Due date: 03-26-2016 (Sat.), 11:59pm

Submission: C source file, **program2.c**, on Blackboard

Points: 20 points

Description:

The nth Fibonacci number F_n is defined as follows:

$F_0 = 1, F_1 = 1,$

and

$F_n = F_{n-1} + F_{n-2}$ for $n > 1$

In other words, each number is the sum of the two previous numbers in the sequence. Thus, the first several Fibonacci numbers are 1, 1, 2, 3, 5, and 8. Interestingly, certain population growth rates are characterized by the Fibonacci numbers. If a population has no deaths, then the series gives the size of the population after each time period.

Assume that a population of green crud grows at a rate described by the Fibonacci numbers and has a time period of 5 days. Hence, if a green crud population starts out as 10 pounds of crud, then after 5 days, there is still 10 pounds of crud; in 10 days, there is 20 pounds of crud; in 15 days, 30 pounds of crud; in 20 days, 50 pounds of crud, and so on, i.e.,

Days	0	5	10	15	20	25	30
Crud (pounds)	10	10	20	30	50	80	130

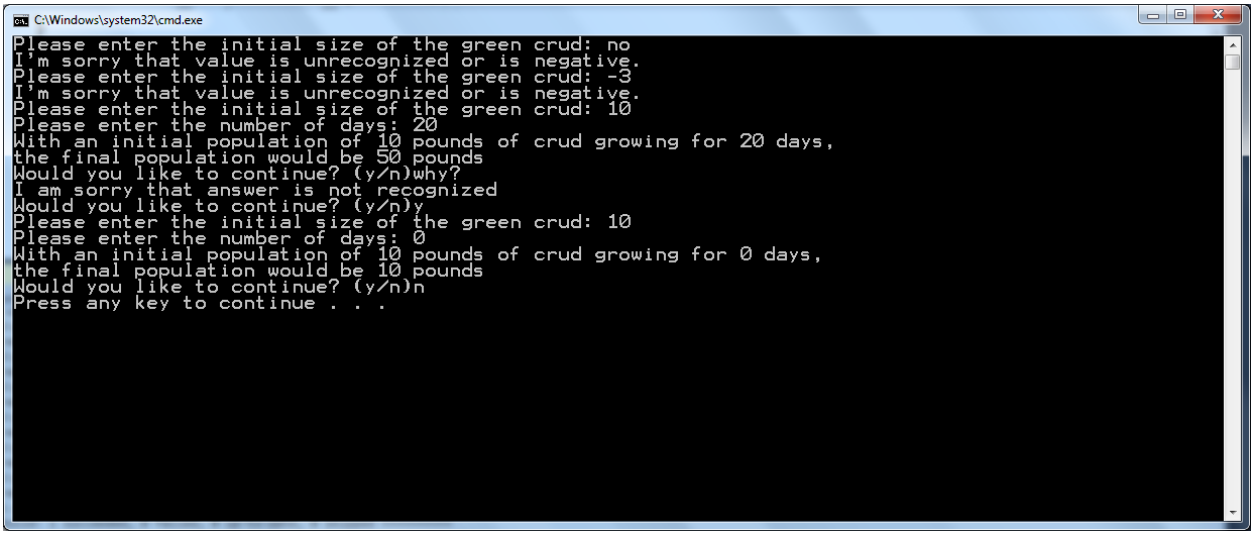
Write a program that takes both the initial size of a green crud population (in pounds) and some number of days as input from the keyboard, and computes from that information the size of the population (in pounds) after the specified number of days. Assume that the population size is the same for four days and then increases every fifth day. The program must allow the user to repeat this calculation as long as desired. Please note that zero is a valid number of days for the crud to grow in which case it would remain at its initial value.

Please plan ahead and don't start the assignment in the last minuet before the due date. You need to start it as soon as possible so you'll have plenty of time to study and ask questions. Technical difficulty (e.g., internet access) is NOT an excuse that you can't submit the assignment on time. If you can't immediately figure out how to write the C code, please try the following steps:

a. think about what your program will need to do (the overall goal);

b. list the steps (sub-tasks) that your program need to accomplish in order to achieve the overall goal, by using pseudo code (or simple English Language). **I will enclose the steps at the end of this document**, if you can't figure it out by yourself, you may read it to get more idea. I encourage you to think through by yourself first.
c. think about what structure your code may need (e.g., if…else for choice between conditions; loops if you need to repeatedly doing something).
d. finally, think how you can write the code in C language. **Don't start from this step and you may get frustrated.**

Your output should look something like:



At the top of your program you should have a comment section that follows the below format:

```
/*********************************************
     Author: <insert your name>
     Date: <insert today's date>

     Purpose: <Insert a short description of what
          your program does here.>
     Time Spent: <Insert how much time you spent
          on the assignment here>
*********************************************/
```

Continue to the next page if you need more hints, but please think through by yourself first.

Hints for students who need more help to get started.

The program can be divided into the following sub-tasks:

- read the initial size of the green crud (from keyboard);
    - read valid number from the keyboard
    - when the input is invalid, keep prompting the user to enter the correct one
- read the number of days (from keyboard);
    - read valid number from the keyboard
    - when the input is invalid, keep prompting the user to enter the correct one
- compute the final population size (using the idea of Fibonacci number)
    - use the above table and your own example to understand how to calculate
- repeat the above 3 steps until the user wants to exit

We have practice the first two steps in previous assignments and please review them.

When calculate the final population size, you may need to consider:

- Do you have any special case (F_0, F_1) to consider? e.g., for the first 0~4 days and 5~9 days, the calculation is different from later days, e.g., 10~14 days
- how can you keep track of previous two values F_{n-1}, and F_{n-2}
- What code structure do you need to calculate the final population?