

SCHOOL OF
COMPUTING

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CH.SC.U4CSE24148

OBJECT ORIENTED PROGRAMMING
(23CSE111)

LAB RECORD

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BONAFIDE CERTIFICATE

This is to certify that the Lab Record work for 23CSE113 –
OBJECT ORIENTED PROGRAMMING by
CH.SC.U4CSE24148 – U Venkata Achyuth Krishna 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

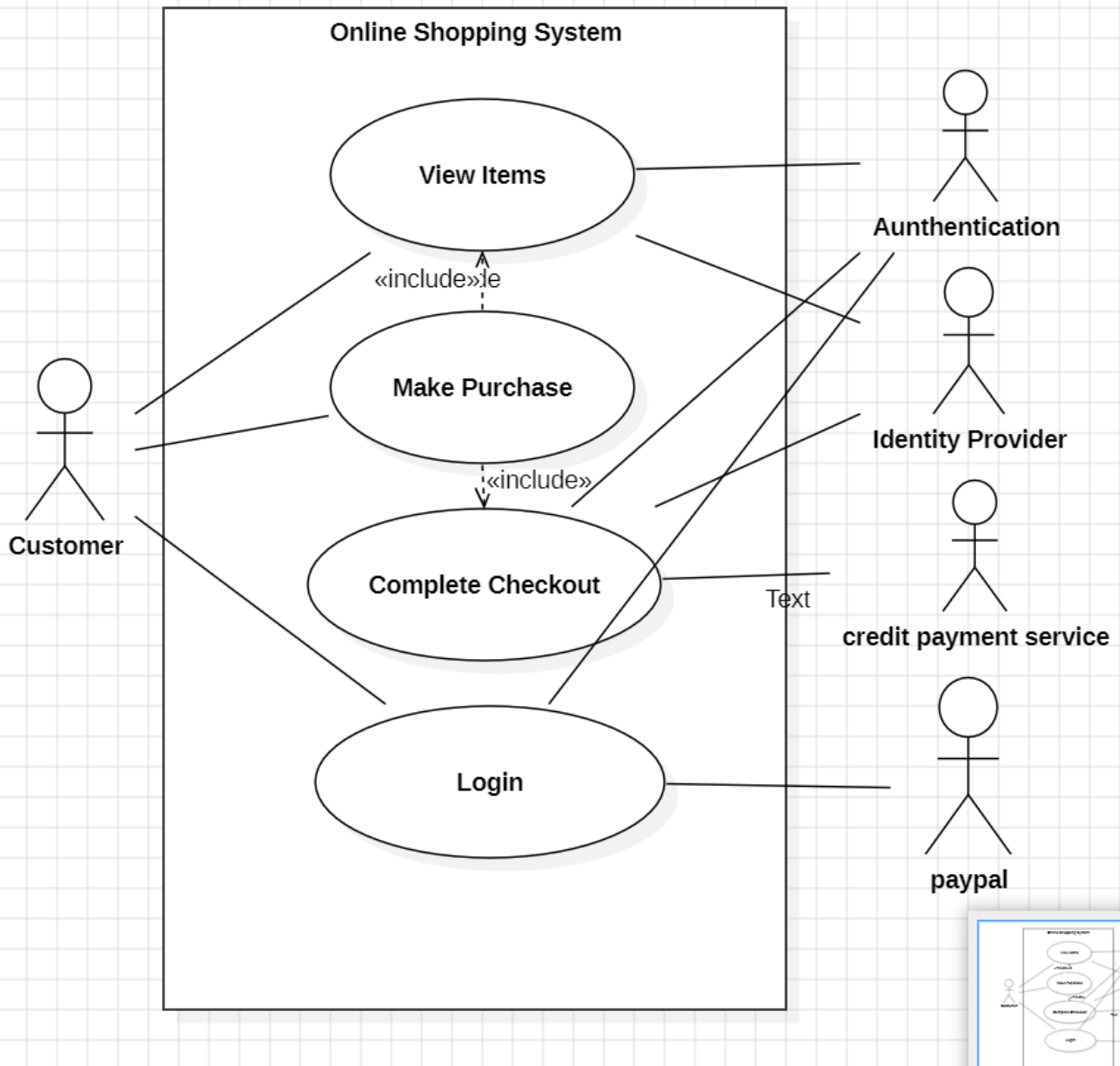
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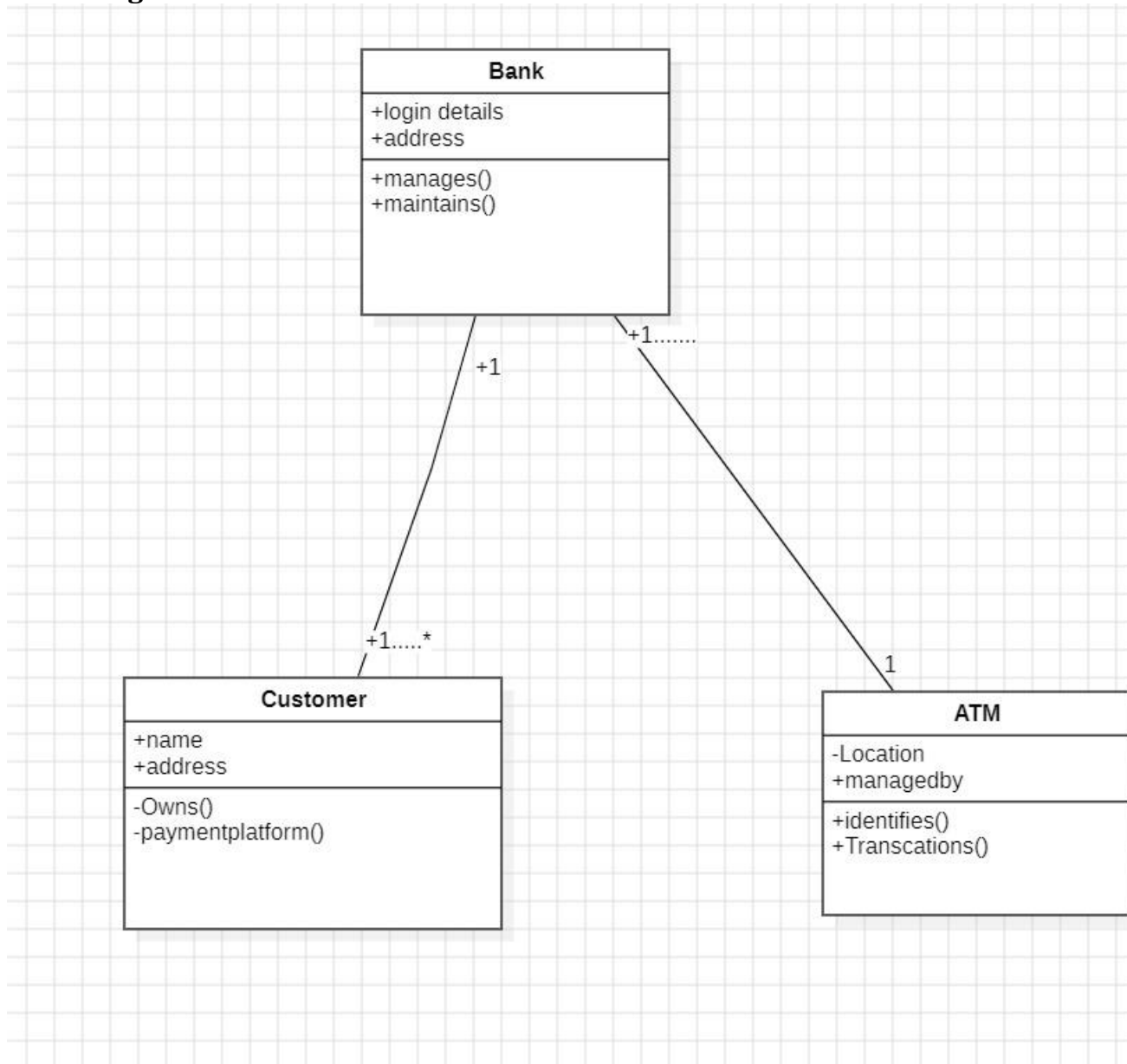
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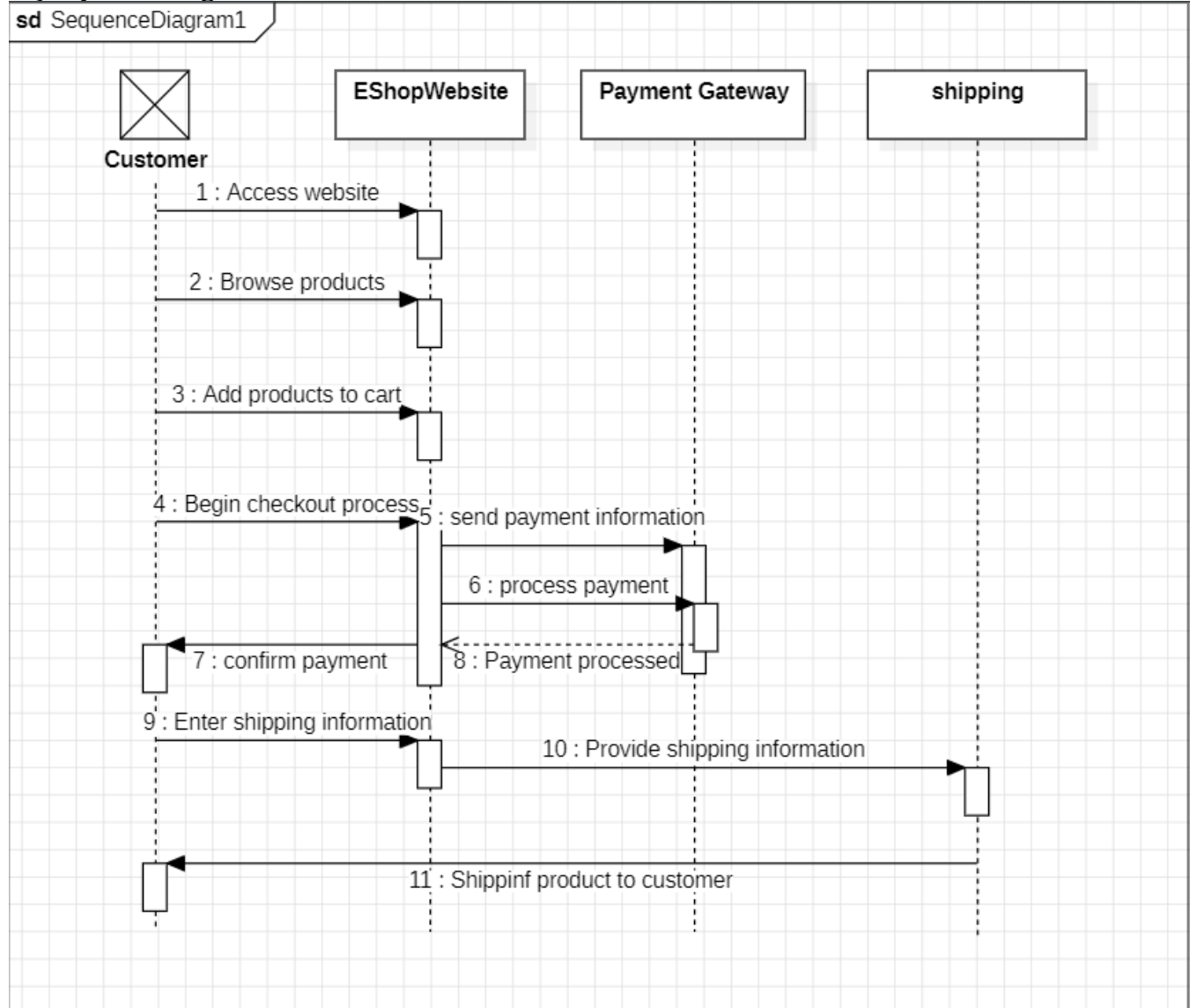
UML DIAGRAMS

