**LAB#03**

**Lab Task#01:**

1. Write a program which takes an integer value (k) as input and prints the sequence of numbers from k to 0 in descending order.

**Code: Output:**

import java.util.\*;

public class Lab3 {

public static void main(String[] args) {

 Scanner no = new Scanner(System.in);

System.out.print("Please input a number (k): ");

for (int k = no.nextInt(); k >= 0; k--) {

System.out.print(k + " "); }

}

}

**Lab Task#02:**

2. Write a program to reverse your full name using Recursion.

**Code: Output:**

import java.util.\*;

A close up of a name

Description automatically generatedpublic class Lab3 {

public static void main(String[] args) {

Scanner inp = new Scanner(System.in);

System.out.print("Please enter your name: ");

System.out.println("Reversed name: " + reverse(inp.nextLine())); }

public static String reverse(String name) {

if (name.length() == 0) {

return ""; }

return name.charAt(name.length() - 1) + reverse(name.substring(0, name.length() - 1)); }

}

**Lab Task#03:**

3. Write a program to calculate the sum of numbers from 1 to N using recursion. N should be user input.

**Code: Output:**

import java.util.\*;

public class Lab3 {

public static void main(String[] args) {

Scanner no = new Scanner(System.in);

System.out.print("Enter a +ive integer (N): ");

int Nth = no.nextInt();

System.out.println("The total sum from 1 to " + Nth + " is: " + calculateSum(Nth)); }

public static int calculateSum(int N) {

if (N <= 0) {

return 0;}

return N + calculateSum(N - 1);}

}

**Lab Task#04:**

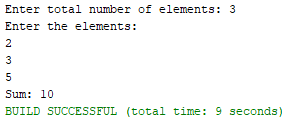
4. Write a recursive program to calculate the sum of elements in an array.

**Code: Output:**

import java.util.\*;

public class Lab3 {

public static void main(String[] args) {

 Scanner no = new Scanner(System.in);

System.out.print("Enter total number of elements: ");

int size = no.nextInt();

int[] array = new int[size];

System.out.println("Enter the elements:");

for (int i = 0; i < size; i++) {

array[i] = no.nextInt(); }

System.out.println("Sum: " + calculateSum(array, size));

}

public static int calculateSum(int[] array, int size) {

if (size == 0) {

return 0; }

return array[size - 1] + calculateSum(array, size - 1); }

}

**Lab Task#05:**

5. Write a recursive program to calculate the factorial of a given integer n.

**Code:**

import java.util.\*;

public class Lab3 {

public static void main(String[] args) {

Scanner no = new Scanner(System.in);

System.out.print("Enter a number for factorial calculation: ");

int n = no.nextInt();

System.out.println("Factorial (" + n + ") = " + factorial(n));

}

public static int factorial(int n) {

if (n <= 1) {

return 1; }

return n \* factorial(n - 1); }

}

**Output:**



**Lab Task#06:**

6. Write a program to count the digits of a given number using recursion.

**Code: Output:**

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Description automatically generatedimport java.util.\*;

public class Lab3 {

public static void main(String[] args) {

Scanner no = new Scanner(System.in);

System.out.print("Input a number to count digits: ");

int number = no.nextInt();

System.out.println(number + " has " + countDigits(number) + " digits.");

}

public static int countDigits(int n) {

if (n < 10 && n > -10) {

return 1; }

return 1 + countDigits(n / 10); }

}

**HomeTask#01:**

1.Write a java program to find the N-th term in the Fibonacci series using Memoization.

**Code:**

import java.util.\*;

public class Lab3 {

static HashMap<Integer, Integer> memo = new HashMap<>();

public static void main(String[] args) {

Scanner no = new Scanner(System.in);

System.out.print("Please enter the Fibonacci term number (N): ");

int n = no.nextInt();

System.out.println("The Fibonacci value for term " + n + " is: " + fibonacci(n));

}

static int fibonacci(int n) {

if (n <= 1) return n;

if (memo.containsKey(n)) return memo.get(n);

int result = fibonacci(n - 1) + fibonacci(n - 2);

memo.put(n, result);

return result; }

}

**Output:**



**HomeTask#03:**

3. Write a java program to check whether a given string is a palindrome or not. A palindrome is a string that reads the same forwards and backwards.Print "YES" if the string is a palindrome, otherwise print "NO".

**Code: Output:**

import java.util.\*;

public class Lab3 {

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Description automatically generated public static void main(String[] args) {

Scanner inp = new Scanner(System.in);

System.out.print("Enter a string: ");

String input = inp.nextLine();

System.out.println(isPalindrome(input) ? "YES" : "NO");

}

static boolean isPalindrome(String str) {

for (int left = 0, right = str.length() - 1; left < right; left++, right--) {

if (str.charAt(left) != str.charAt(right)) return false;

}

return true; }

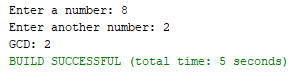
}

**HomeTask#04:**

4. Write a recursive program to find the greatest common divisor (GCD) of two numbers using Euclid's algorithm.

**Code: Output:**

import java.util.\*;

public class Lab3 {

public static void main(String[] args) {

Scanner no = new Scanner(System.in);

System.out.print("Enter a number: ");

int no1 = no.nextInt();

System.out.print("Enter another number: ");

int no2 = no.nextInt();

System.out.println("GCD: " + gcd(no1, no2));

}

static int gcd(int a, int b) {

if (b == 0) {

return a; }

return gcd(b, a % b); }

}