

CS150 Assignment 3

Date Calculations

Date assigned: Wednesday, September 27, 2017

This is an individual assignment

Due: Wednesday, October 4, 2017, 9:15am (25 points)

Goals:

- Formatting
- if statements
- switch statements
- Constants

Write a program asks the user to read in the month, day of the month, and year, and then outputs:

- whether that year is a leap year,
- the number of days in the month,
- and the day of the week

Your program must look like the following. The input is in bold.

```
*****
Date Calculations
*****

What is the month? 9
What is the day of the month? 1
What is the year? 2016

2016 is a leap year.

The number of days in 9/2016 is: 30

9/1/2016 is a Thursday.

Press any key to continue . . .
```

Determining if a year is a leap year

You must determine if the year is a leap year so that you can provide a correct information for the month of February. A year is a leap year if it is divisible by 4. The only exception to this is if it is a century year. Then it is a leap year only if it is divisible by 400.

Determining the day of the week of a particular date:

To calculate the day on which a particular date falls, the following algorithm must be used:

$$a = (14 - month) / 12$$

$$y = year - a$$

$$m = month + 12 * a - 2$$

$$dayOfWeek = (day + y + y/4 - y/100 + y/400 + (31*m)/12) \% 7$$

where *year* is the four-digit year, *month* is the integer between 1 and 12, *day* is the day of the month, and *dayOfWeek* is the day of the week. The value for *dayOfWeek* is 0 for Sunday, 1 for Monday, 2 for Tuesday, etc. All variables must be integers!

For example, if you were trying to find the day of the week on which 9/28/2016 falls, then you would substitute:

- 9 for *month*
- 28 for *day*
- 2016 for *year*

The result in *dayOfWeek* will be 3, which is a Wednesday.

NOTES:

- You **must** follow the coding standards presented in class and provided on the class website.
- In the above formulas, the following numbers are meaningful and **must** be declared as **const** with **meaningful names**. 4, 7, 14, 31, 100, 400.
- The names of the days of the week **must** be **const strings**
- The positions of the days of the week, 0-6, Sunday-Saturday, **must** be **const**
- You will find other constants that need to be **const** as you code.

To complete this assignment you must submit the following:

1. An electronic copy of your program on grace

- a. Add new project named 03_DateCalculations to your previously created assignment solution called PUNetIDAssignments. It is *vital* that you name your project correctly!
- b. Type your program (fully documented/commented) into the project. The comment block at the top of the program needs to contain your name, the date the assignment is due, the class name, assignment number and name, and a brief description of the program.
- c. Pay attention to the example output! Your program's output must look **exactly** like the example output! The spacing and newlines in your output must match exactly.
- d. Your program **must** use if statements, logical operators, constants, and switch statements.
- e. Make sure that your program compiles and runs correctly. If you get any errors (or warnings), double check that you typed everything correctly. Be aware that C++ is case-sensitive.
- f. Once you are sure that the program works correctly it is time to submit your program. You do this by logging on to grace and placing your complete solution folder in the **CS150-03 Drop** folder. This solution folder must contain four projects we have done this semester.
- g. The program must be in the drop folder by 9:15am on the day that it is due. Anything submitted after that will be considered late.

2. A hard copy of your program

- a. The hard copy must be placed on the instructor's desk by 9:15am on the day that it is due.
- b. The hard copy must be printed in color, double-sided, and stapled in the upper-left corner if necessary. I do not bring a stapler to class.

Good luck! And remember, if you have any problems, come and see straight away.

The printers in Marsh are slow. Do NOT expect to be able to print your code 10 minutes before class!