

Assignment - 3

CS 181 Spring-2021

Please adequately comment your program and make use of advanced class features including "this" pointer in your solution whenever applicable. This lab assignment must be completed **individually** and there will be strict plagiarism check in place.

Q1. (5 Points) Program name: DayOfYear.cpp

Assuming that a year has 365 days, write a class named DayOfYear that takes an integer representing a day of the year and translates it to a string consisting of the month followed by day of the month. For example,

Sample Input: 2

Sample Output: January 2.

Sample Input: 32

Sample Output: February 1.

Sample Input: 365

Sample Output: December 31.

The constructor for the DayOfYear class should take an integer parameter representing the day of the year, and the class should have a member function to_string() that returns the date in the month-day format (as shown above). The class should have an integer instance variable to represent the day and should have constant string member variables string month names that can be used to translate from the integer to the month-day format.

Test your class by inputting various integers representing days and printing out their representation in the month-day format.

Q2. (5 points) Program name: DayOfYearPlus.cpp

Modify the DayOfYear class from Q1, and add the following overloaded operators:

++ prefix and postfix increment operators. These operators should modify the DayOfYear object so that it represents the next day. If the day is already the end of the year (e.g., 365), the new value of the object will represent the first day of the year.

-- prefix and postfix decrement operators. These operators should modify the DayOfYear object so that it represents the previous day. If the day is already the first day of the year, the new value of the object will represent the last day of the year.

For example,

```
DayOfYear date(1);  
cout<< date.to_string() ; // will print January 1.
```

```
DayOfYear birthday = date - - ; // postfix decrement  
cout<< date.to_string(); // will print December 31.  
cout<< birthday.to_string(); // will print January 1.
```

```
date ++; // postfix increment  
cout<< date.to_string(); // will print January 1.
```

Q3. (5 points) Program name: FeetInches.cpp

Refer the FeetInches Version 4 source code in the text book (page 856). It is in the form of header file and source file. Put all the code from the header file and source file to create one single source file that will contain the class declaration and class member function implementation code.

a) Modify the FeetInches class so it overloads the following operators:

`<=`

`>=`

`!=`

b) Add a copy constructor to the FeetInches class

This constructor should accept a FeetInches object as an argument. The constructor should assign to the feet attribute the value in the argument's feet attribute, and assign to the inches attribute the value in the argument's inches attribute.

c) Overload the ostream<< operator function (as shown in Feb 17 lecture)

Overload the ostream<< operator, so that the object of the FeetInch class can be displayed by using the cout object as the following:

```
FeetInch box_length(10, 2);  
cout << box_length << endl ; // will print: 10 feet and 2 inches
```

As deliverables, you need to submit the source codes for each questions (create three separate program files named, FeetInches.cpp, DayOfYear.cpp, and DayOfYearPlus.cpp). Please ensure to follow the programming good practice rubrics (available on the Labs/Assignment section of the Blackboard course website) in your coding.

Test your programs by adding a main function in each program files and demonstrate the sample input output shown in this document.

When your program is running, take screenshot of the output (make sure that the title of the program name is visible). There will be three screenshots in total for each program run.

Create UML diagrams for the three classes. There will be three UML diagrams.

Put the three screenshot and three UML diagrams in a single document and save that as a pdf.

When you are satisfied with your work, submit the solution files (three source code files, and one pdf file) on the Blackboard website by 5pm, 27 Feb.

Please let me know if you have any questions. Thank you.