AMRITA
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CSE – B

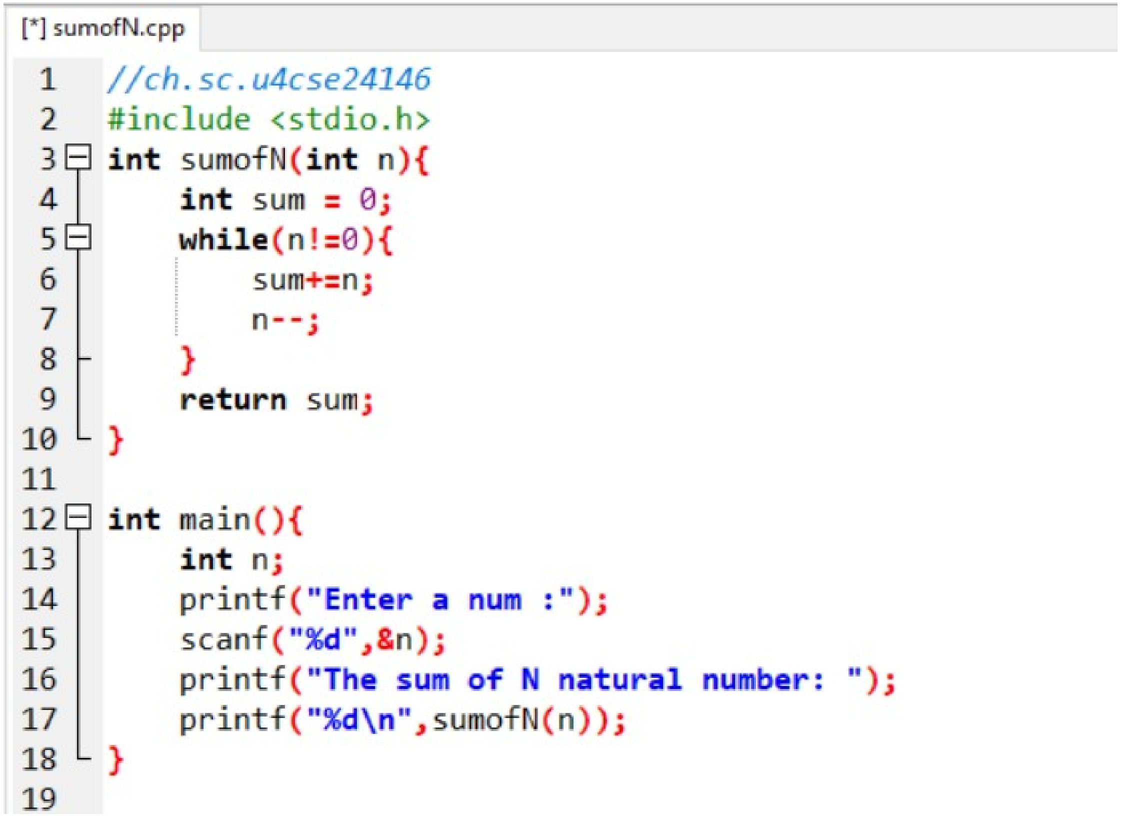
CH.SC.U4CSE24146

Date : 27/11/2025

Week-1

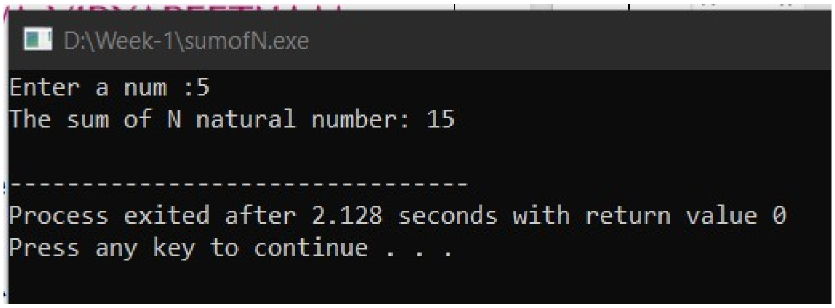
1.Write a program to find the sum of first N natural number

CODE:



```c
//ch.sc.u4cse24146
#include <stdio.h>
int sumofN(int n){
    int sum = 0;
    while(n!=0){
        sum+=n;
        n--;
    }
    return sum;
}

int main(){
    int n;
    printf("Enter a num :");
    scanf("%d",&n);
    printf("The sum of N natural number: ");
    printf("%d\n",sumofN(n));
}
```

