.** These should be turned in your home directory on the **the server**. Do NOT make a separate homework 4 folder and store it in there. Also, make sure that no other .cpp files or other unnecessary files in your home directory. If you have other programs or files, make a new directory and store the other programs in there. Make sure your code compiles and runs on the server.

2.1 - Class

You will need to make a class named **stopwatch** with the attributes **hour, minute, and second. You need to declare them as private members.**
Your class will need to contain two constructors, a default that will set the classes attributes to 0, and a constructor that takes three arguments to set hour, minute and second.

2.2 - Main Program

Your main program should ask the user how many times they wish to enter and then create a dynamic array based on that input. The user should then be asked to enter the data for the time objects that will be stored in the array. If the user enters a value outside of the ranges for one or more of the attributes (i.e., negative for hours, negative or >60 values for minutes or seconds), the default constructor should be called.

Once the array has been completed, the user should be presented with a menu with three options: 1) Print the Individual Stored Times, 2) Print the Total Time, 3) Exit the Program.

In order to perform the first two menu functions you may need to expand your class beyond the earlier mentioned constructors. Specifically, to implement 1), add a new member function, called print_time() to print out the time in the format of hh:mm:ss (see the following example output for a demonstration). To implement 2), you need to implement a loop to go over all objects in your dynamic array and sum their times together. Remember, the range for minutes and seconds is both from 0 to 59. You need to properly carry the over-range value to hours or minutes if they are more than 60.

You will need to format your program so that it matches the example output exactly. Do not change menu option numbers or add any additional input lines. As we are on the server you will not need to include system pause or the cin.ignore()/cin.getline() combo to pause the program.

You will need to use the **string type** variable with **cin** to capture input and cout to print your output.

3 - Example Output

```
Please enter how many times you would like to store: 3
Please enter hour: 1
Please enter minute: 25
Please enter second: 36
Please enter hour: 0
Please enter minute: 34
Please enter second: 26
Please enter hour: 1
Please enter minute: 45
Please enter second: 34
1) Print Times
2) Print Total Time
0) Exit
Please enter your selection:1
Time 1 - 1:25:36
Time 2 - 0:34:26
Time 3 - 1:45:34
1) Print Times
2) Print Total Time
0) Exit
Please enter your selection:2
Total Time - 3:45:36
1) Print Times
2) Print Total Time
0) Exit
Please enter your selection:0
Terminating...

Process finished with exit code 0
```

4 - Grading

A submitted program that **does not compile** is only worth **at most 10 points.**
A submitted program that contains **an infinite loop** is only worth **at most 20 points.**
A submitted program that contains **no dynamic arrays** is only worth **at most 20 points.**

Your program will be ran with 10 sets of input. For each set of input that your program does not produce the correct output for, 10 points will be deducted.

5 - Helpful Hints

5.1 - Leading 0's

#include <iomanip> <- Library to manipulate output streams
i = 10;
cout << setw(5) << setfill('0') << i << endl;
00010 would be printed from this set of statements.

5.2 - Input string variables

Using a string to capture numbers from a cin statement requires you to convert the input to the type int. This is accomplished by using *int_variable_name* = stoi(*string_variable_name)*.

6 - Extra Credit (5 pts)

For extra credit you will add an additional option to the menu **3) Number of Days.** For this menu option, you will need to make an additional class function that returns the number of days in the total time.
This number must be in decimal format and must only print two decimal places.

```
Please enter your selection:2
Total Time - 6:06:06
1) Print Times
2) Print Total Time
3) Print Days in Total Time
0) Exit
Please enter your selection:3
Total Time in Days - 0.25
1) Print Times
2) Print Total Time
3) Print Days in Total Time
0) Exit
Please enter your selection:0
Terminating...

Process finished with exit code 0
```