**practice-4.2**

Code:

public class Main {

// Linear class to compute factorial

public static class Linear {

// Method to calculate factorial using recursion

public static double factorial(double n) {

// Base case: if n <= 1

if (n <= 1) {

return 1;

}

// Recursive case: n \* factorial(n - 1)

else {

return n \* factorial(n - 1);

}

}

public static void main(String[] args) {

double d = 5.0;

double result = factorial(d);

System.out.println("Factorial [" + result + "] of [" + d + "]");

}

}

// NonLinear class to compute Fibonacci numbers

public static class NonLinear {

// Method to calculate Fibonacci number using recursion

public static double fibonacci(double n) {

// Base cases: if n < 2

if (n < 2) {

return n;

}

// Recursive case: fibonacci(n - 1) + fibonacci(n - 2)

else {

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

}

}

public static void main(String[] args) {

double d;

// Check if an argument is provided

if (args.length > 0) {

d = Double.parseDouble(args[0]);

} else {

d = 5.0;

}

// Print Fibonacci values for indices from 0 to d

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

double fibValue = fibonacci(i);

System.out.println("Fibonacci index [" + i + "] value [" + fibValue + "]");

}

}

}

// Entry point for running the program

public static void main(String[] args) {

// Run tests for both Linear and NonLinear classes

System.out.println("Testing Linear Class:");

Linear.main(args);

System.out.println("\nTesting NonLinear Class:");

NonLinear.main(args);

}

}

Output:

