

EXPERIMENT:-2

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Branch: CSE-IOT

Semester: 3RD

Subject Name:- Programming in Java lab

Subject Code: 210-20CSP-235_20BIT-1_A

UID:- 20BCS4576

Section/Group:-A

Date of Performance:- 28/08/2021

1. Aim/Overview of the practical:- The Fibonacci sequence is defined by the following rule. The first 2 values in the sequence are 1, 1. Every subsequent value is the sum of the 2 values preceding it. Write a Java program that uses both recursive and non-recursive functions to print the nth value of the Fibonacci sequence.

2. Task to be done:-

- The Fibonacci series of element where, the previous two elements are added to get the next elements, starting with 0 and 1. Here previous terms of Fibonacci is 1 and current is 1, so that next term = previous(1) + current(1) etc so on.
- Fibonacci series is calculated using recursion, with seed as 0 and 1. Recursion means a function calling itself, in the below code Fibonacci function calls itself with a lesser value several time.

3. Apparatus(For applied/experimental sciences/materials based labs):-

- Notepad++
- Command Prompt

4. Algorithm/Flowchart (For programming based labs):-

Non-Recursive

- Step 1:- Start
- Step 2:- Declare Variable prev, curr, next, i.
- Step 3:- Initialize variable prev=1, curr=1, i=10
- Step 4:- Read value of length from user.
- Step 5:- print enter the length of Fibonacci.
- Step 6:- Repeat until $i \leq \text{length}$
 - Step 6.1:- $\text{next} = \text{prev} + \text{curr}$
 - Step 6.2:- print next
 - Step 6.3:- $\text{prev} = \text{curr}, \text{curr} = \text{next}$
 - Step 6.4:- $i = i + 1$
- Step 7:- Stop

Recursive

- Step 1:- Start
- Step 2:- Declare a variable for the total numbers of terms.
- Step 3:- Ask the user to initialize the number of terms.
- Step 4:- Print the first and second numbers of the series.
- Step 5:- Call a recursive function to print the Fibonacci series up to
That number of terms.
- Step 6:- Update the series terms recursively.
- Step 7:- Print the Fibonacci series.
- Step 8:- Stop

5. Code (For creative domains):-

Non-Recursive

```
import java.util.Scanner;
class Fibonacci{

    public static void main(String[] args)
    {
        int prev=1;
        int curr=1;
        System.out.println("Enter the length of fibonacci : ");
        Scanner input=new Scanner(System.in);
        int length=input.nextInt();

        System.out.println("Fibonacci of first "+length+" numbers : ");
        System.out.println(prev);
        System.out.println(curr);
        for(int i=3; i<=length; i++)

        {
            int next=prev+curr;
            System.out.println(next);
            prev=curr;
            curr=next;
        }
    }
}
```

With Recursive

```
class FibonacciRec{
static int n1=0,n2=1,n3=0;
static void printFibonacci(int count){
    if(count>0){
        n3 = n1 + n2;
        n1 = n2;
        n2 = n3;
        System.out.print(" "+n3);
        printFibonacci(count-1);
    }
}

public static void main(String args[]){
    int count=10;
    System.out.print(n1+" "+n2);
    printFibonacci(count-2);
}
}
```

6. Percentage error (if any or applicable):-NA

7. Result/Output/Writing Summary:-

Non-Recursive Output

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19042.1165]
(c) Microsoft Corporation. All rights reserved.

C:\3RD SEMESTER ALL\3RD SEM_JAVA>java Fibonacci.java
Enter the length of fibonacci :
10
Fibonacci of first 10 numbers :
1
1
2
3
5
8
13
21
34
55
```

Recursive Output

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.19042.1165]
(c) Microsoft Corporation. All rights reserved.

C:\3RD SEMESTER ALL\3RD SEM_JAVA>java FibonacciRec.java
0 1 1 2 3 5 8 13 21 34
C:\3RD SEMESTER ALL\3RD SEM_JAVA>
```

8. Graphs (If Any): Image /Soft copy of graph paper to be attached here

NA

Learning outcomes (What I have learnt):

- 1. Learn How to create the Fibonacci series and Fibonacci Using Recursion.**
- 2. Learn how to write types of loops.**
- 3. To learn Select the correct type of loop based on a given problem.**
- 4. To learn Fibonacci Series.**
- 5. To learn Fibonacci Series using Recursion.**

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

Sr. No.	Parameters	Marks Obtained	Maximum Marks
1.			
2.			
3.			