OUTPUT:



```
Enter a num :5
The sum of N natural number: 15

--------------------------------
Process exited after 2.128 seconds with return value 0
Press any key to continue . . .
```

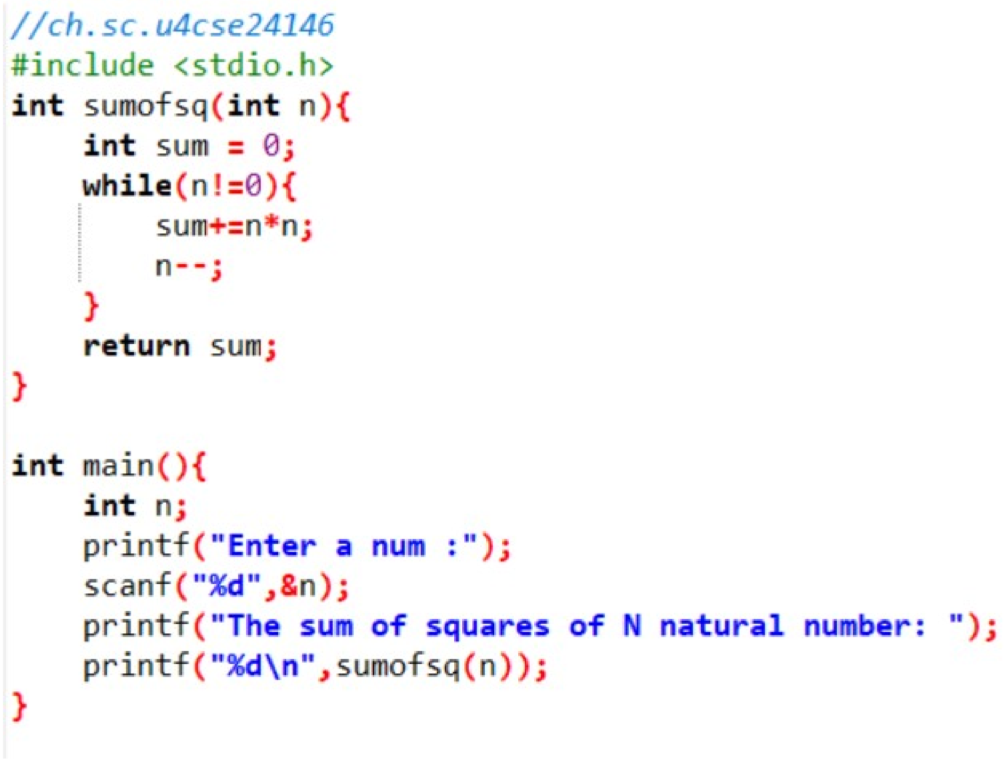
SPACE COMPLEXITY:

The space complexity of this program is O(1) as there are no variable with varying size, therefore the space complexity is a constant here.

Ie, the variable “sum” remains the same size even after summing From 1 to N numbers.

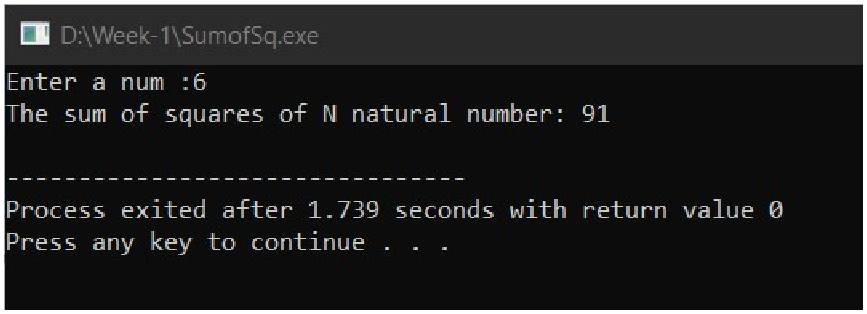
2. Write a program to find the sum of Square first N natural number

CODE:



```c
//ch.sc.u4cse24146
#include <stdio.h>
int sumofsq(int n){
    int sum = 0;
    while(n!=0){
        sum+=n*n;
        n--;
    }
    return sum;
}

int main(){
    int n;
    printf("Enter a num :");
    scanf("%d",&n);
    printf("The sum of squares of N natural number: ");
    printf("%d\n",sumofsq(n));
}
```

