

## Day 2 : Special Logic Building

1. Print 1 to n without using loops

```
package Assignment2;
```

```
public class PrintNumber {
```

```
    public static void printNumbers(int n) {
```

```
        if (n > 0) {
```

```
            printNumbers(n - 1);
```

```
            System.out.println(n);
```

```
        }
```

```
    }
```

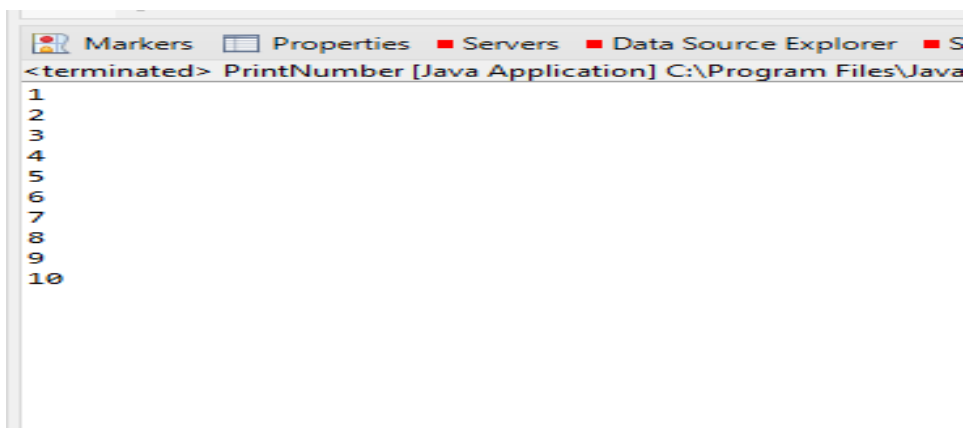
```
    public static void main(String[] args) {
```

```
        int n = 10; // Change n to whatever value you want
```

```
        printNumbers(n);
```

```
    }
```

```
}
```



2)

1. Sum of natural numbers using recursion

```
package Assignment2;
```

```
public class SumOfNaturalNumbers {
```

```
    public static int sumOfNumbers(int n) {
```

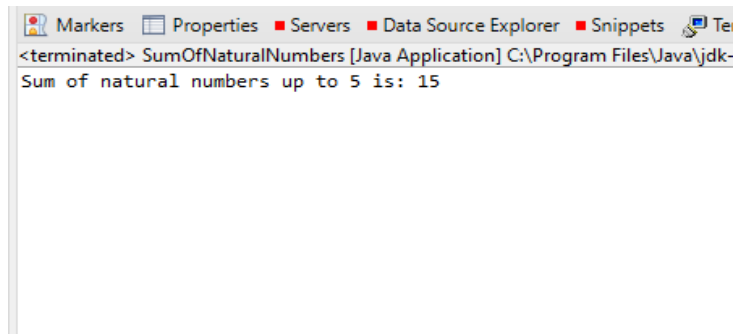
```
        if (n == 0) {
```

```

        return 0;
    } else {
        return n + sumOfNumbers(n - 1);
    }
}

public static void main(String[] args) {
    int n = 5; // Change n to whatever value you want
    int sum = sumOfNumbers(n);
    System.out.println("Sum of natural numbers up to " + n + " is:
" + sum);
}
}

```



3)

### 1. Mean of Array using

Recursion class

MeanArray{

```

public static double Mean(int []arr,int n){
    if(n==0)return 0.0;
    return (Mean(arr,n-1)*(n-1)+arr[n-1])/n;
}

```

```

public static void main(String[]args){

```

```

    int arr[]={ 1,2,3,4,5 };

```

```

    System.out.println("the mean of the array is "+Mean(arr,arr.length));

```

```

}}

```

```
E:\edac_dsa_assignments\Assignment2>java MeanArray  
the mean of the array is 3.0
```