1. ONLINE SHOPPING SYSTEM

1.a) Use Case Diagram:

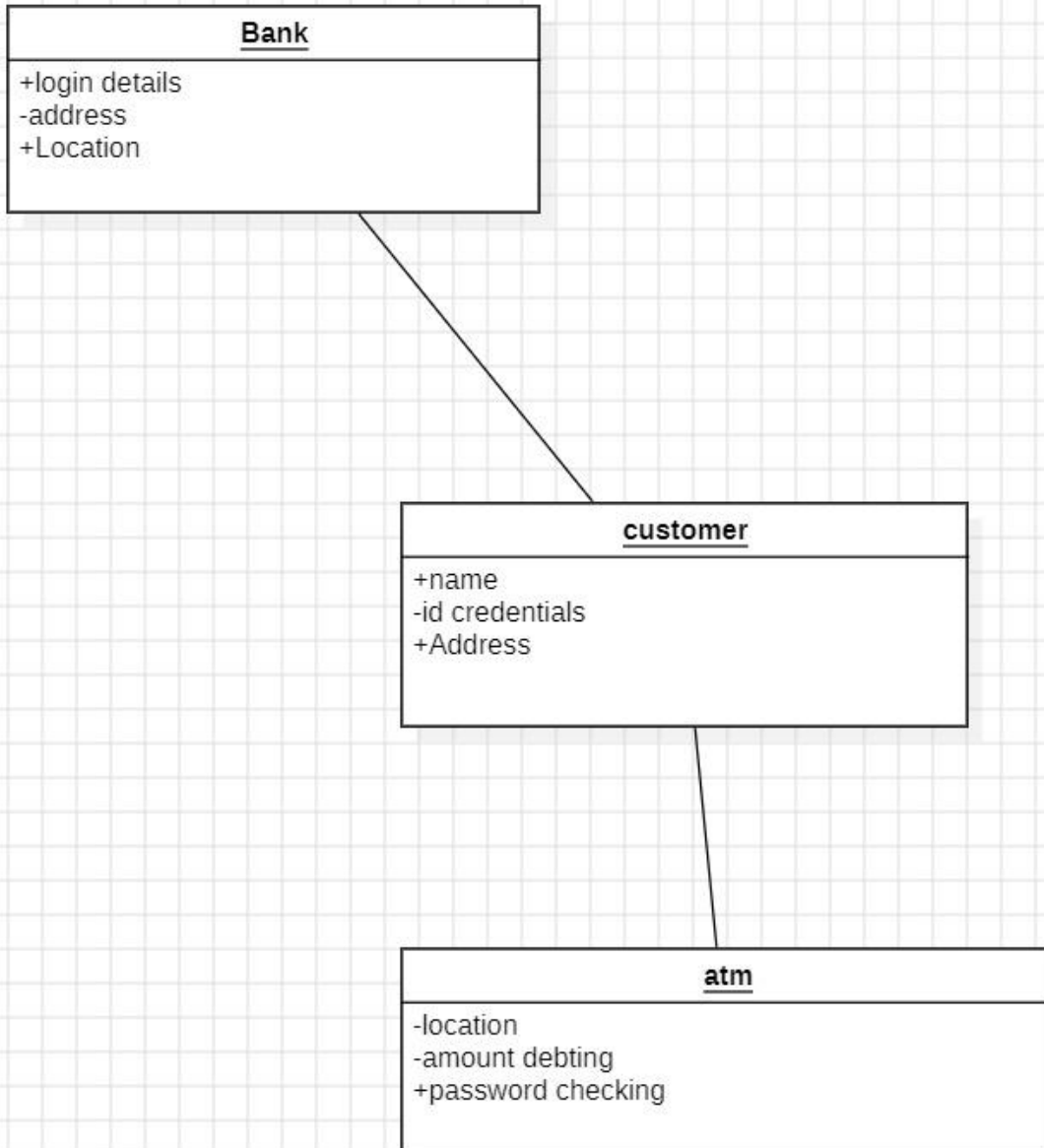


1.b) **Class Diagram:**

1c)sequence diagram:

