

Program 3 - **Calendar**
Comp 150
100 Points

Write a C++ program called `calendar.cpp` that will produce a calendar for a given month and year. The user will be able to produce calendars until 0 is entered for the month. All user input should be validated.

Your program should produce output **exactly** like the example below.

```
Enter month (1-12) or 0 to quit: 4
Enter year (1900 or above): 2000

          April 2000

Sun  Mon  Tue  Wed  Thu  Fri  Sat
     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

Enter month (1-12) or 0 to quit: 1
Enter year (1900 or above): 1900

          January 1900

Sun  Mon  Tue  Wed  Thu  Fri  Sat
     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

Enter month (1-12) or 0 to quit: 0
```

To determine which day of the week a calendar should start on, consider the fact that Jan 1, 1900 was on a Monday. That means Feb 1, 1900 would be on Thurs since there are 31 days in Jan, and Jan 31st was on a Wed. Mar 1, 1900 would begin on Thurs since there are 28 days in Feb, and Feb 28th was on a Wed.

The following formula can be used for calculating which day of the week the 1st would fall on for a particular month and year:

$$\text{First Day} = \text{Remainder of } (1 + \text{Total Number of Days from Jan 1, 1900 to 1}^{\text{st}} \text{ of current Month}) / 7$$

where First Day of 0 is Sun, 1 is Mon, 2 is Tues, ..., 6 is Sat.

Example:

First Day for Mar 1900: $(\text{Remainder of } [1 + 31 + 28]) / 7 = 4$ which corresponds to Thurs.

In calculating the total number of days since Jan 1, 1900, it is necessary to add a day to Feb for Leap Years. If the number of the year is divisible by 4 then the year is a Leap Year, except in the case where the number of the year ends in 00; then the year is not a Leap Year. However, if the number of the year ends in 00 and the year is divisible by 400 the year is a Leap Year.

Notes about output:

- Each day is separated by 2 spaces (Sun--Mon)
- The right edge of the month and year output ("January 1900") should be aligned with the right edge of "Thu" unless the year is greater than 4 digits.

You can use the finished version of my program for testing if you'd like. It's located at:

\\cs1\Classes\comp170\calendar_fm.exe

Submit your **program** and a **structure chart** (as a .txt file) to Easel (<http://cs.harding.edu/easel/>) *before* class on the due date.

The main purpose of this assignment is for you to get experience using functions. Use them whenever appropriate. Each function should have a single purpose and be named with a verb and noun. Make sure no function is greater than a printed page. You will be penalized greatly for not using functions.