```java
// Harini. R 192324108
//JP section-4_3 question-1
package test;

public class Linear {
    public static double factorial(double n) {
        if (n <= 1) {
            return 1;
        }
        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 + "]");
    }
}

```

Problems Javadoc Declaration Console × Coverage Error Log

<terminated> Linear [Java Application] C:\Users\harin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.v

```
Factorial [120.0] of [5.0]
```

```java
// Harini. R 192324108
//JP section-4_3 question-2
package test;

public class NonLinear {
    public static double fibonacci(double n) {
        // Base case: if n is less than 2, return n
        if (n < 2) {
            return n;
        }
        return fibonacci(n - 1) + fibonacci(n - 2);
    }
    public static void main(String[] args) {
        double d;
        if (args.length > 0) {
            d = Double.parseDouble(args[0]);
        } else {
            d = 5.0;
        }
        for (int i = 0; i <= (int)d; i++) {
            double fibValue = fibonacci(i);
            System.out.println("Fibonacci index [" + i + ".0] value [" + fibValue + ".0]");
        }
    }
}

```

Problems | Javadoc | Declaration | Console | Coverage | Error Log

<terminated> NonLinear [Java Application] C:\Users\harin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.1.v20240426-1149\jre

```
Fibonacci index [0.0] value [0.0.0]
Fibonacci index [1.0] value [1.0.0]
Fibonacci index [2.0] value [1.0.0]
Fibonacci index [3.0] value [2.0.0]
Fibonacci index [4.0] value [3.0.0]
Fibonacci index [5.0] value [5.0.0]
```

```java
// Harini. R 192324108
//JP section-4_3 question-3
package test;

public class FactorialTrace {

    public static double factorial(double d) {
        if (d <= 1) {
            System.out.println("factorial(" + d + ") = 1");
            return 1;
        } else {
            double result = d * factorial(d - 1);
            System.out.println("factorial(" + d + ") = " + d + " * factorial(" + (d - 1) + ") = " + result);
            return result;
        }
    }

    public static void main(String[] args) {
        double number = 7;
        double result = factorial(number);
        System.out.println("The factorial of " + number + " is: " + result);
    }
}
```

Problems | Javadoc | Declaration | Console | Coverage | Error Log

<terminated> FactorialTrace [Java Application] C:\Users\harin\.p2\pool\plugins\org.eclipse.justj.openjdk.hotspot.jre.full.win32.x86_64_22.0.1.v20240426-1149\jre\bin\java

```
factorial(1.0) = 1
factorial(2.0) = 2.0 * factorial(1.0) = 2.0
factorial(3.0) = 3.0 * factorial(2.0) = 6.0
factorial(4.0) = 4.0 * factorial(3.0) = 24.0
factorial(5.0) = 5.0 * factorial(4.0) = 120.0
factorial(6.0) = 6.0 * factorial(5.0) = 720.0
factorial(7.0) = 7.0 * factorial(6.0) = 5040.0
The factorial of 7.0 is: 5040.0
```