Introduction to Computers and Programming LAB-Quiz1 2014/10/29

Time: 2.5 hrs

※Please create a new folder. Name the folder as: Student ID-Name (XXXXXXX-○○○). Inside the folder, your file format will be Q_1.c, Q_2.c, etc. There will ONLY be a total of 5 .c files in your folder (wrong file name or format will cause score deductions).

※No Internet. No discussions.

※The class is for C language, so do not use C++.

※You cannot use Arrays or Characters even if you have learned them.

※If any of your program cannot be compiled, you will get zero score for the question.

※Before you use any variables, make sure you have assigned values to them. Some IDE's, such as Dev-C++, may not automatically initialize the variables.

※Your programs will be checked (by a tool) for the programming integrity. Be honest with your own works.

※Your output must comply with the sample output format.

1. (10%) TA's score function

   At the beginning of C programming class, one of the TAs suggested a score function in 40 program exercises. The function is designed for not easily flunking students, because if you finish basic amount of programs you can get high score per program. But, the more programs you finish, the less score per program you will get. Here is the detail.

   If number of finished programs is less or equal to 10, you can get 4 scores per program.

   If number of finished programs is between 11~20, you can get 3 scores per program, starting from 11^{th} program (first 10 program is still 4 scores each).

   If number of finished programs is between 21~30, you can get 2 scores per program.

   If number of finished programs is between 31~40, you can get 1 scores per program.

   So full marks is still 100 scores.

   Given number of finished programs N, write a program to output the total scores you will get.

```
Input N: 26
You will get 82 scores
請按任意鍵繼續 . . .
```

```
Input N: 12
You will get 46 scores
請按任意鍵繼續 . . .
```

2. (10%) Beat the spread!

   On Superbowl Sunday, to pass the time waiting for the half-time commercials and wardrobe malfunctions, the local hackers have organized a betting pool on the game. Members place their

bets on the sum of the two final scores, or on the absolute difference between the two scores. Given the winning numbers for each type of bet, can you deduce the final scores?

Input will gives *s* and *d*, non-negative integers representing the sum and (absolute) difference between the two final scores. Then output a line giving the two final scores, largest first. If there are no such scores, output a line containing "impossible". Recall that football scores are always non-negative integers.

```
Input s, d: 16 4
10 6
請按任意鍵繼續 . . .
```

```
Input s, d: 17 10
impossible
請按任意鍵繼續 . . .
```

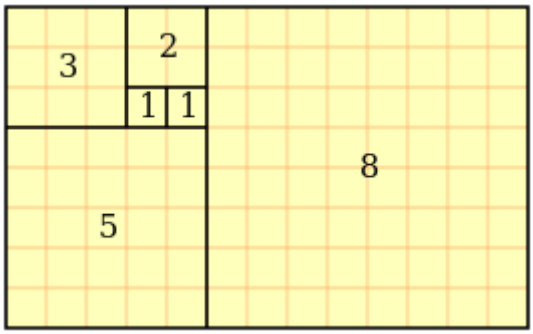
3. (15%) Prime number or not

   A prime number is a natural number greater than 1 that has no positive divisors other than 1 and itself. Given a positive integer number, please judge whether it is a prime number.

```
Please input a number : 10
This number 10 is not a prime number!
請按任意鍵繼續 . . .
```

```
Please input a number : 79
This number 79 is a prime number!
請按任意鍵繼續 . . .
```

4. (15%) Fibonacci number



The graph is a tiling with squares whose side lengths are successive Fibonacci numbers

Introduction: In mathematics, the Fibonacci numbers or Fibonacci sequence are the numbers in the following integer sequence.

$$0,\ 1,\ 1,\ 2,\ 3,\ 5,\ 8,\ 13,\ 21,\ 34,\ 55,\ 89,\ 144,\ \ldots$$

The recurrence relation of Fibonacci numbers is

$$F_n = F_{n-1} + F_{n-2},$$

Please write a program to read in a non-negative integer ***n***, and print out the ***n***th number of the Fibonacci series F_n.

Note: F_0 =0, F_1 =1, F_2 = 1 …..F_n = ?, n >= 0

```
Input n: 0
Fn = 0
請按任意鍵繼續 . . .
```

```
Input n: 10
Fn = 55
請按任意鍵繼續 . . .
```

5. (20%) Bee

In Africa there is a very special species of bee. Every year, the female bees of such species give birth to one male bee, while the male bees give birth to one male bee and one female bee, and then they die!

Now scientists have accidentally found one "magical female bee" of such special species to the effect that she is immortal, but still able to give birth once a year as all the other female bees. The scientists would like to know how many bees there will be after N years. Please write a program that helps them find the number of male bees and the total number of all bees after N years.

```
Input Year N: 1
1 2
請按任意鍵繼續 . . .
```

```
Input Year N: 3
4 7
請按任意鍵繼續 . . .
```