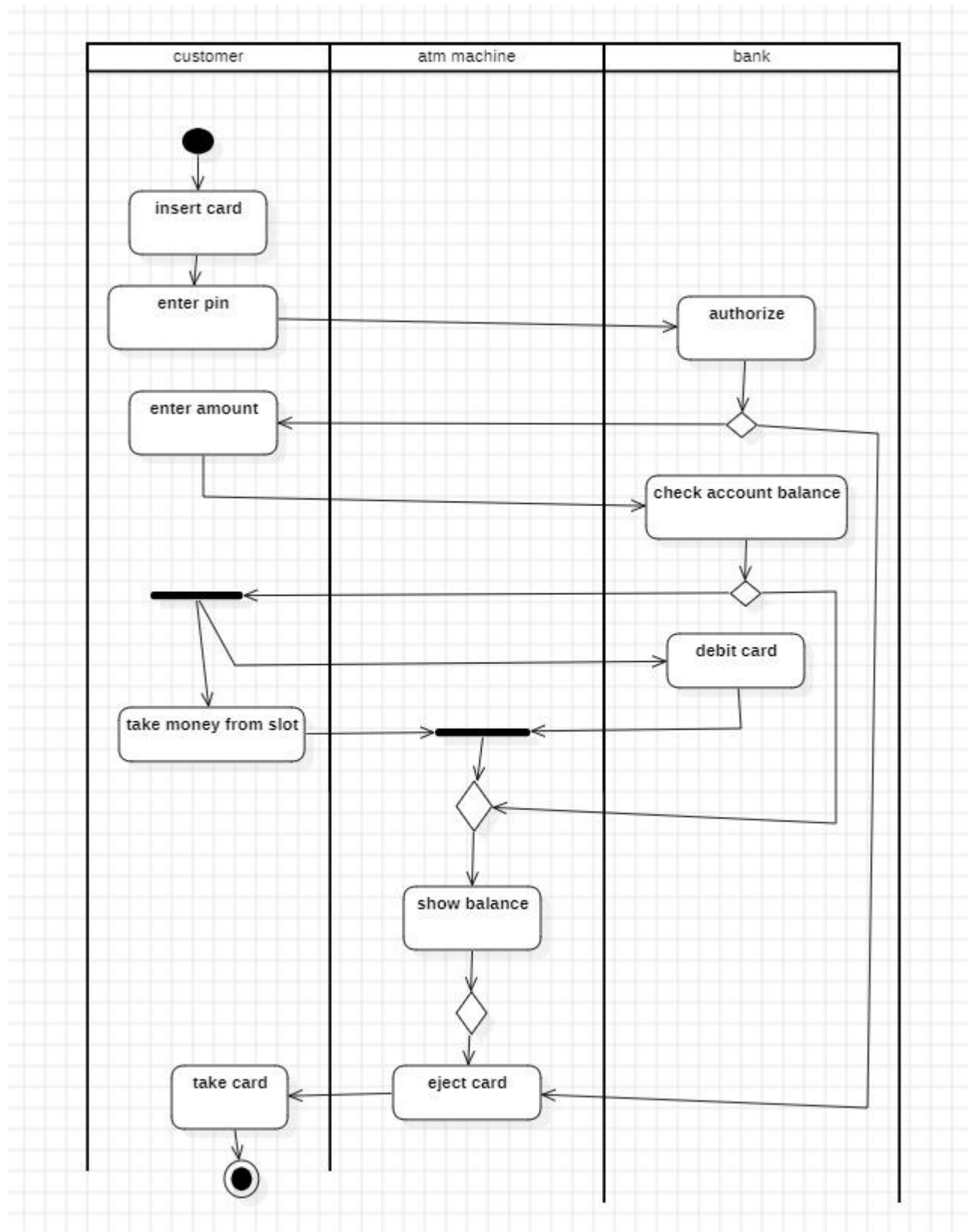
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Object Diagram:



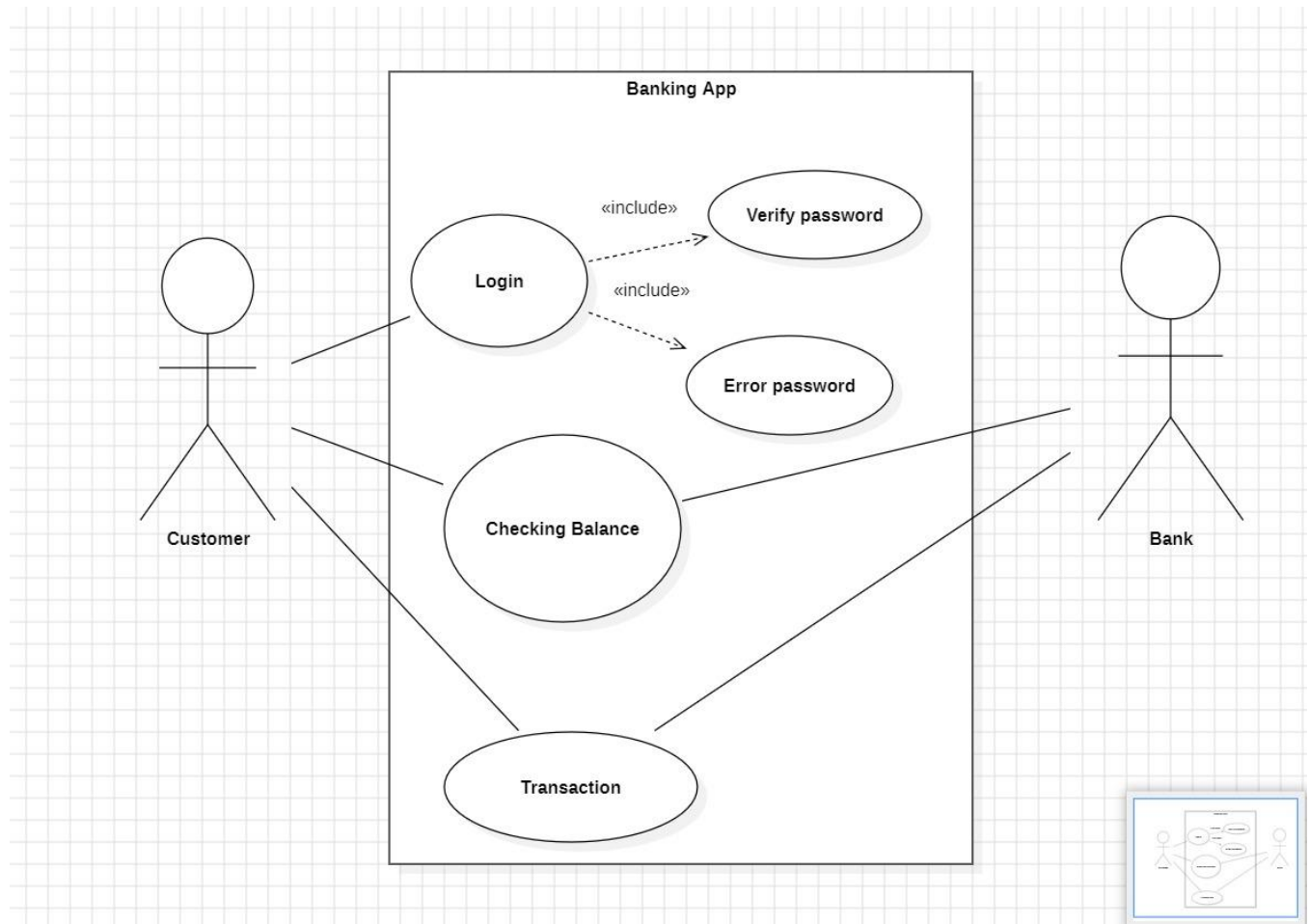
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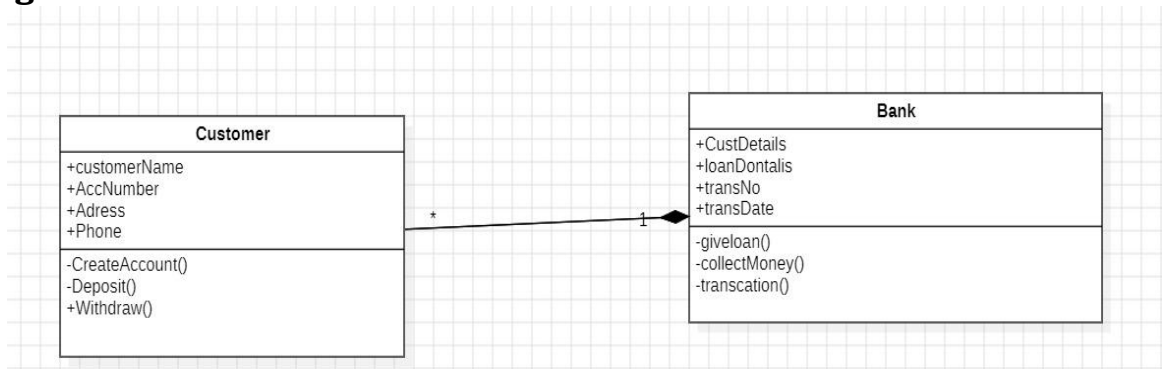
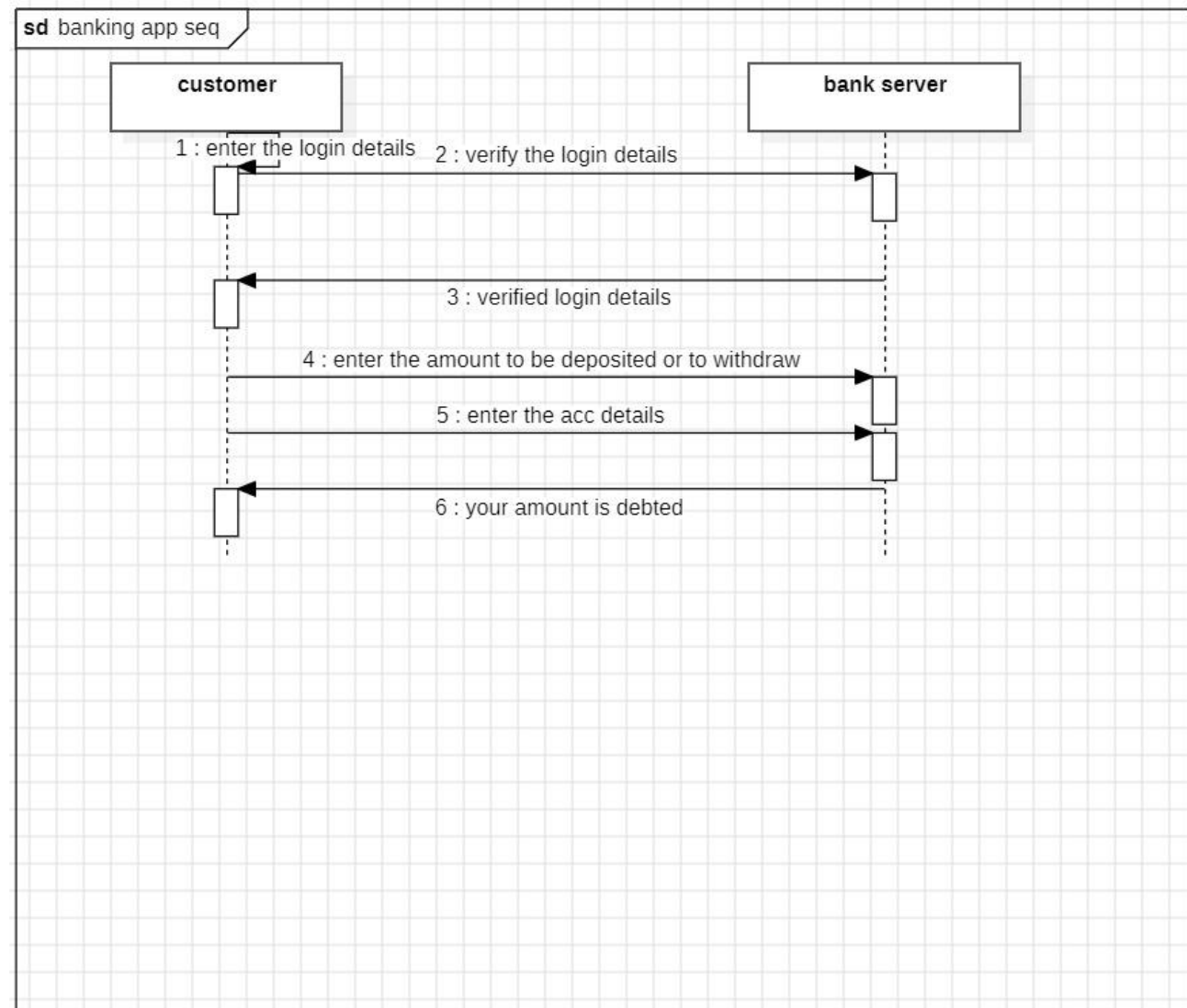
State-Activity Diagram:



Banking Application

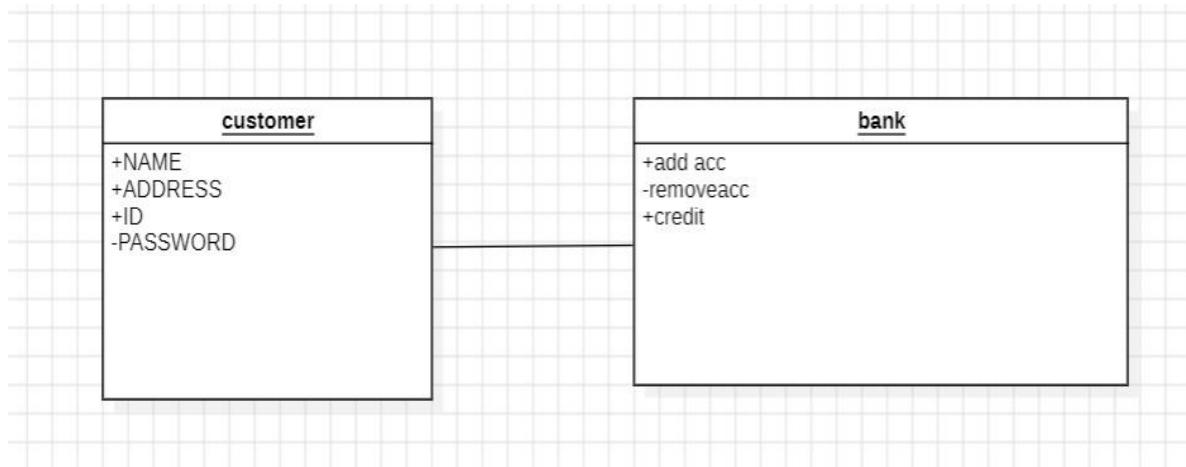
Use Case Diagram:



Class Diagram:**Sequence Diagram:**

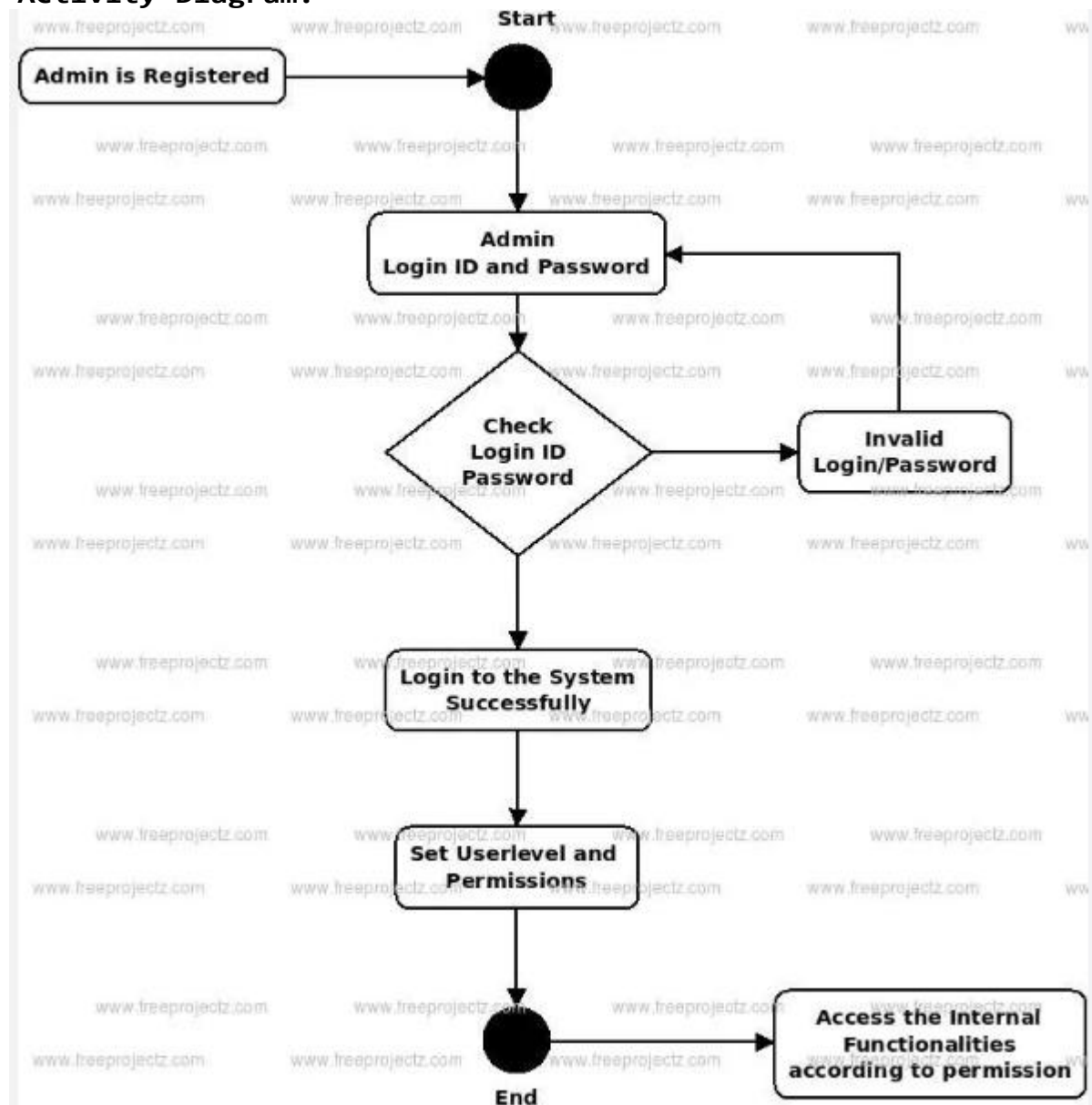
A

Object diagram



A

State-Activity Diagram:



2. Basic Java Programs

2.a) PascalTriangle :

Code:

```
public class PascalTriangle {  
    public static void main(String[] args) {  
        int rows = 5;  
        for (int i = 0; i < rows; i++) {  
            int number = 1;  
            for (int j = 0; j < rows - i; j++)  
                System.out.print(" ");  
            for (int j = 0; j <= i; j++) {  
                System.out.print(number + " ");  
                number = number * (i - j) / (j + 1);  
            }  
            System.out.println();  
        }  
    }  
}
```

Output:

```
C:\Users\DELL\Downloads\java programs>javac PascalTriangle.java  
  
C:\Users\DELL\Downloads\java programs>java PascalTriangle  
    1  
   1 1  
  1 2 1  
 1 3 3 1  
1 4 6 4 1  
  
C:\Users\DELL\Downloads\java programs>
```

2.b) Factorial :**Code:**

```
public class Factorial {  
    public static void main(String[] args) {  
        int num = 5, fact = 1;  
        for (int i = 1; i <= num; i++) {  
            fact *= i; // Multiplying i with fact  
        }  
        System.out.println("Factorial: " + fact);  
    }  
}
```

Output:

```
C:\Users\DELL\Downloads\java programs>javac Factorial.java
```

```
C:\Users\DELL\Downloads\java programs>java Factorial  
Factorial: 120
```

```
C:\Users\DELL\Downloads\java programs>|
```


2.c) Sum Natural Numbers :**Code:**

```
public class SumNaturalNumbers {  
    public static void main(String[] args) {  
        int n = 10, sum = 0, i = 1;  
  
        while (i <= n) {  
            sum += i;  
            i++; // Increments i  
        }  
  
        System.out.println("Sum: " + sum);  
    }  
}
```

Output:

```
C:\Users\DELL\Downloads\java programs>javac SumNaturalNumbers.java  
  
C:\Users\DELL\Downloads\java programs>java SumNaturalNumbers  
Sum: 55  
  
C:\Users\DELL\Downloads\java programs>|
```

4.

