COMSC 200

Summer 2024

Programming Assignment 4

Worth 12.5 points (1.25% of your grade)

DUE: Thursday, 6/27/24 by 11:59 P.M. on Canvas

Late Pass Deadline: Sunday, 6/30/24 by 11:59 P.M. on Canvas

Your solution will consist of the following four files:

HeartRates.h (class specification file)

HeartRates.cpp (class implementation file)

200_assign4.cpp (application program)

200_assign4.pdf (sample runs)

NOTE: Your submission for this assignment should be **one .h file** and **two .cpp files (see above)**.

The following naming convention should be used for naming your **class specification file**: firstname_lastname_HeartRates.h

The following naming convention should be used for naming your **class implementation file**: firstname_lastname_HeartRates.cpp

The following naming convention should be used for naming your **application program file**: firstname_lastname_200_assign4.cpp

The following naming convention should be used for naming your **sample runs file**: firstname_lastname_200_assign4.pdf

For example, if your first name is “James” and your last name is “Smith”, then your four files would be named **James_Smith_ HeartRates.h, James_Smith_ HeartRates.cpp, James_Smith_200_assign4.cpp, and James_Smith_200_assign4.pdf.**

COMMENTS – worth 1.25 points (10%) of your programming assignment grade:

Your program should have at least **ten (10)** different detailed comments explaining the different parts of your program. Each individual comment should be, at a minimum, a sentence explaining a particular part of your code. You should make each comment as detailed as necessary to fully explain your code. You should also number each of your comments (i.e., comment 1, comment 2, etc.).

Sample Runs – worth 1.25 points (10%) of your programming assignment grade:

You should submit screenshots of at least **five (5)** different sample runs of your program. You should also number each of your sample runs (i.e., sample run 1, sample run 2, etc.). **NOTE: Your sample runs should be different from my sample runs shown in this write-up for the programming assignment, and you should also use different inputs for each sample run.**

For your fourth programming assignment you will be writing the following C++ program:

The formula for calculating your *maximum heart rate* in beats per minute is 220 minus your age in years. Your *target heart rate* is a range that is 50–85% of your maximum heart rate. Create a **class** called **HeartRates**. The class **attributes (member variables)** should include the person's **first name**, **last name** and date of birth (consisting of separate attributes for the **month of birth**, **day of birth,** and **year of birth**). Your class should have a **constructor** that receives this data as parameters. For each attribute provide ***set*** and ***get*** **functions**.

The class also should include a function **getAge** that calculates and returns the person's age (in years), a function **getMaxiumumHeartRate** that calculates and returns the person's maximum heart rate and a function **getTargetHeartRate** that calculates and returns the person's target heart rate. Function **getAge** should prompt the user to enter the current month, day and year before calculating the person's age. **NOTE:** The current month/day/year should be **local variables defined in the getAge function**, rather than member variables in the heartRates class, because this information does not "belong" to the patient, but is just used to help calculate their age.

Write an **application program** that prompts for the person's information, creates an **object** of class **HeartRates** and prints the information from that object—including the person's first name, last name and date of birth—then calculates and prints the person's age in (years), maximum heart rate and target-heart-rate range. **The application program should have other functions besides main (try to have a separate function for each task being performed).**

Sample run 1:

```
Please enter first and last name (separated by spaces):
Optimus Prime
Please enter month, day, and year of birth (separated by spaces):
12 11 1946
First Name: Optimus
Last Name: Prime
Date of Birth: 12/11/1946
Please enter today's month, day, and year:
9 6 2017
Age: 70
Maximum Heart Rate: 150
Target Heart Rate: 75-127
```

Sample run 2:

```
Please enter first and last name (separated by spaces):
Han Solo
Please enter month, day, and year of birth (separated by spaces):
4 1 1980
First Name: Han
Last Name: Solo
Date of Birth: 4/1/1980
Please enter today's month, day, and year:
9 6 2017
Age: 37
Maximum Heart Rate: 183
Target Heart Rate: 91-155
```