OUTPUT:



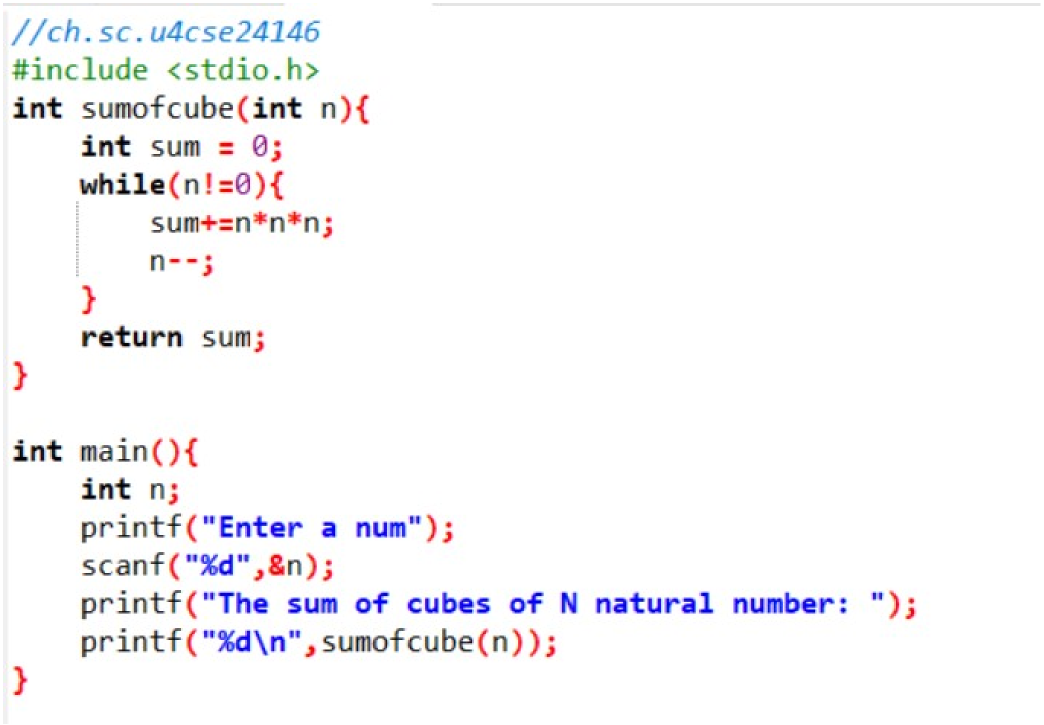
```
Enter a num :6
The sum of squares of N natural number: 91

--------------------------------
Process exited after 1.739 seconds with return value 0
Press any key to continue . . .
```

SPACE COMPLEXITY:

The space complexity of this program is O(1) as there are no variable with varying size, ie the variable’s size created doesn’t change with input.

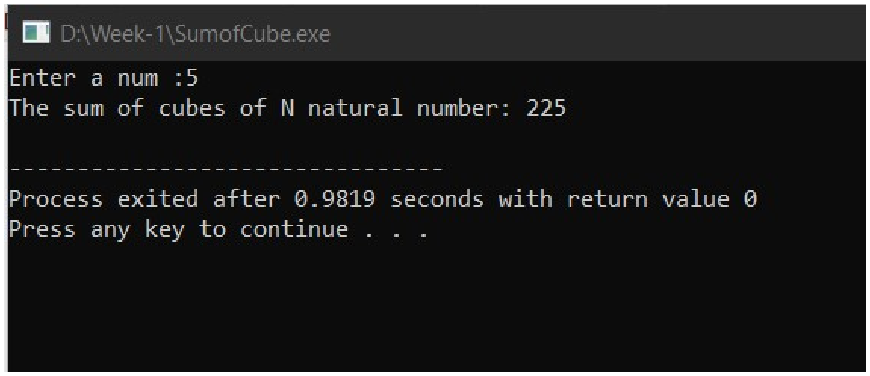
3.Write a program to find the sum of Cube first N natural number

