



**SCHOOL OF  
COMPUTING**

**R N VISHNU VIKAS**  
**CH.SC.U4CSE24151**  
**OBJECT ORIENTED PROGRAMMING**  
**(23CSE111)**  
**LAB RECORD**



**SCHOOL OF  
COMPUTING**

**AMRITA VISHWA VIDYAPEETHAM  
AMRITA SCHOOL OF COMPUTING, CHENNAI**

**BONAFIDE CERTIFICATE**

This is to certify that the Lab Record work for 23CSE111- Object Oriented Programming Subject submitted by **CH.SC.U4CSE24151 – R N VISHNU VIKAS** in “**Computer Science and Engineering**” is a Bonafide record of the work carried out under my guidance and supervision at Amrita School of Computing, Chennai.

This Lab examination held on

Internal Examiner 1

Internal Examiner 2

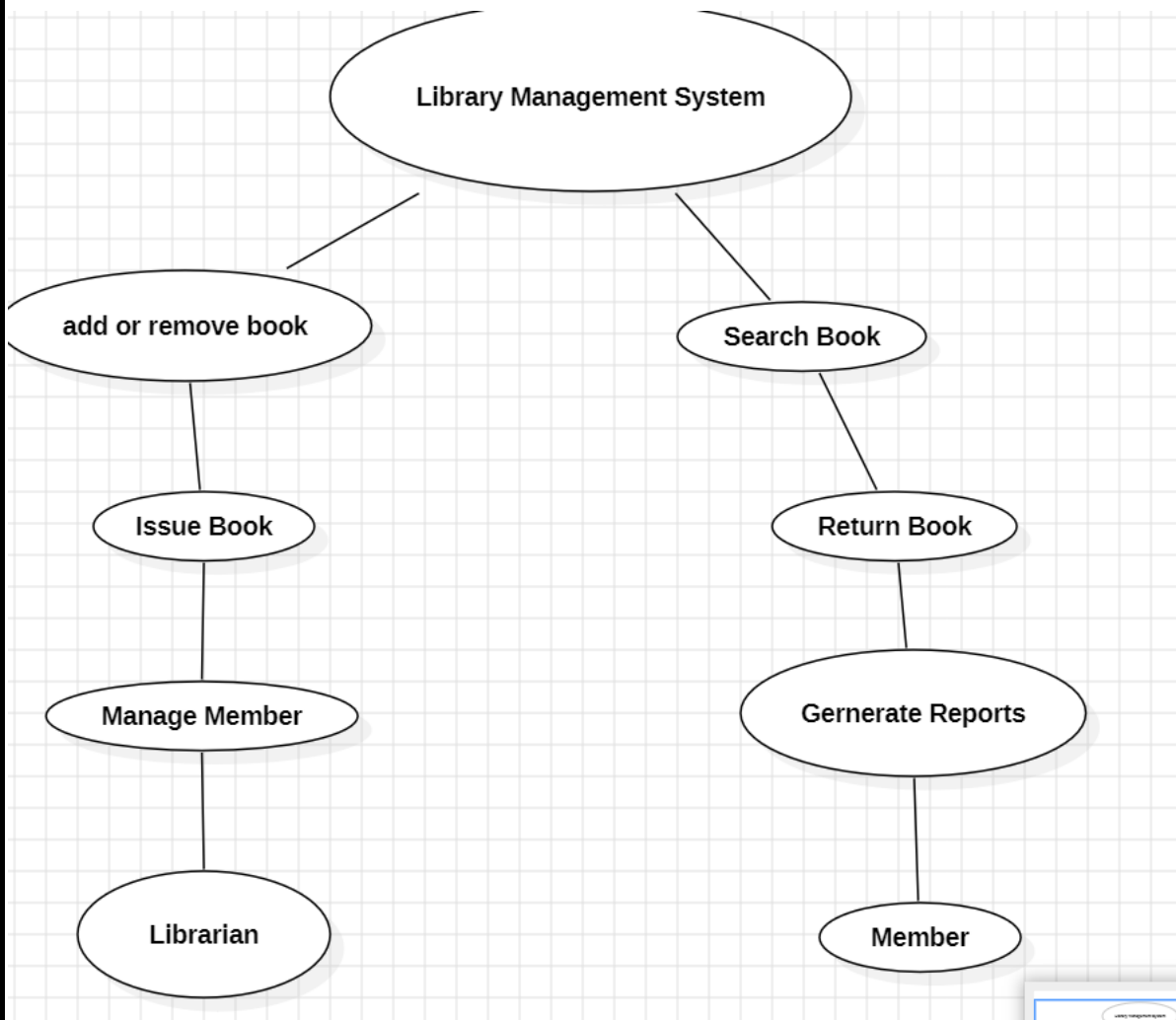
