Alekya Gouda (8483009) **Assignment 3** Friday, 13th November 2015

Question 1

The program will print the following:

```
t in abc before increasing: x=10
t in abc after increasing: x=110
t in abc before increasing: x=10
t in abc after increasing: x=120
in main: a=110, x=120
```

Question 2

The program will print the following:

```
t in main: x=100
t in abc before increasing: x=10
In acb after increasing: x=110
In main: x=110
In abc before increasing: x=110
In abc after increasing: x=220
In main: x=220
```

Question 3

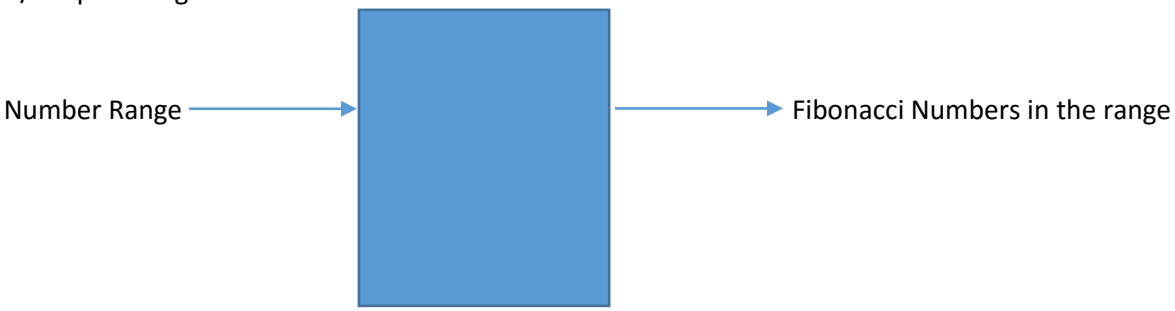
Problem Identification

To compute a program that finds the Fibonacci series using the C program, by using `int getNextFibonacciNumber(void);`

Gathering Information

The Fibonacci Sequence is the series of numbers : 0,1,1,2,3,5,8,21,34…… The next number is usually found by adding up the two numbers before it, it is defined by the linear recurrence sequence. $F_n = F_{n-1} + F_{n-2,}$ with $F_1 = F_2$. As a result of the definition, it is conventional to define $F_0 = 0$. Fibonacci numbers can be viewed as a particular case of the Fibonacci polynomials $F_n(x)$ with $F_n = F_n(1)$.

Input/Output Design



Test Case and Algorithm

Test Case

Number Range	Fibonacci Series
15	0,1,1,2,3,5,8,13,21,34,55,89,144,233,377
7	0,1,1,2,3,5,8
10	0,1,1,2,3,5,8,13,21,34

In order to come up with the values for the Fibonacci Series, we need to create an algorithm that prompts the user to input a value and will print out the number of Fibonacci numbers for the inputed range. Since now that we have been able to solve the problem for the test cases shown above, we can now develop an algorithm for the problem solution. The first step to creating this program is to prompt the user to input a value. The computer then takes this variable and stores it and uses it to print out the number of Fibonacci series in the range.

Implementation

```
#include<stdio.h>
int main(){
    int k,r;
    long int i=0l,j=1,f;

    //Taking maximum numbers form user
```

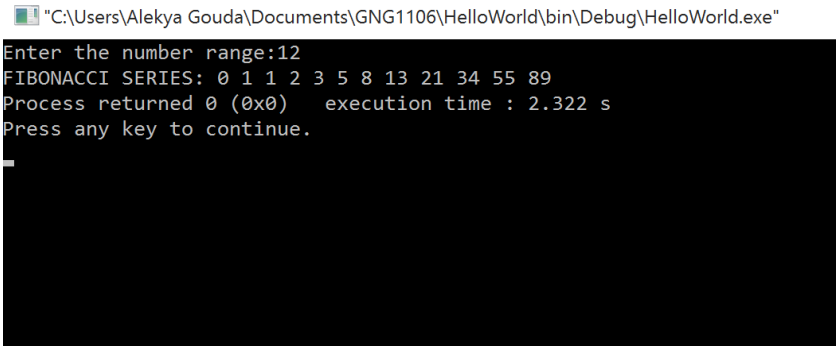
```
    printf("Enter the number range:");
    scanf("%d",&r);

    printf("FIBONACCI SERIES: ");
    printf("%d %d",i,j); //printing fits two values.

    for(k=2;k<r;k++){
        f=i+j;
        i=j;
        j=f;
        printf(" %d",j);
    }

    return 0;
}
```

Software Testing and Verification

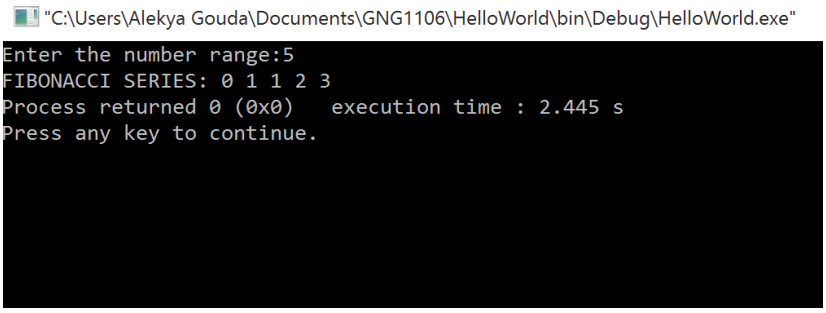
Test Cases:

Test Case	Number Range	Fibonacci Series
1	12	0,1,1,2,3,5,8,13,21,34,55,89
2	5	0,1,1,2,3
3	20	0,1,1,2,3,5,8,13,21,34,55,89,144,233,377,610,987,1597,2584,4181

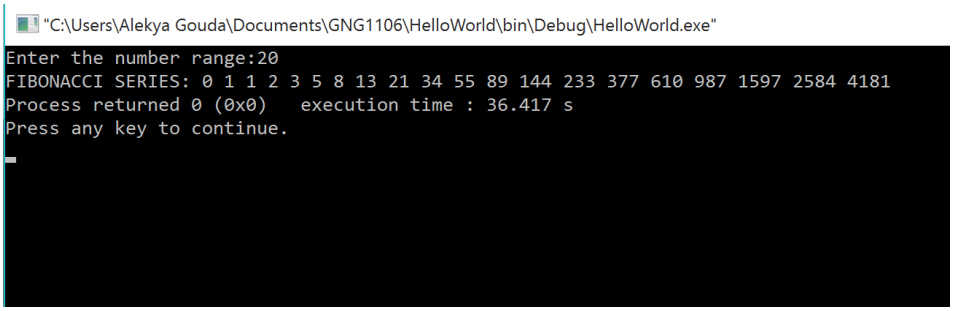
Test Case 1



Test Case 2



Test Case 3



So we can conclude that the program is working accurately.

Question 4

Problem Identification

To compute a program promts the user to enter a positive interger and prints out the set of all binary strings.

Gathering Information

A binary string is a sequence of 0's and 1's. Let ∑ be the set {0,1}. Then the set of finite binary strings is written as ∑*, and the set of finite and infinite binary strings is written as ∑**. (The same notation is used for other alphabets other than 0 and 1).

Test Cases and Algorithm

Test Case	Input Value	Output Binary
1	30	11110
2	6	110
3	45	101101

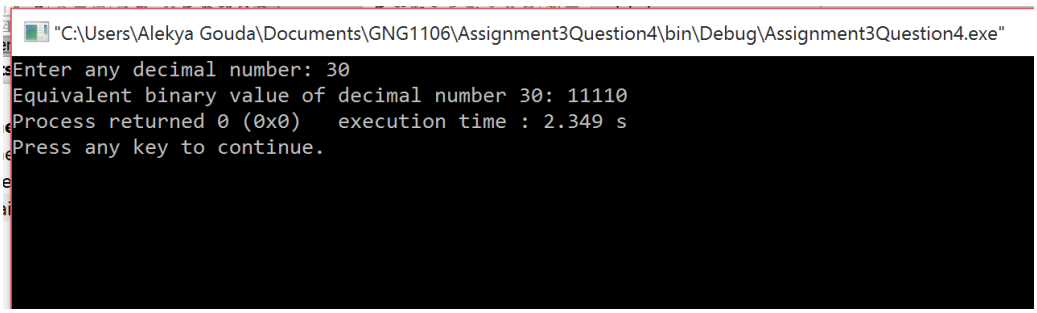
Implementation

```
#include<stdio.h>

int main(){

   long int decimalNumber,remainder,quotient;

    int binaryNumber[100],k=1,m;


    printf("Enter any decimal number: ");

    scanf("%ld",&decimalNumber);
```

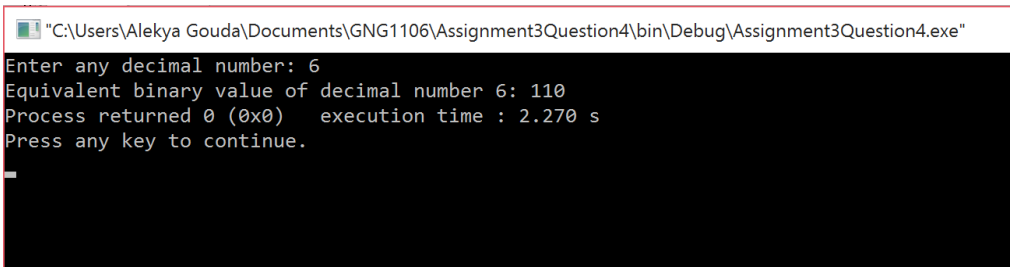
```
 quotient = decimalNumber;
 while(quotient!=0){
         binaryNumber[k++]= quotient % 2;
          quotient = quotient / 2;
 }
printf("Equivalent binary value of decimal number %d: ",decimalNumber);
  for(m = k -1 ;m> 0;m--)
   printf("%d",binaryNumber[m]);
    return 0;
}
```

Software Testing and Verification

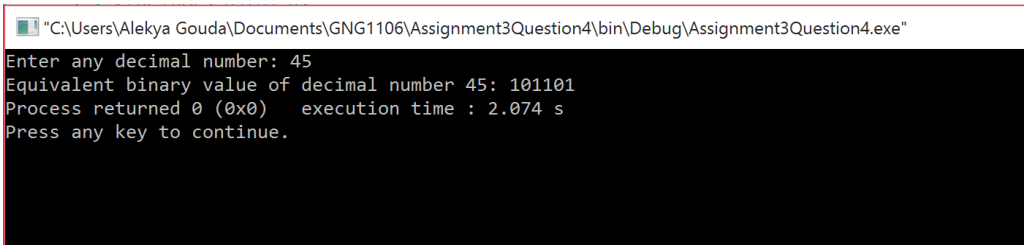
Test Case 1



Test Case 2



Test Case 3



Therefore we can say that the code is working accuratly.