

**LAB-09**

**Title: Write recursive function for the following problems**

**a. To calculate the factorial of an integer number.**

**b. To calculate the Fibonacci number, given the index value.**

**c. To print the numbers 1 to 100 in reverse order.**

**d. To print the message “JAVA” 100 times**

**e. To calculate whether a given word is palindrome or not.**

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**Course Title: (Data Structures)**

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**Source Code:**

**Calculate.java:**

package Lab09;

public class Calculate {

    public static int factorial(int n) {

        if (n == 0) {

            return 1;

        } else {

            return n \* factorial(n - 1);

        }

    }

    public static int fibonacci(int n) {

        if (n <= 1) {

            return n;

        } else {

            return fibonacci(n - 1) + fibonacci(n - 2);

        }

    }

    public static void printReverse(int n) {

        if (n > 0) {

            System.out.print(" " +n);

            printReverse(n - 1);

        }

    }

    public static void printJava(int n) {

        if (n > 0) {

            System.out.print(" JAVA");

            printJava(n - 1);

        }

    }

    public static boolean isPalindrome(String word, int start, int end) {

        if (start >= end) {

            return true;

        } else if (word.charAt(start) != word.charAt(end)) {

            return false;

        } else {

            return isPalindrome(word, start + 1, end - 1);

        }

    }

}

**Main.java:**

package Lab09;

import java.util.Scanner;

public class Main {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

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

        int num = scanner.nextInt();

        System.out.println("Factorial: " + Calculate.factorial(num));

        System.out.println("Enter a number for fibonacci calculation:");

        num = scanner.nextInt();

        System.out.println("Fibonacci: " + Calculate.fibonacci(num));

        System.out.println("Printing numbers 1 to 100 in reverse order:");

        Calculate.printReverse(100);

        System.out.println("\nPrinting 'JAVA' 100 times:");

        Calculate.printJava(100);

        System.out.println("\nEnter a word to check if it's a palindrome:");

        String word = scanner.next();

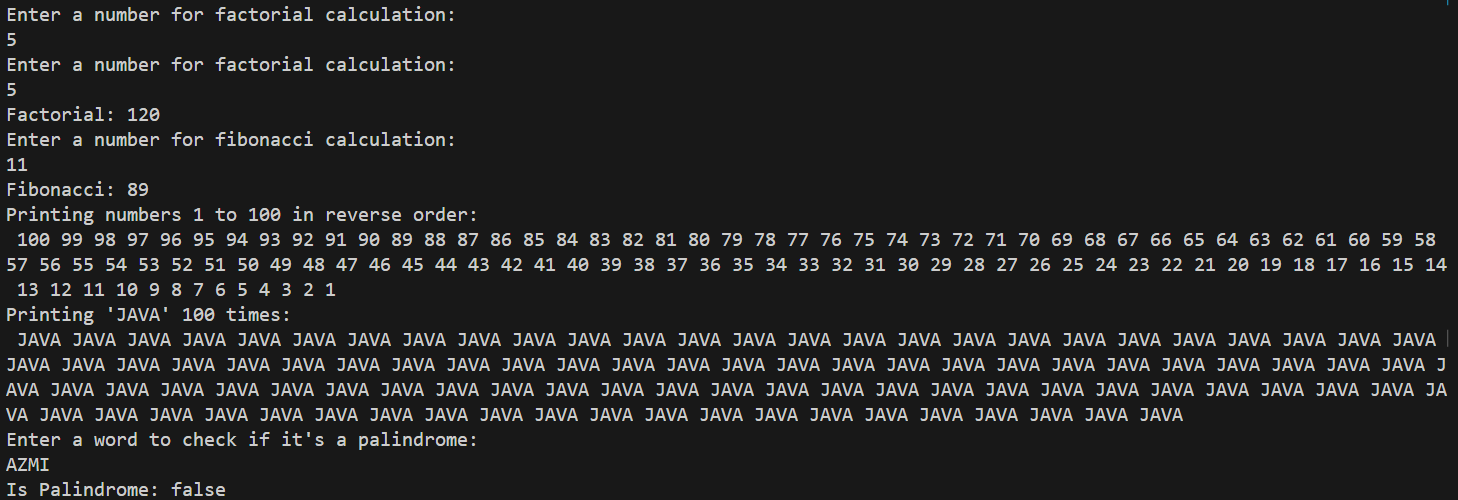
        System.out.println("Is Palindrome: " + Calculate.isPalindrome(word, 0, word.length() - 1));

        scanner.close();

    }

}

**Output:**

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