# INDEX

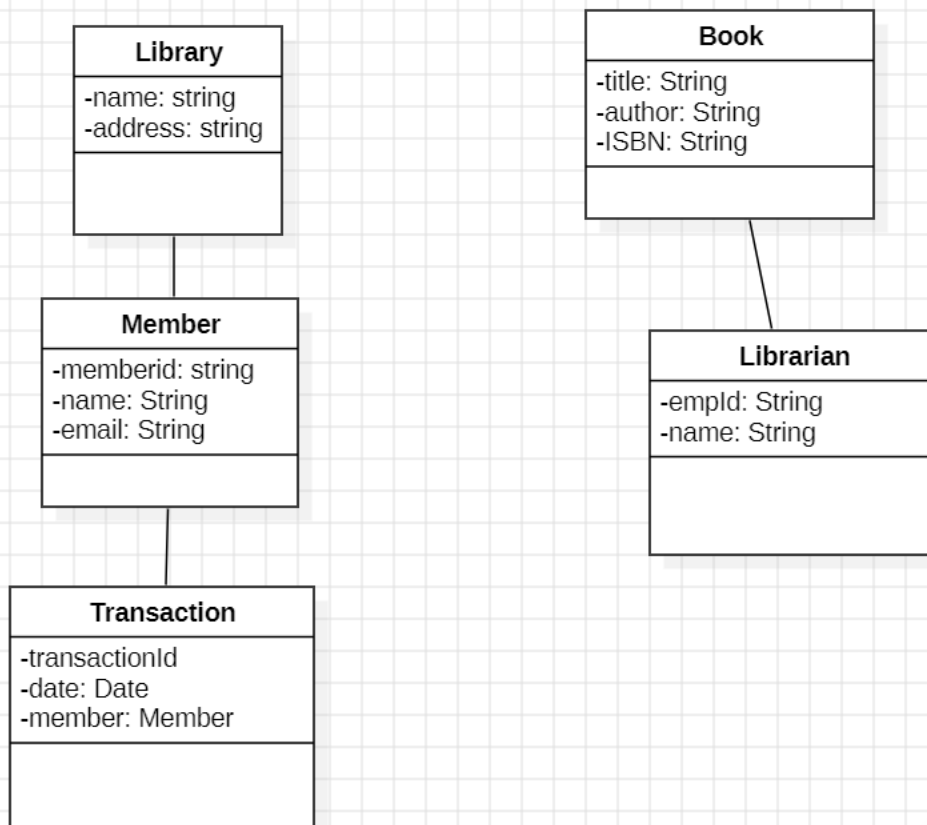
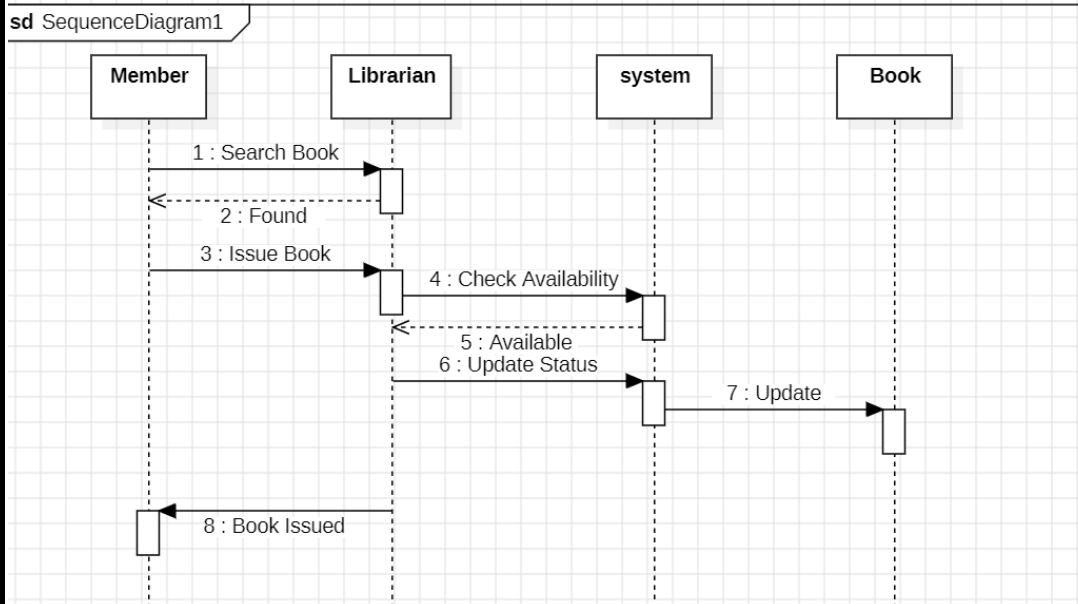
S.NO	TITLE	PAGE.NO
UML DIAGRAM		
1.	<b>LIBRARY MANAGEMENT SYSTEM</b>	
	1.a) Use Case Diagram	4
	1.b) Class Diagram	5
	1.c) Sequence Diagram	5
	1.d) Activity Diagram	6
	1.e) State-Activity Diagram	6
2.	<b>SHIPPING MANAGEMENT</b>	
	2.a) Use Case Diagram	7
	2.b) Class Diagram	8
	2.c) Sequence Diagram	8
	2.d) Communication Diagram	9
	2.e) State-Activity Diagram	9
3.	<b>BASIC JAVA PROGRAMS</b>	
	3.a) Calculator	10
	3.b) EvenOdd	11
	3.c) Factorial	12
	3.d) Fibonacci Series	13
	3.e) NumberCheck	14
	3.f) Prime Checker	15
	3.g) PrintNumbers	16
	3.h) ReverseNumber	17
	3.i) SumNatural	18
	3.j) TrianglePattern	19