CODE:



```
//ch.sc.u4cse24146
#include <stdio.h>
int sumofcube(int n){
	int sum = 0;
	while(n!=0){
		sum+=n*n*n;
		n--;
	}
	return sum;
}

int main(){
	int n;
	printf("Enter a num");
	scanf("%d",&n);
	printf("The sum of cubes of N natural number: ");
	printf("%d\n",sumofcube(n));
}
```

OUTPUT:



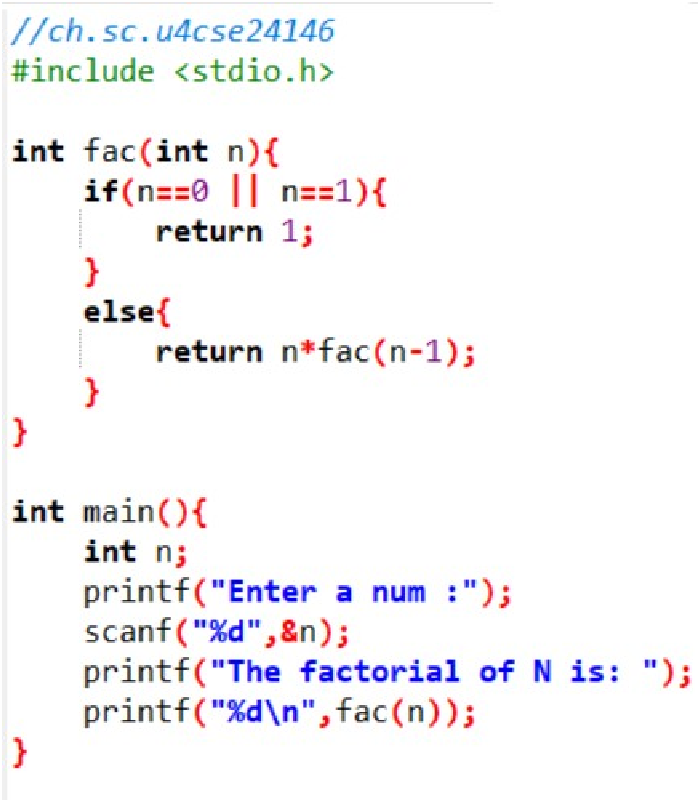
```
Enter a num :5
The sum of cubes of N natural number: 225

--------------------------------
Process exited after 0.9819 seconds with return value 0
Press any key to continue . . .
```

SPACE COMPLEXITY:

The space complexity of this program is O(1) as there are no variable with varying size, ie the variable’s size created doesn’t change with input.

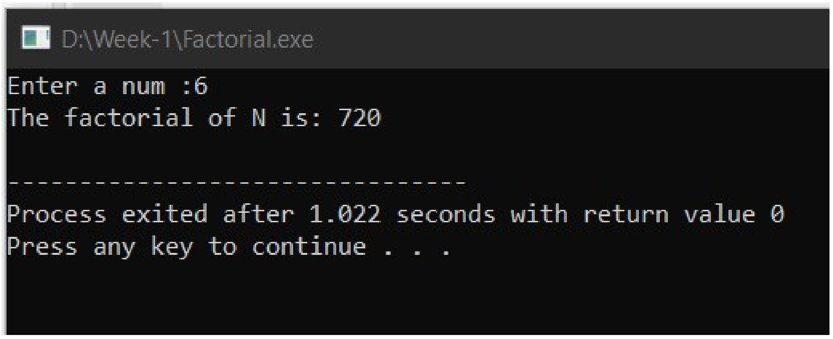
4.Write a program to find factorial using recursion

CODE:



```c
//ch.sc.u4cse24146
#include <stdio.h>

int fac(int n){
    if(n==0 || n==1){
        return 1;
    }
    else{
        return n*fac(n-1);
    }
}

int main(){
    int n;
    printf("Enter a num :");
    scanf("%d",&n);
    printf("The factorial of N is: ");
    printf("%d\n",fac(n));
}
```

OUTPUT:



```
Enter a num :6
The factorial of N is: 720

--------------------------------
Process exited after 1.022 seconds with return value 0
Press any key to continue . . .
```