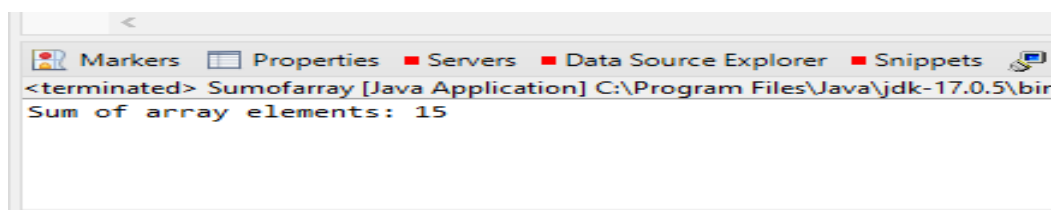
## 1.1 Sum of array elements using recursion

```
package Assignment2;

public class Sumofarray {

    public static int arraySum(int[] arr, int n) {
        // Base case: when n is 0, return 0
        if (n <= 0) {
            return 0;
        } else {
            // Recursive step: add current element and sum of remaining
            elements
            return arr[n - 1] + arraySum(arr, n - 1);
        }
    }

    public static void main(String[] args) {
        int[] arr = { 1, 2, 3, 4, 5 }; // Example array
        int sum = arraySum(arr, arr.length);
        System.out.println("Sum of array elements: " + sum);
    }
}
```



## 2. Decimal to binary number using recursion

```
class DecimalToBinary{  
    public static int Binary(int n){  
        if(n==0)return 0;  
        return Binary(n/2)*10+n%2;  
    }  
  
    public static void main(String[]args){  
        int n=10;  
        System.out.println("the binary conversion of "+n+ " is "+Binary(n));  
    }  
}
```

```
E:\edac_dsa_assignments\Assignment2>java DecimalToBinary  
the binary conversion of 10 is 1010
```

### 3. Sum of digit of a number using recursion

```
class SumDigits{  
    public static int Sum(int n){  
        if(n==0)return 0;  
        return Sum(n/10)+n%10;  
    }  
    public static void main(String[]args){  
        int n=1234;  
        System.out.println("the sum of digits of no "+n+" is "+Sum(n));  
    }  
}
```

```
E:\edac_dsa_assignments\Assignment2>java SumDigits  
the sum of digits of no 1234 is 10  
E:\edac_dsa_assignments\Assignment2>
```

#### 4. Print reverse of a string using recursion

```
class StringReverse{  
    public static String Reverse(String input){  
        if( input.length()==0 || input.length()==1){return input;}  
        return Reverse(input.substring(1))+input.charAt(0);  
    }  
    public static void main(String[]args){  
        String str="swapnali";  
        System.out.println("the rev of "+str+"is "+Reverse(str));  
    }  
}
```

```
<terminated> Program [Java Application] C:\Users\  
the rev of swapnali is ilanpaws
```

## 5. Program for length of a string using recursion

```
class StringLength{  
    public static int Length(String str){  
        if(str.length()==0){return 0;}  
        return Length(str.substring(1))+1;  
    }  
    public static void main(String[]args){  
  
        String str="swapnali";  
        System.out.println("the length of "+ str +" is "+Length(str));  
    }  
}
```

```
<terminated> Program [Java Application] C:\Users\  
the length of swapnali is 8
```



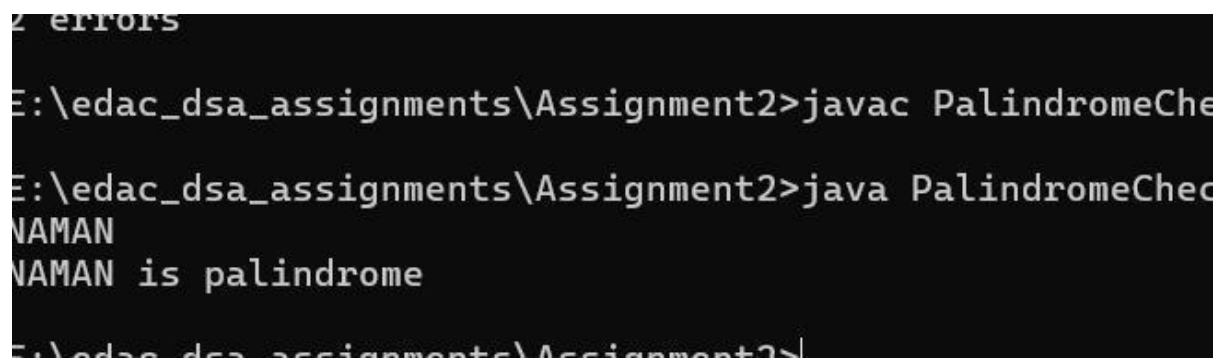
## 6. Recursive function to check if a string is palindrome

```
import java.util.Scanner;

class PalindromeChecker{

public static boolean isPalindrome(String input){
if(input.length()==0 || input.length()==1){return true;}
if(input.charAt(0)!=input.charAt(input.length()-1)){
return false;}
return isPalindrome(input.substring(1,input.length()-1));
}

public static void main(String[]args){
Scanner sc=new Scanner(System.in);
String str=sc.next();
if(isPalindrome(str)){
System.out.println(str + " is palindrome " );}
else{
System.out.println(str + " is not palindrome " );
}
}}
```



```
2 errors
E:\edac_dsa_assignments\Assignment2>javac PalindromeChe
E:\edac_dsa_assignments\Assignment2>java PalindromeChec
NAMAN
NAMAN is palindrome
E:\edac_dsa_assignments\Assignment2>
```