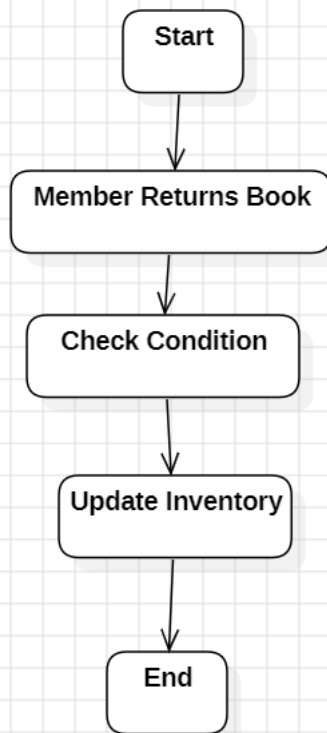
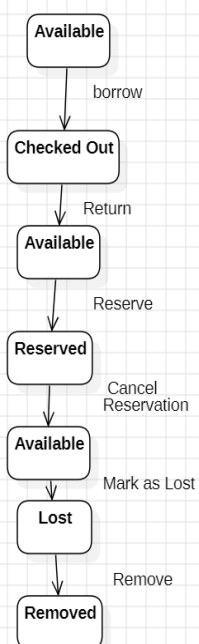
# UML DIAGRAMS

