**Due Date: Wednesday, October 10, 2018 before 11:00pm.**

**Instructions**: This is an individual homework assignment. There are two problems worth 20 points each. Solve the problem below by yourself (unlike the labs, where you work collaboratively), and submit the solution as a C++ source code file. Here are a few more important details:

1. Unlike the computer lab exercises, this is not a collaborative assignment.

2. Because all homework assignments are submitted and tested electronically, the following are important:
   - You follow any naming conventions mentioned in the homework instructions.
   - You submit the correct file(s) through Moodle by the due deadline.
   - You follow the example input and output formats exactly given in each problem description.
   - **Regardless of how or where you develop your solutions, your programs compile and execute on cselabs computers running the Linux operating system.**

3. You should test your program on other test cases (that you make up) as well. Making up good test cases is a valuable programming skill, and is part of ensuring your code solution is correct.

**Problem A: Number game** (20 points)
Write a C++ program that will play the following game. Ask the user how many "rounds" you want to play and start at 10 points. Every turn you can add either 1 point (by choosing 'a') or 2 points (by choosing 'b'). After adding this you should do one of two things:

- If the end result is a Fibonacci number, add to the current points the sum of the next 'n' Fibonacci numbers starting at the Fibonacci number equal to the point value, where 'n' is the current round. If on the 3rd round you had 8 points, since 8 is a Fibonacci number you would compute the new score as: 8 + (8+13+21) = <span style="color:red">50</span>
- If the end result is not a Fibonacci number, divide it by two and round down any fractions.

At the start of each round tell them how many points they currently have and ask what they want to do. If it is the final round, tell them their final score and end the program.

Example 1 (user input is underlined):
```
How many rounds?
3
Current points: 10
Choose: (a) add 1 point, (b) add 2 points...
a
Current points: 5
Choose: (a) add 1 point, (b) add 2 points...
b
Current points: 3
```

```
Choose: (a) add 1 point, (b) add 2 points...
b
Final score:
31
```

Example 2 (user input is underlined):
```
How many rounds?
5
Current points: 10
Choose: (a) add 1 point, (b) add 2 points...
b
Current points: 6
Choose: (a) add 1 point, (b) add 2 points...
b
Current points: 29
Choose: (a) add 1 point, (b) add 2 points...
b
Current points: 15
Choose: (a) add 1 point, (b) add 2 points...
b
Current points: 8
Choose: (a) add 1 point, (b) add 2 points...
b
Final score:
5
```

When you are done, name the source code file <username>_3A.cpp. Here you replace
<username> with your U of M email address; for example, if your email address is
smithx1234@umn.edu, your file should be named smithx1234_3A.cpp. Then submit your
program using the HW 3 Problem A submission link in Moodle.

**Problem B: Prime Fibonacci numbers** (20 points)
Write a C++ program that asks the user for a range of numbers. Then print out all numbers in that range
that are both a prime number and a Fibonacci number (separated by a space between).

Example 1 (user input is underlined):
```
Bottom of range?
5
Top of range?
89
5 13 89
```

Example 2 (user input is underlined):
```
Bottom of range?
20000
Top of range?
30000
```

When you are done, name the source code file <username>_3B.cpp. Here you replace <username> with your U of M email address; for example, if your email address is smithx1234@umn.edu, your file should be named smithx1234_3B.cpp. Then submit your program using the HW 3 Problem B submission link in Moodle.