7. Tail recursion to calculate sum of array elements.

```
class SumArray{  
    public static int Sum(int []arr,int n){  
        if(n==0){return 0;}  
        int sSum=Sum(arr,n-1);  
        return sSum+arr[n-1];  
    }  
    public static void main(String[]args){  
        int arr[]={ 1,2,3,4,5};  
        System.out.println("the sum of the array is "+Sum(arr,arr.length));  
    }  
}
```

```
E:\edac_dsa_assignments\Assignment2>java SumArray  
the sum of the array is 15  
E:\edac_dsa_assignments\Assignment2>
```

## 8. Print Fibonacci Series in reverse order using Recursion

```
import java.util.*;

class PrintFibonacciReverse{

public static List<Integer>list=new ArrayList<>();

public static List<Integer> printFib(int n){
if(n==1){list.add(0);return list;}
if(n==2){list.add(0);list.add(1);return list;}

List<Integer>result=printFib(n-1);
int fLast=result.get(result.size()-1);
int sLast=result.get(result.size()-2);
int last=fLast+sLast;
if(last<n){

result.add(last);
}

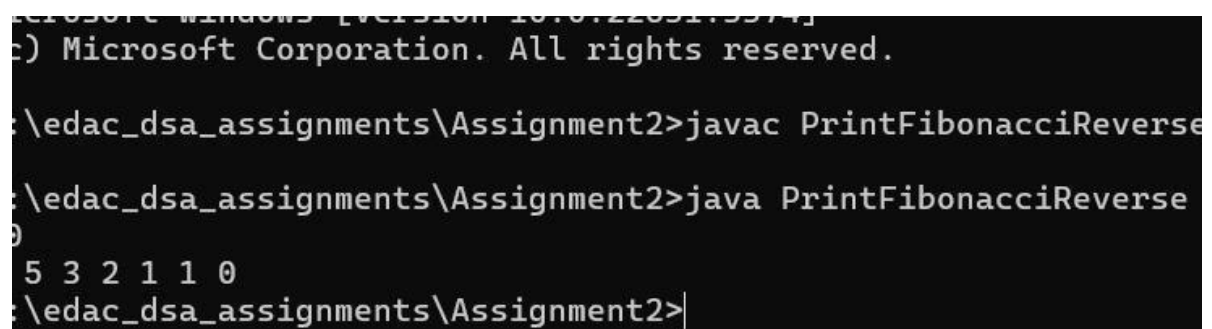
return result;

}

public static void printReverse(List<Integer>list){
if(list.size()==0)return;
Integer val=list.get(0);
list.remove(val);
printReverse(list);
System.out.print(val+" ");

}
```

```
public static void main(String[] args){  
    Scanner sc=new Scanner(System.in);  
    int n=sc.nextInt();  
    List<Integer>res=printFib(n);  
    printReverse(res);  
}
```



A screenshot of a Windows command prompt window. The title bar at the top reads "Microsoft Windows [Version 10.0.22031.3574]". The first line of the command prompt shows the copyright notice: "© Microsoft Corporation. All rights reserved." The subsequent lines show the user navigating to the directory "C:\edac\_dsa\_assignments\Assignment2" and running the following commands: "javac PrintFibonacciReverse.java" and "java PrintFibonacciReverse 5". The output of the program is displayed as "5 3 2 1 1 0". The prompt then returns to "C:\edac\_dsa\_assignments\Assignment2>".

```
Microsoft Windows [Version 10.0.22031.3574]  
© Microsoft Corporation. All rights reserved.  
C:\edac_dsa_assignments\Assignment2>javac PrintFibonacciReverse.java  
C:\edac_dsa_assignments\Assignment2>java PrintFibonacciReverse 5  
5 3 2 1 1 0  
C:\edac_dsa_assignments\Assignment2>
```