## 1. LIBRARY MANAGEMENT SYSTEM

### 1.a) Use Case Diagram:

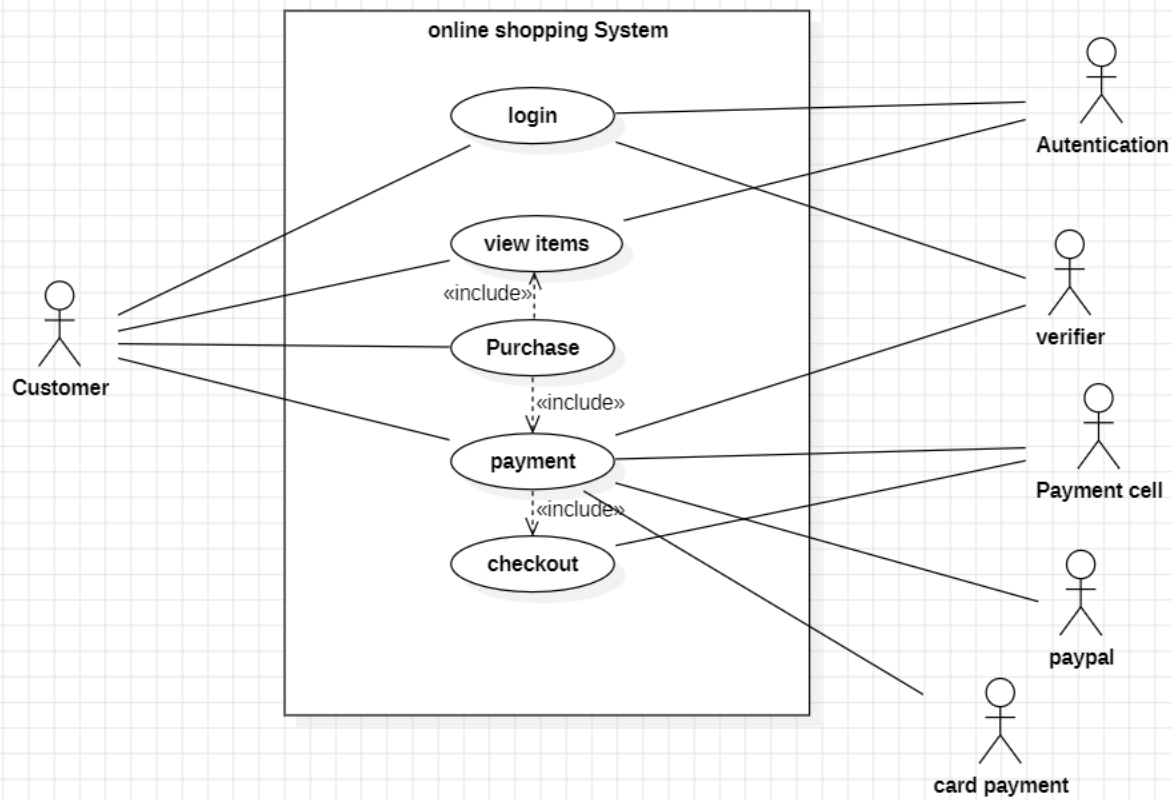


**1.b) Class Diagram:****1.c) Sequence Diagram:**

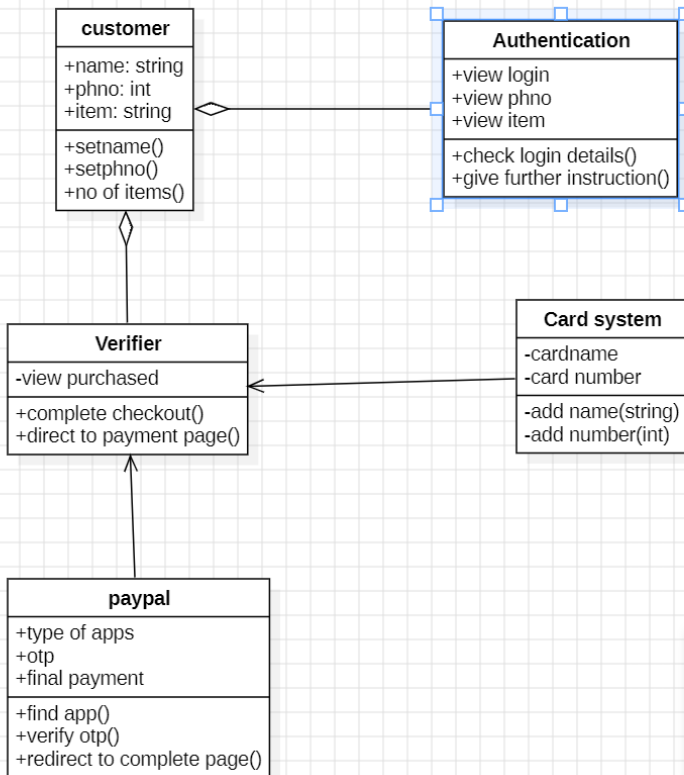
**1.d) Activity Diagram:****1.e) State-Activity Diagram:**