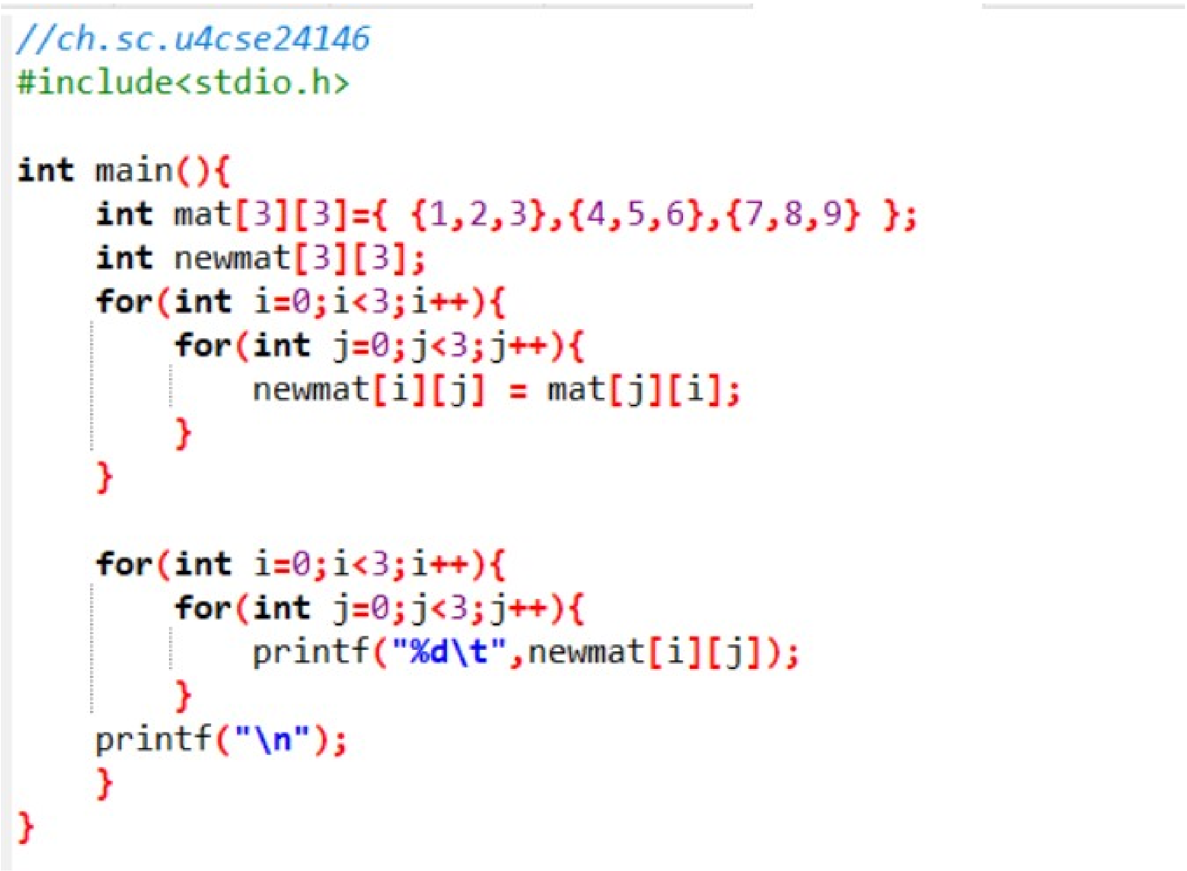
SPACE COMPLEXITY:

The space complexity of this program is O(n) as the recursive function gets called for “n” times so each time it gets called the result should be stored in memory. There are “n” number of result stored in memory hence it size increases by “n”. Therefore space complexity is “n”.

Each time function gets called the value is stored in a stack for recursive function, as there are “n” function calls therefore O(n) is the space complexity.

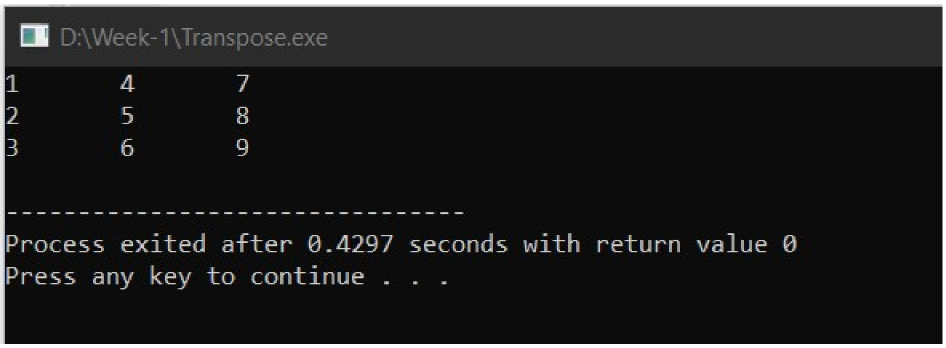
5. Write a program to find transpose of a 3*3 Matrix

