Mahmoud Moustafa Assignment 1

Fibonacci Primes

A Fibonacci prime is a Fibonacci number that is prime, such as 2, 3, 4, 13, 89 and so on.[1] Prime numbers are numbers greater than one and can be divided only by themselves and one and the result would be a counting number. A Fibonacci number is a number that can be obtained by the following functions: $F_0 = 0$, $F_1 = 1$, and $F_n = F_{n-1}+F_{n-2}$.[2].

isPrime Function Source Code

```
/*
This program checks if a given number is in a prime number
@author Mahmoud Moustafa; ID:3648276
*/
int isPrime(int i) {
    int lCounter = 3;
    if (i < 2) { //0 & 1 are not prime numbers
        return 0;
    }

    if (i == 2) //2 is a prime number
    {
        return 1;
    }

    while (lCounter < i){ // as long as counter < input check if there is a remainder and output accordingly
        if(i % lCounter == 0){
            return 0;
        }
        lCounter++;
    }
    return 1;
}
```

[1] Fibonacci prime - Wikipedia
[2] Fibonacci number - Wikipedia

testingprimes Source Code

```c
#include <stdio.h>
#include <stdlib.h>


int main() {
    int input;
    printf("Enter the int you want to check whether it is a prime: ");
    scanf("%d", &input);
    if (isPrime(input) == 0)
    {
        printf("%d is not a prime number\n", input);
    }
    else
    {
        printf("%d is a prime number\n", input);
    }
    return EXIT_SUCCESS;
}
```

isPrime and testingprimes compiling

```
[mmoustaf@gc112m38 A1]$ gcc testingprimes.c isprime.c -o prog1
```

isPrime and testingprimes testing

```
[mmoustaf@gc112m38 A1]$ ./prog1
Enter the int you want to check whether it is a prime: 8
8 is not a prime number
[mmoustaf@gc112m38 A1]$ ./prog1
Enter the int you want to check whether it is a prime: 9
9 is not a prime number
[mmoustaf@gc112m38 A1]$ ./prog1
Enter the int you want to check whether it is a prime: 0
0 is not a prime number
[mmoustaf@gc112m38 A1]$ ./prog1
Enter the int you want to check whether it is a prime: 1
1 is not a prime number
```

```
[mmoustaf@gc112m38 A1]$ ./prog1
Enter the int you want to check whether it is a prime: 101
101 is a prime number
[mmoustaf@gc112m38 A1]$ ./prog1
Enter the int you want to check whether it is a prime: 50
50 is not a prime number
[mmoustaf@gc112m38 A1]$ ./prog1
Enter the int you want to check whether it is a prime: 28
28 is not a prime number
[mmoustaf@gc112m38 A1]$ ./prog1
Enter the int you want to check whether it is a prime: 3218
3218 is not a prime number
[mmoustaf@gc112m38 A1]$ ./prog1
Enter the int you want to check whether it is a prime: 17
17 is a prime number
[mmoustaf@gc112m38 A1]$
```

isFib Function Source Code

```
/*
This program checks if a given number is in the Fibonacci Sequence
@author Mahmoud Moustafa; ID:3648276
*/
 //if number is in the Fibonacci sequence return 1, otherwise 0
int isFib(int i) {
    int m = 0;
    int n = 1;
    int o = m + n;
    if (i == 0 || i == 1) // 0 and 1 exist in the Fibonacci sequence
    {
        return 1;
    }
    else
    {
        while (o <= i) //as long as o < input, check if they are equal, if not increment accordingly
                       // until they are == or o>i and output accordingly
        {
            if (o == i)
            {
                return 1;
            }
            m = n;
            n = o;
            o = m + n;
        }
        return 0;
    }
}

```

testingfibs Source Code

```c
#include <stdio.h>
#include <stdlib.h>

int main() {
    int input;
    printf("Enter an int to check if it is in the Fibonacci sequence: ");
    scanf("%d", &input);
    if (isFib(input) == 0)
    {
        printf("%d is not in the Fibonacci sequence.\n", input);
    }
    else
    {
        printf("%d is in the Fibonacci sequence.\n", input);
    }
    return EXIT_SUCCESS;
}

```

isFib and testingfibs compiling

```
[mmoustaf@gc112m38 A1]$ gcc testingfibs.c isfib.c -o prog2
```

isfib and testingfibs testing

```
[mmoustaf@gc112m38 A1]$ ./prog2
Enter an int to check if it is in the Fibonacci sequence: 3
3 is in the Fibonacci sequence.
[mmoustaf@gc112m38 A1]$ ./prog2
Enter an int to check if it is in the Fibonacci sequence: 9
9 is not in the Fibonacci sequence.
[mmoustaf@gc112m38 A1]$ ./prog2
Enter an int to check if it is in the Fibonacci sequence: 5
5 is in the Fibonacci sequence.
[mmoustaf@gc112m38 A1]$ ./prog2
Enter an int to check if it is in the Fibonacci sequence: 17
17 is not in the Fibonacci sequence.
[mmoustaf@gc112m38 A1]$ ./prog2
Enter an int to check if it is in the Fibonacci sequence: 27
27 is not in the Fibonacci sequence.
[mmoustaf@gc112m38 A1]$ ./prog2
Enter an int to check if it is in the Fibonacci sequence: 21
21 is in the Fibonacci sequence.
[mmoustaf@gc112m38 A1]$ ./prog2
Enter an int to check if it is in the Fibonacci sequence: 293
293 is not in the Fibonacci sequence.
[mmoustaf@gc112m38 A1]$ ./prog2
Enter an int to check if it is in the Fibonacci sequence: 294
294 is not in the Fibonacci sequence.
[mmoustaf@gc112m38 A1]$
[mmoustaf@gc112m38 A1]$ ./prog2
Enter an int to check if it is in the Fibonacci sequence: 180
180 is not in the Fibonacci sequence.
[mmoustaf@gc112m38 A1]$
```

fibprimes Source Code

```c
/*
This program asks users for lower and upper limit input and
prints the prime numbers in the fibonacci sequence inclusive of
the limits
@author Mahmoud Moustafa; ID:3648276
*/
#include <stdio.h>
#include <stdlib.h>
int x1;
int x2;
int n;

int main() {
    printf("Enter the lower limit: ");
    scanf("%d", &x1);
    printf("Enter the upper limit: ");
    scanf("%d", &x2);
    n = x1;
    while (n <= x2)
    {
        if (isFib(n) && isPrime(n))
        {
            printf("%d ", n);
        }
        n++;
    }
    printf("\n");
    return EXIT_SUCCESS;
}

```

fibprimes, isfib, isprime compiling

```
[mmoustaf@gc112m38 A1]$  gcc fibprimes.c isfib.c isprime.c -o prog3
```

fibprimes, isfib, isprime testing

```
[mmoustaf@gc112m38 A1]$ ./prog3
Enter the lower limit: 10
Enter the upper limit: 100
13 89
[mmoustaf@gc112m38 A1]$ ./prog3
Enter the lower limit: 1597
Enter the upper limit: 1597
1597
[mmoustaf@gc112m38 A1]$
```