## 2. SHIPPING MANAGEMENT

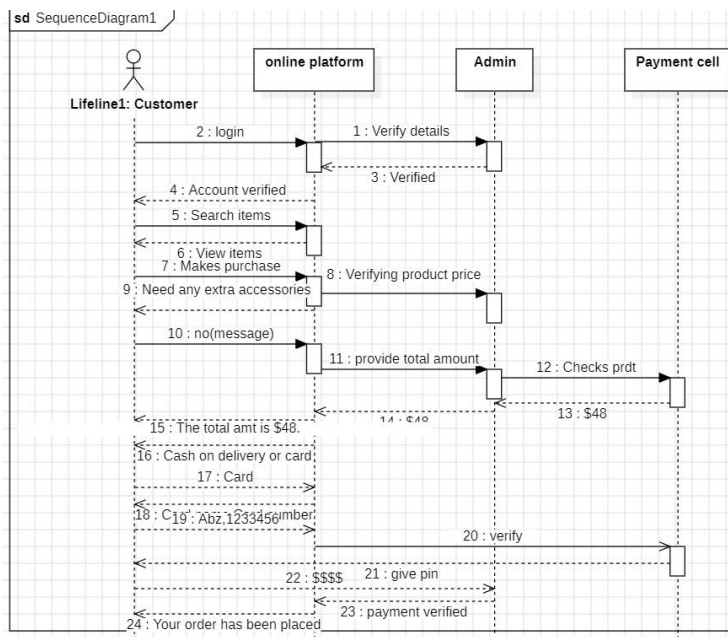
### 2.a) Use Case Diagram:



## 2.b) Class Diagram:



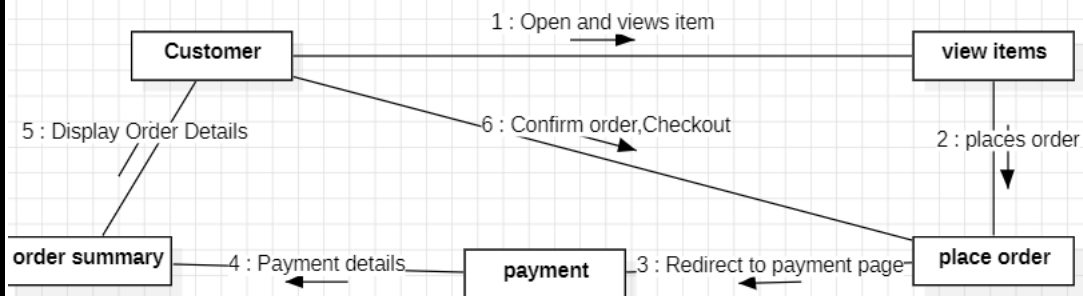
## 2.c) Sequence Diagram:



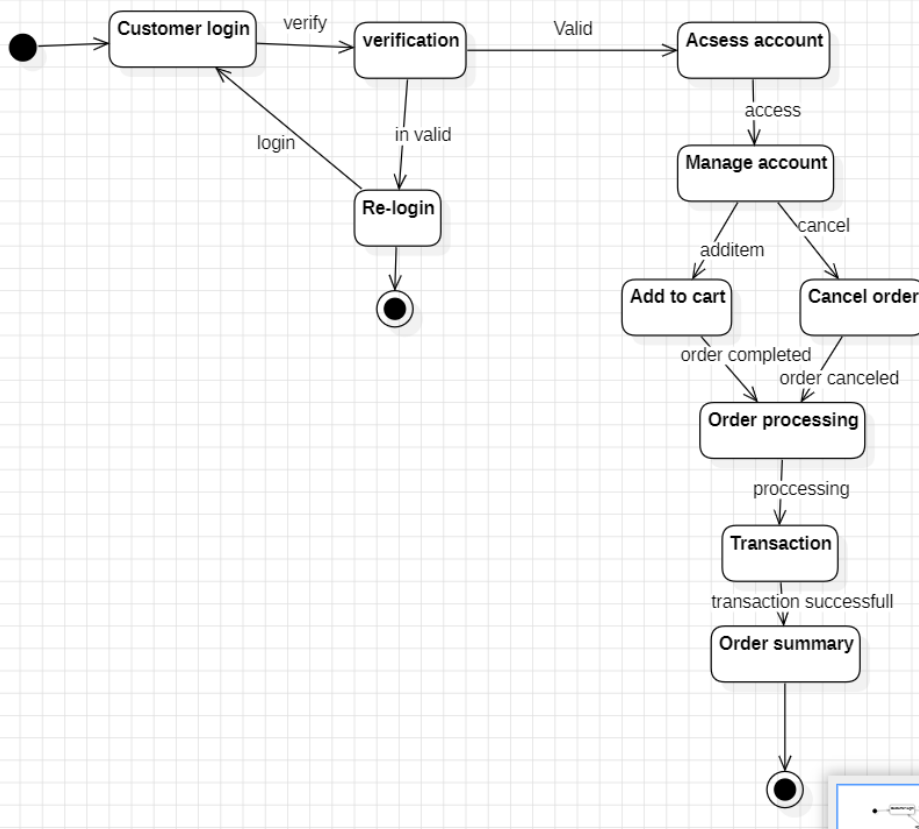


## 2.d) Communication Diagram:

CommunicationDiagram1



## 2.e) State-Activity Diagram:



## 3. Basic Java Programs

### 3.a) Calculator:

**Code:**

```
import java.util.Scanner;

public class Calculator {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter first number: ");
        double num1 = sc.nextDouble();
        System.out.print("Enter second number: ");
        double num2 = sc.nextDouble();
        System.out.print("Choose operation (+, -, *, /): ");
        char op = sc.next().charAt(0);

        switch (op) {
            case '+': System.out.println("Result: " + (num1 + num2)); break;
            case '-': System.out.println("Result: " + (num1 - num2)); break;
            case '*': System.out.println("Result: " + (num1 * num2)); break;
            case '/':
                if (num2 != 0)
                    System.out.println("Result: " + (num1 / num2));
                else
                    System.out.println("Division by zero not allowed!");
                break;
            default: System.out.println("Invalid operator");
        }
        sc.close();
    }
}
```

**Output:**

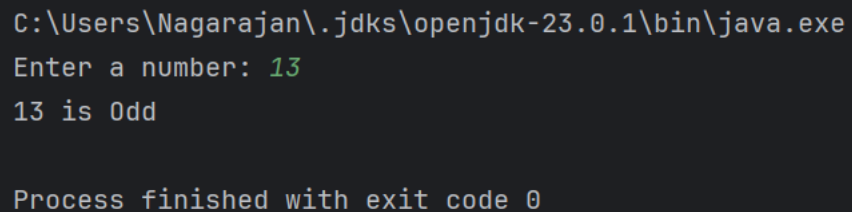
```
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe
Enter first number: 23
Enter second number: 12
Choose operation (+, -, *, /): +
Result: 35.0
```

### 3.b) Even, Odd :

**Code:**

```
import java.util.Scanner;

public class EvenOdd {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = sc.nextInt();
        if (num % 2 == 0)
            System.out.println(num + " is Even");
        else
            System.out.println(num + " is Odd");
        sc.close();
    }
}
```

**Output:**

```
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe
Enter a number: 13
13 is Odd
Process finished with exit code 0
```

### 3.c) Factorial:

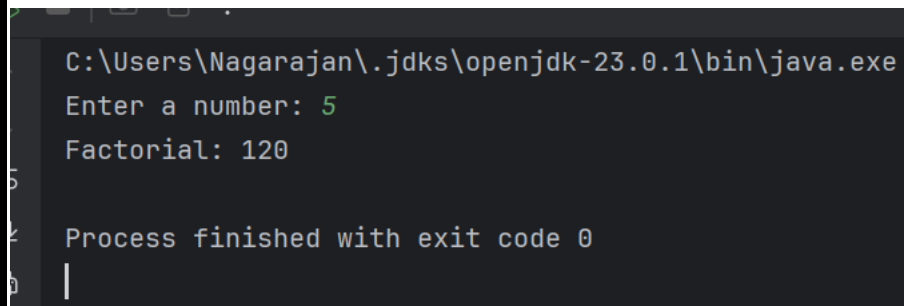
**Code:**

```
import java.util.Scanner;

public class Factorial {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = sc.nextInt();
        int fact = 1, i = 1;

        do {
            fact *= i;
            i++;
        } while (i <= num);

        System.out.println("Factorial: " + fact);
        sc.close();
    }
}
```

