

Program1

```
//20191128 Jian Park
#include <iostream>
#include <fstream>
#include <string>

using namespace std;

// it is a function that converts n to binary number string and return it
string myIntegerToBinary(int n){
    string bi; //string that save binary number
    int i=0;
    char c; // c is

    while(n!=0){ //repeat until n becomes 0
        i=n%2; //i is the remainder of n divided by 2
        c=i+'0'; //change i to char and put it in c
        bi=c+bi; //add c to bi that is string
        n/=2; //n is the quotient of n divided by 2.
    }

    return bi; //return bi
}

int main() {
    ifstream inFile;
    ofstream outFile; //set file open mode
    inFile.open("Program1Input.txt"); //open input file
    outFile.open("Program1Output.txt"); //open output file
    int n;

    inFile >> n; //input n
    outFile << myIntegerToBinary(n); //output myIntegerToBinary(n)

    inFile.close(); //close input file
    outFile.close(); //close output file
    return 0;
}
```

The binary number of n is the reverse of the remainder of n divided by 2

So input n and until n become zero, n divided by 2.

To reverse of the remainder, $bi = c + bi$, not $bi = bi + c$

Decimal number : 17

2	17	1
2	8	0
2	4	0
2	2	0
	1	

Binary number: 10001

Program2

```
//20191128 Jian Park
#include <iostream>
#include <iomanip>
#include <fstream>

using namespace std;

int myFibonacci(int n){
    if(n==0) return 0; //if n is 0, return 0
    else if(n==1) return 1; //if n is 1, return 1
    else return myFibonacci(n-1)+myFibonacci(n-2);
    //another case return the sum of the (n - 1)-th and (n - 2)-th numbers
}

int main() {
    ifstream inFile;
    ofstream outFile; //set file open mode
    inFile.open("Program2Input.txt"); //open input file
    outFile.open("Program2Output.txt"); //open output file
    int n;

    inFile >> n; //input n
    outFile << myFibonacci(n); //output myFibonacci(n)

    inFile.close(); //close input file
    outFile.close(); //close output file
    return 0;
}
```

Fibonacci sequence are 0 and 1. The n -th number of the Fibonacci sequence for $n \geq 2$ is then defined as the sum of the $(n - 1)$ -th and $(n - 2)$ -th numbers.

So if n is 0, return 0 and if n is 1, return 1. Another case return the sum of the $(n - 1)$ -th and $(n - 2)$ -th numbers that is $\text{myFibonacci}(n-1) + \text{myFibonacci}(n-2)$