ECE160: Foundations of Computer Engineering I
Homework #4 Solution (Spring 2023)
(55 points)
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1. Convert the following *while* loop into a ***for*** loop. And into a ***do-while*** loop:

```
x=3;
while (x < 17)
{
        printf("%d\n",x);
        x++;
}
```

Solution: (**7.5 points each, 15 points in total**)

/*for loop*/

```
for(x = 3; x < 17; x++)
{
     printf("%d\n",x);
}
```

/*do…while loop*/
```
x =3;
do
{
     printf("%d\n",x);
      x++;
} while(x < 17);
```

2. Evaluate the value of the following expressions: **(5 points each, 10 points in total)**

floor(3.76*10+0.5)/10+pow(2.0, 3.0)*ceil(-2.3) = 3.8-16= -12.2

floor(ceil(10.7)-fabs(-2.0)+floor(-7.0))+sqrt(16) = 2+4 = 6

3. Modify the program in the random number generation example in Lecture #17 (Slide 11) so that the program generates three random numbers in the range 70 ~ 130.

Solution: (10 points)

```
#include "stdlib.h"
#include "stdio.h"
#include "time.h"

void main(void)
```

```c
{
    int myrand1;
    int myrand2;
    int myrand3;

    srand(time(NULL));

    myrand1 = rand() % 61 + 70;
    myrand2 = rand() % 61 + 70;
    myrand3 = rand() % 61 + 70;

    printf("The numbers are %d %d %d\n", myrand1, myrand2, myrand3);
}
```

Testing:
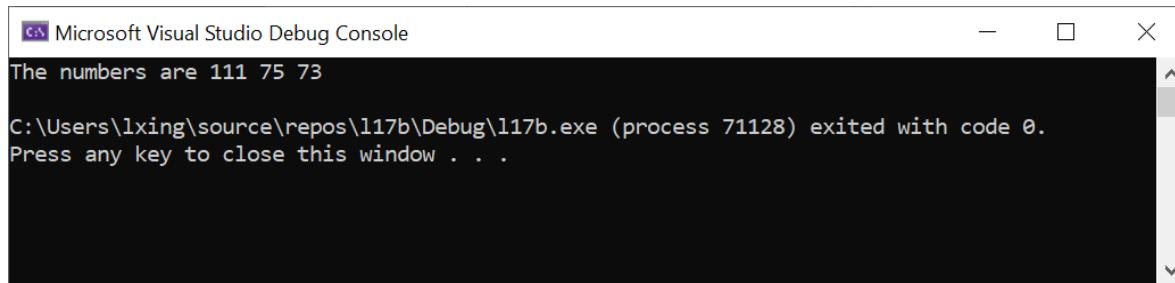
Microsoft Visual Studio Debug Console

The numbers are 111 75 73

C:\Users\lxing\source\repos\l17b\Debug\l17b.exe (process 71128) exited with code 0.
Press any key to close this window . . .

4. Write a program that input an integer number *n* from the keyboard and print out the series of Fibonacci numbers from F_0 to F_n. Note $F_0=0$, $F_1=1$ are base cases. Each number in the rest of the series is the sum of two preceding ones.
    For example, if you input 4 from the keyboard, then 0, 1, 1, 2, 3 (corresponding to F_0, F_1, F_2, F_3, F_4, respectively) should be printed out on the screen; if *n*=6, then 0, 1, 1, 2, 3, 5, 8 should be printed out on the screen.
    You are required to generate each Fibonacci number in a recursive function defined by you (Refer to Lecture#17 Exercise on Slide 32) and call the function in the main().

Solution: (20 points)

```c
#include "stdio.h"

long fib(long n);

void main(void)
{
    int n;
    long f;
    int i = 0; /*control variable*/
    printf("Enter an integer number \n");
    scanf_s("%d", &n);

    for (i = 0; i <= n; i++)
    {
        f = fib(i);
        printf("%ld,", f);
    }
    printf("\n");

}
```

```
long fib(long n)
{
        if ((n == 0) || (n == 1))
                return n;
        return(fib(n - 1) + fib(n - 2));
}
```

Testing:
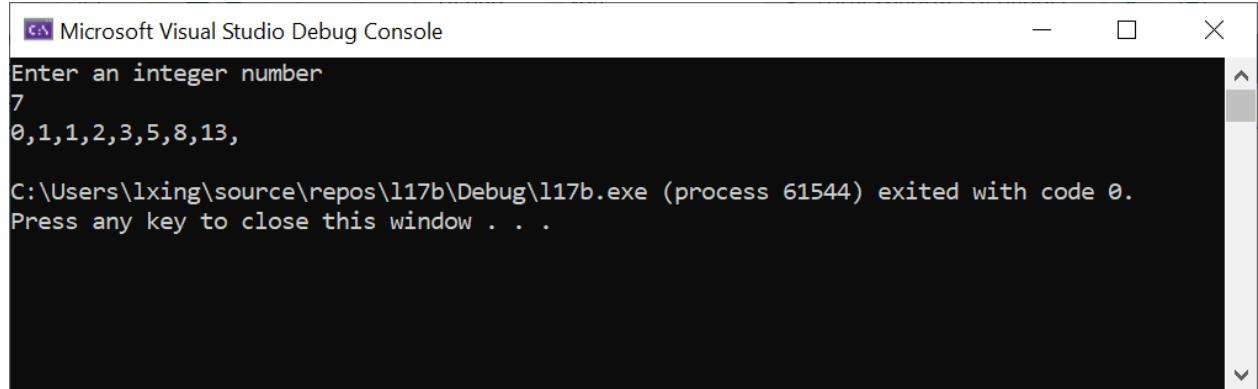
```
Microsoft Visual Studio Debug Console                          —    □    ✕

Enter an integer number
7
0,1,1,2,3,5,8,13,

C:\Users\lxing\source\repos\l17b\Debug\l17b.exe (process 61544) exited with code 0.
Press any key to close this window . . .
```