**Output:**

```
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe
Enter a number: 5
Factorial: 120

Process finished with exit code 0
|
```

### 3.d) Fibonacci Series:

**Code:**

```
import java.util.Scanner;

public class Fibonacci {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of terms: ");
        int n = sc.nextInt();

        int a = 0, b = 1, sum;
```

```
System.out.print("Fibonacci Series: " + a + " " + b);

    for (int i = 2; i < n; i++) {
        sum = a + b;
        System.out.print(" " + sum);
        a = b;
        b = sum;
    }

    sc.close();
}
```

### Output;

```
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe
Enter the number of terms: 5
Fibonacci Series: 0 1 1 2 3
Process finished with exit code 0
|
```

### 3.e) Number Check:

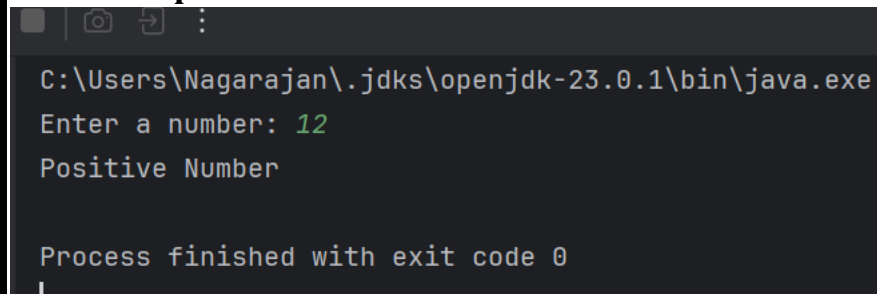
**Code:**

```
import java.util.Scanner;

public class NumberCheck {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = sc.nextInt();

        if (num > 0)
            System.out.println("Positive Number");
        else if (num < 0)
            System.out.println("Negative Number");
        else
            System.out.println("Zero");

        sc.close();
    }
}
```

**Output:**

```
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe
Enter a number: 12
Positive Number

Process finished with exit code 0
```

### 3.f) Prime Check:

**Code:**

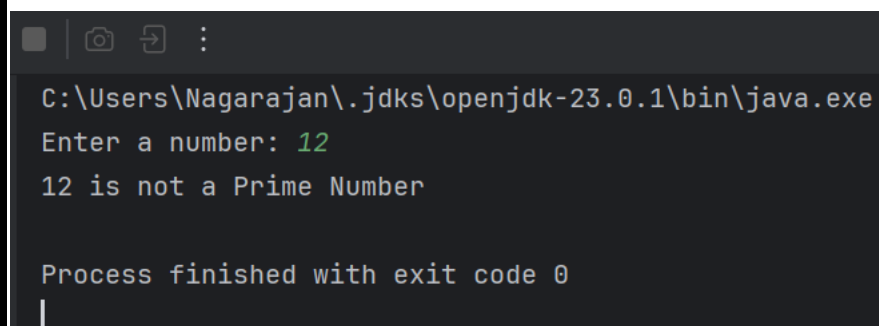
```
import java.util.Scanner;

public class PrimeCheck {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = sc.nextInt();
        boolean isPrime = true;

        if (num <= 1)
            isPrime = false;
        else {
            for (int i = 2; i <= Math.sqrt(num); i++) {
                if (num % i == 0) {
                    isPrime = false;
                    break;
                }
            }
        }

        if (isPrime)
            System.out.println(num + " is a Prime Number");
        else
            System.out.println(num + " is not a Prime Number");

        sc.close();
    }
}
```

**Output:**

```
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe
Enter a number: 12
12 is not a Prime Number

Process finished with exit code 0
```

