CS150 Assignment 4

Calendar

Date assigned: Wednesday, October 10, 2007
Date due: Monday, October 22, 2007
Total points: 40

Problem

Write a C++ program that will allow the user to input a year, and will output the complete calendar for that particular year.

The calendar should be organized in a grid format, with the year and month right-aligned with the month grid. Under that there should be seven columns labeled Su, Mo, Tu, We, Th, Fr, Sa. The first of the month must appear under the correct day and the rest of the days in the month should line up appropriately.

Each month should appear on its own screen, and the user must press a key to clear the screen and display the following month.

system("cls"); clears the screen.
system("pause"); pauses the program until the user hits a key.

Output

The output for this program should look exactly like this (sample input given in bold):

[SCREEN #1]

```
***************************************************
*                    Calendar                     *
***************************************************

Please enter the calendar year that you wish to view: 2007

Thank you. Press any key to start viewing the calendar.
```

[SCREEN #2]
```
      === YEAR: 2007 ===

                     JANUARY
      Su Mo Tu We Th Fr Sa
          1  2  3  4  5  6
       7  8  9 10 11 12 13
      14 15 16 17 18 19 20
      21 22 23 24 25 26 27
      28 29 30 31
```

[SCREEN #3]
```
      === YEAR: 2007 ===

                    FEBRUARY
      Su Mo Tu We Th Fr Sa
                   1  2  3
       4  5  6  7  8  9 10
      11 12 13 14 15 16 17
      18 19 20 21 22 23 24
      25 26 27 28
```
[AND SO ON UNTIL DECEMBER]

Notes

- You will need to take into consideration whether the year entered is a leap year. As you recall, a year is a leap year if it is divisible by 4, unless it is a century year where it is a leap year only if it is divisible by 400. See lab 5 dated 9/25/2007.

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

```
a = (14 - month) / 12
y = year - a
m = month + 12*a - 2
d = (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 representing the month, *day* is the day of the month, and *d* is the day of the week. The value for d is 0 for Sunday, 1 for Monday, 2 for Tuesday, etc.

Taking March 15, 2007 as an example; month = 3, day = 15, year = 2007. The result of the above calculations is; d = 4, which means that March 15, 2007 falls on a Thursday.

To complete this assignment you must

1. Create a new C++ project in Visual Studio. Name your project "04Calendarxxxxxxxx", where xxxxxxxx should be replaced by your PU Net Id. As an example, my project would be called "04Calendarkhoj0332". It is vital that you name your project correctly!
2. Type the solution (fully documented/commented) to the problem into your project.
3. Make sure that your program compiles and runs correctly. If you get any errors, double check that you typed everything correctly. Be aware that C++ is case-sensitive.
4. Once you are sure that the program works correctly it is time to submit your program. You do this by logging on to Turing and placing your complete project folder in the CS150-01 drop folder. Make sure that you copy your program folder and don't move it. If you move it, then you will not have your own copy!

Answer the following questions:

What will your program need to do conditionally? What data will this decision be based on?

_____

_____

_____

_____

_____

What will your program need to do in a loop? When data will your program use to stop the loop?

_____

_____

_____

_____

_____

_____

Notes

1. You must follow the coding standards.
2. You must validate the year; it should be greater than zero.
3. You must use constants when possible.
4. Your program will be graded on efficiency. In other words, you will be marked down for repeating code statements unnecessarily.
5. You may only use the C++ programming concepts covered thus far in class. Do not use any more advanced concepts that we have not covered or any other programming concepts that you have had experience with.
6. Your output must look exactly like the sample given.
7. You must comment your code appropriately.
8. Refer to the syllabus for what constitutes plagiarism, and the consequences for plagiarizing.

Hints

1. Use `if` statements to figure out how many days there are per month and to display the name of the month.
2. Using `setw` will help you format the output.
3. Check your results against a real calendar!
4. Don't forget to test February for all leap year possibilities.

To receive full credit for this assignment, your project must be in the drop box by 1pm on the day that it is due. Anything later will be considered late. Further, you must bring a color hard copy of your program and the answers to the above questions to class and place it on the instructor's desk by 1pm.

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

START EARLY!!