**2.d) Reverse
Numbers :****Code:**

```
public class ReverseNumbers {  
    public static void main(String[] args) {  
        for (int i = 10; i >= 1; i--) {  
            System.out.print(i + " ");  
        }  
    }  
}
```

Output;

```
C:\Users\DELL\Downloads\java programs>javac ReverseNumbers.java  
C:\Users\DELL\Downloads\java programs>java ReverseNumbers  
10 9 8 7 6 5 4 3 2 1  
C:\Users\DELL\Downloads\java programs>
```

2.e) Fibonacci :**Code:**

```
public class Fibonacci {  
    public static void main(String[] args) {  
        int n = 10, a = 0, b = 1, c;  
  
        for (int i = 1; i <= n; i++) {  
            System.out.print(a + " ");  
            c = a + b;  
            a = b;  
            b = c;  
        }  
    }  
}
```

Output:

```
C:\Users\DELL\Downloads\java programs>javac Fibonacci.java  
  
C:\Users\DELL\Downloads\java programs>java Fibonacci  
0 1 1 2 3 5 8 13 21 34  
C:\Users\DELL\Downloads\java programs>|
```

2.f) BMI Calculator :

Code:

```
import java.util.Scanner;
public class BMICalculator {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter weight in kilograms: ");
        double weight = scanner.nextDouble();
        System.out.print("Enter height in meters: ");
        double height = scanner.nextDouble();
        double bmi = weight / (height * height);
        System.out.printf("Your BMI is: %.2f\n", bmi);
        if (bmi < 18.5) {
            System.out.println("Category: Underweight");
        } else if (bmi < 24.9) {
            System.out.println("Category: Normal weight");
        } else if (bmi < 29.9) {
            System.out.println("Category: Overweight");
        } else {
            System.out.println("Category: Obese");
        }
        scanner.close();
    }
}
```

Output:

```
C:\Users\DELL\Downloads\java programs>javac BMICalculator.java
C:\Users\DELL\Downloads\java programs>java BMICalculator
Enter weight in kilograms: 50
Enter height in meters: 6
Your BMI is: 1.39
Category: Underweight
C:\Users\DELL\Downloads\java programs>
```

2.g) Sum Of Digits :**Code:**

```
import java.util.Scanner;
public class SumOfDigits {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a four-digit number: ");
        int number = scanner.nextInt();
        if (number < 1000 || number > 9999) {
            System.out.println("Please enter a valid four-digit number.");
        } else {
            int sum = 0, temp = number;
            while (temp > 0) {
                sum += temp % 10;
                temp /= 10;
            }
            System.out.println("Sum of digits: " + sum);
        }
        scanner.close();
    }
}
```

Output:

```
C:\Users\DELL\Downloads\java programs>javac SumOfDigits.java
C:\Users\DELL\Downloads\java programs>java SumOfDigits
Enter a four-digit number: 7831
Sum of digits: 19
C:\Users\DELL\Downloads\java programs>|
```

2.h) **positive**
Negative :

Code:

```
import java.util.Scanner;
public class Positive_Negative {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int n = scanner.nextInt();
        if (n > 0) {
            System.out.println(n + " is Positive");
        } else if (n < 0) {
            System.out.println(n + " is Negative");
        } else {
            System.out.println(n + " is Zero");
        }
    }
}
```

Output:

```
C:\Users\DELL\Downloads\java programs>javac Positive_Negative.java
C:\Users\DELL\Downloads\java programs>java Positive_Negative
Enter a number: 8
8 is Positive
C:\Users\DELL\Downloads\java programs>|
```

3.i) Largest Number :

Code:

```
import java.util.Scanner;
public class Largest_Number {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter number of elements: ");
        int n = scanner.nextInt();
        int a[] = new int[n];
        System.out.println("Enter elements: ");
        for (int i = 0; i < n; i++) {
            a[i] = scanner.nextInt();
        }
        int max = a[0];
        for (int i = 0; i < n; i++) {
            if (max < a[i]) {
                max = a[i];
            }
        }
        System.out.println("Maximum value: " + max);
    }
}
```

Output:

```
C:\Users\DELL\Downloads\java programs>javac Largest_Number.java
C:\Users\DELL\Downloads\java programs>java Largest_Number
Enter number of elements: 10
Enter elements:
5
5
5
5
```

3.j) Biggest Number :

Code:

```
import java.util.Scanner;

public class BiggestNumber {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter three numbers: ");
        int x = scanner.nextInt();
        int y = scanner.nextInt();
        int z = scanner.nextInt();

        int largest;
        if (x > y && x > z) {
            largest = x;
        } else if (y > z) {
            largest = y;
        } else {
            largest = z;
        }

        System.out.println("Largest number is: " + largest);

        scanner.close();
    }
}
```

Output:

```
C:\Users\DELL\Downloads\java programs>javac BiggestNumber.java

C:\Users\DELL\Downloads\java programs>java BiggestNumber
Enter three numbers: 7 8 9
Largest number is: 9

C:\Users\DELL\Downloads\java programs>|
```