CODE:



```
//ch.sc.u4cse24146
#include<stdio.h>

int main(){
	int mat[3][3]={ {1,2,3},{4,5,6},{7,8,9} };
	int newmat[3][3];
	for(int i=0;i<3;i++){
		for(int j=0;j<3;j++){
			newmat[i][j] = mat[j][i];
		}
	}
	
	for(int i=0;i<3;i++){
		for(int j=0;j<3;j++){
			printf("%d\t",newmat[i][j]);
		}
	printf("\n");
	}
}
```

OUTPUT:



```
1       4       7
2       5       8
3       6       9

--------------------------------
Process exited after 0.4297 seconds with return value 0
Press any key to continue . . .
```

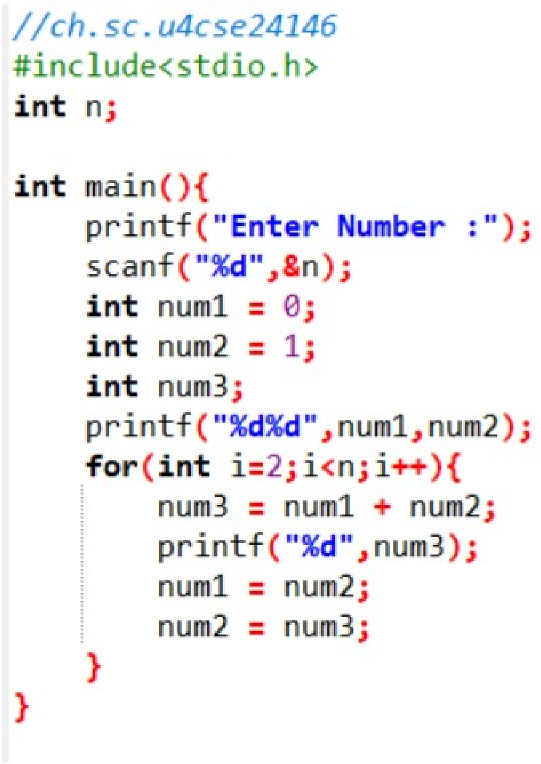
SPACE COMPLEXITY:

The space complexity of this program is O(1) as there are no variable with varying size, ie the variable’s size created doesn’t change with input.

If mat[n][m] is given then space complexity would be O(n*m).
ie variable’s length can be changed by the input.

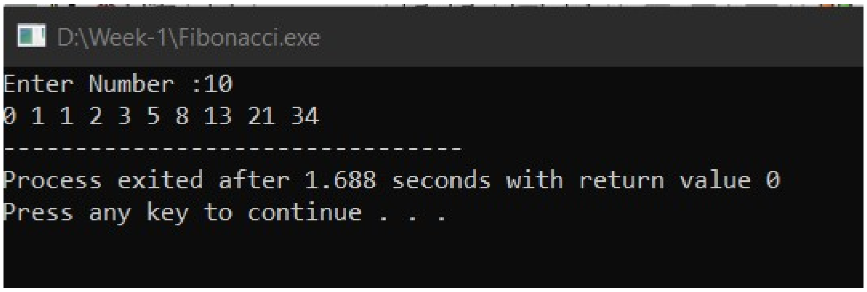
6. Write a program to find Fibonacci series

CODE:



```
//ch.sc.u4cse24146
#include<stdio.h>
int n;

int main(){
    printf("Enter Number :");
    scanf("%d",&n);
    int num1 = 0;
    int num2 = 1;
    int num3;
    printf("%d%d",num1,num2);
    for(int i=2;i<n;i++){
        num3 = num1 + num2;
        printf("%d",num3);
        num1 = num2;
        num2 = num3;
    }
}
```

OUTPUT:



```
Enter Number :10
0 1 1 2 3 5 8 13 21 34
--------------------------------
Process exited after 1.688 seconds with return value 0
Press any key to continue . . .
```

SPACE COMPLEXITY:

The space complexity of this program is O(1) as there are no variable with varying size, ie the variable’s size created doesn’t change with input.