### 3.g) Print Number:

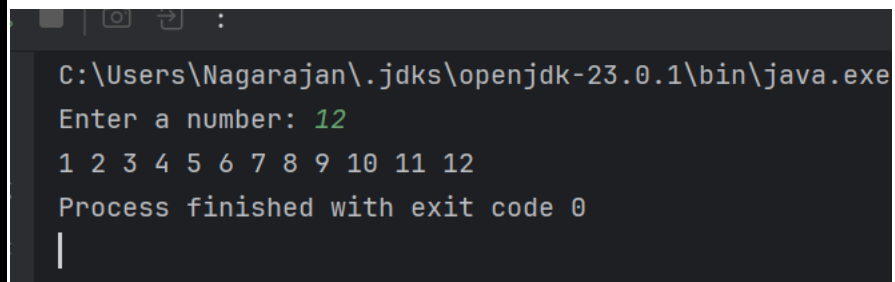
**Code:**

```
import java.util.Scanner;

public class PrintNumbers {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int n = sc.nextInt();

        for (int i = 1; i <= n; i++) {
            System.out.print(i + " ");
        }

        sc.close();
    }
}
```

**Output:**

```
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe
Enter a number: 12
1 2 3 4 5 6 7 8 9 10 11 12
Process finished with exit code 0
|
```



### 3.h) Reverse Number:

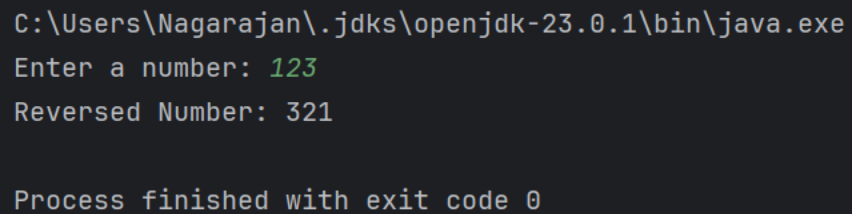
**Code:**

```
import java.util.Scanner;

public class ReverseNumber {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = sc.nextInt();
        int rev = 0;

        while (num != 0) {
            int digit = num % 10;
            rev = rev * 10 + digit;
            num /= 10;
        }

        System.out.println("Reversed Number: " + rev);
        sc.close();
    }
}
```

**Output:**

```
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe
Enter a number: 123
Reversed Number: 321

Process finished with exit code 0
```

### 3.i) SumNatural:

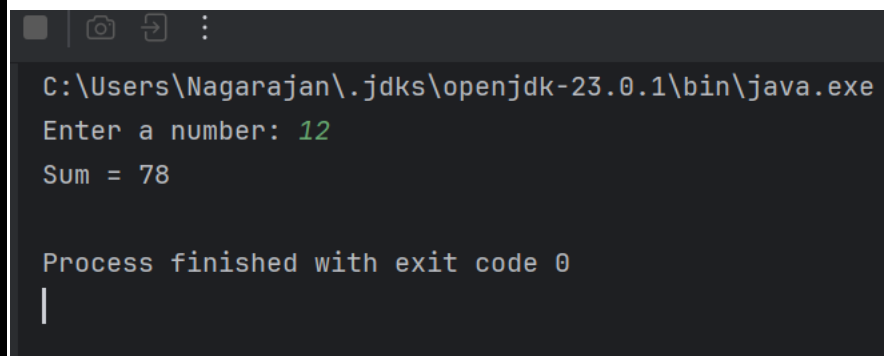
**Code:**

```
import java.util.Scanner;

public class SumNatural {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int n = sc.nextInt();
        int sum = 0, i = 1;

        while (i <= n) {
            sum += i;
            i++;
        }

        System.out.println("Sum = " + sum);
        sc.close();
    }
}
```

**Output:**A screenshot of a Java IDE terminal window. The title bar shows standard window controls and icons. The terminal text is as follows:  
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe  
Enter a number: 12  
Sum = 78  
  
Process finished with exit code 0  
|

### 3.j) Triangular Pattern:

**Code:**

```
import java.util.Scanner;

public class TrianglePattern {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number of rows: ");
        int n = sc.nextInt();

        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print("* ");
            }
            System.out.println();
        }

        sc.close();
    }
}
```

**Output:**

The screenshot shows a command prompt window with the following text:

```
C:\Users\Nagarajan\.jdk\openjdk-23.0.1\bin\java.exe
Enter the number of rows: 3
*
* *
* * *
```