SCHOOL OF COMPUTING

LAB RECORD

23CSE111 – Object Oriented Programming

Submitted by

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BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

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BONAFIDE CERTIFICATE

This is to certify that the Lab Record work for 23CSE111- Object Oriented Programming Subject submitted by ***CH.SC.U4CSE24108 –Chepoori Sai Vivek*** 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 in 2nd Semester

Internal Examiner 1 Internal Examiner 2

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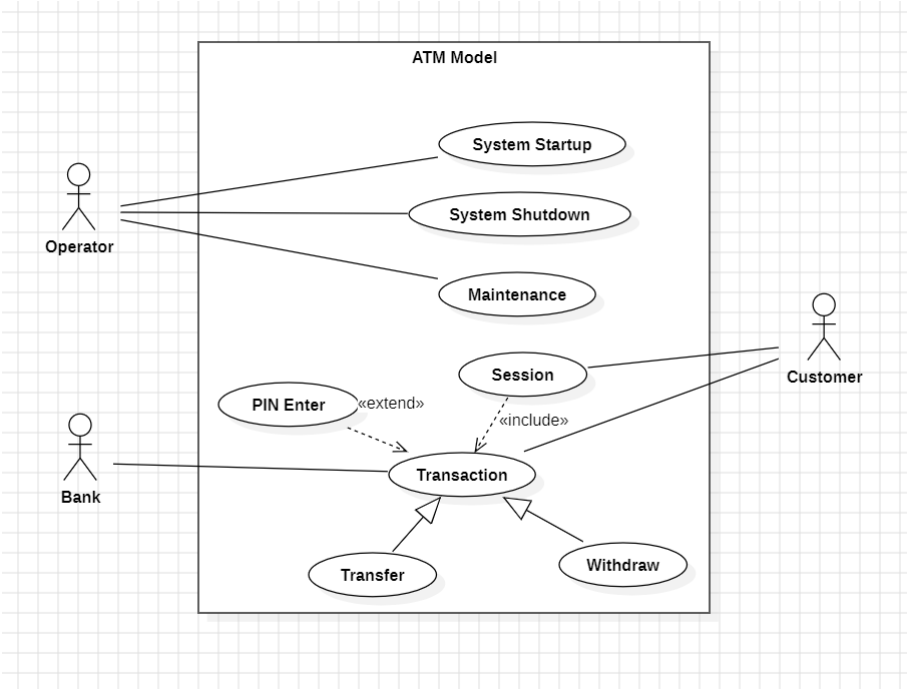
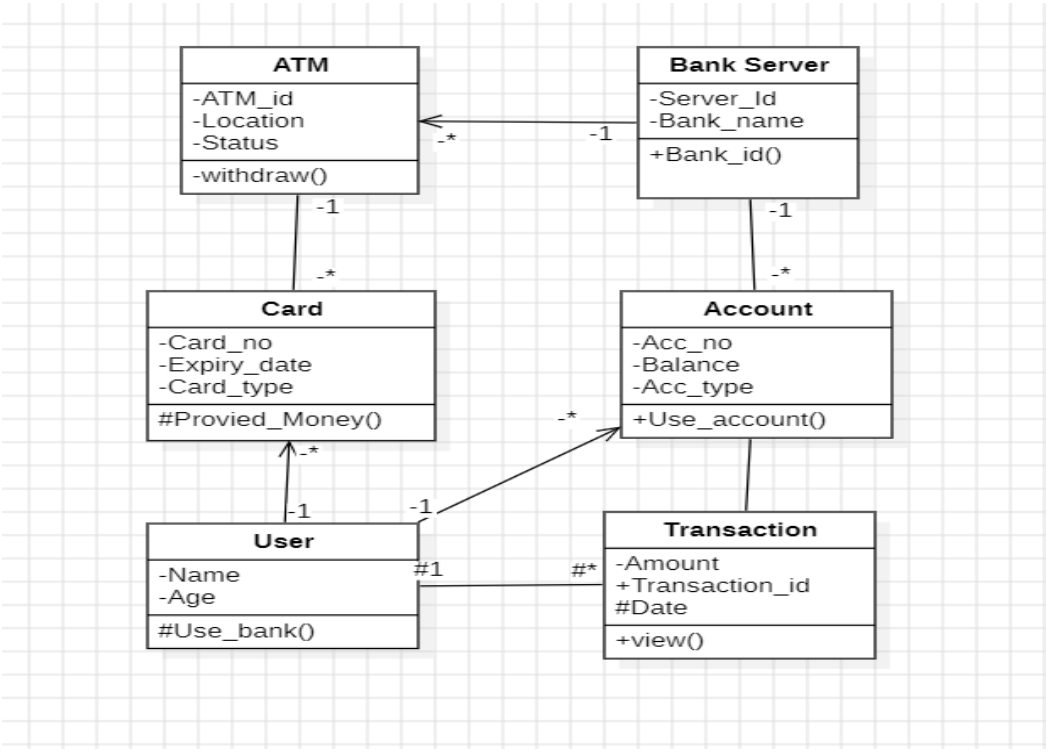
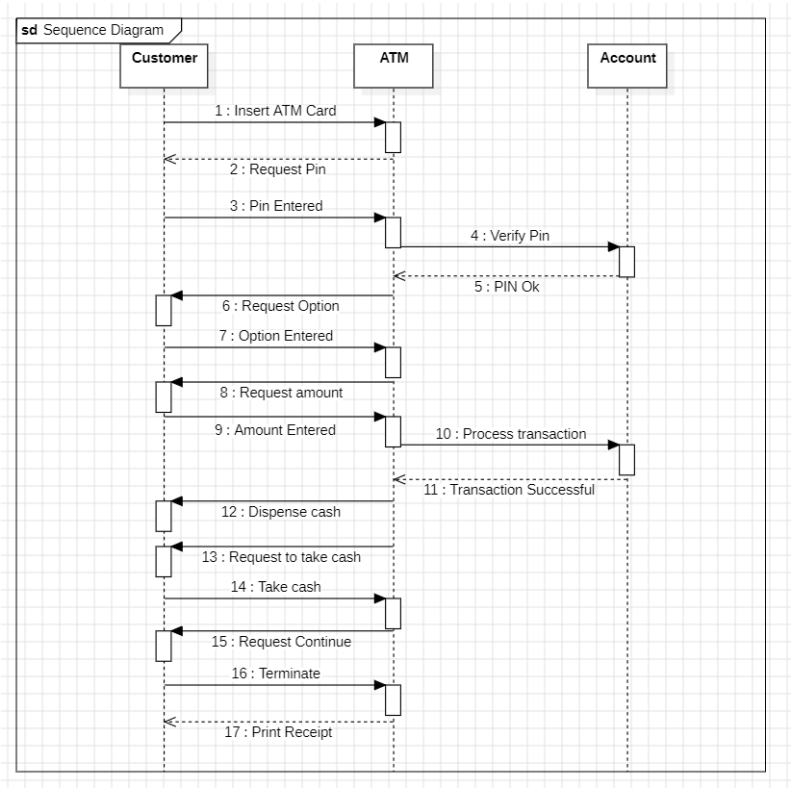
a. Use Case Diagram



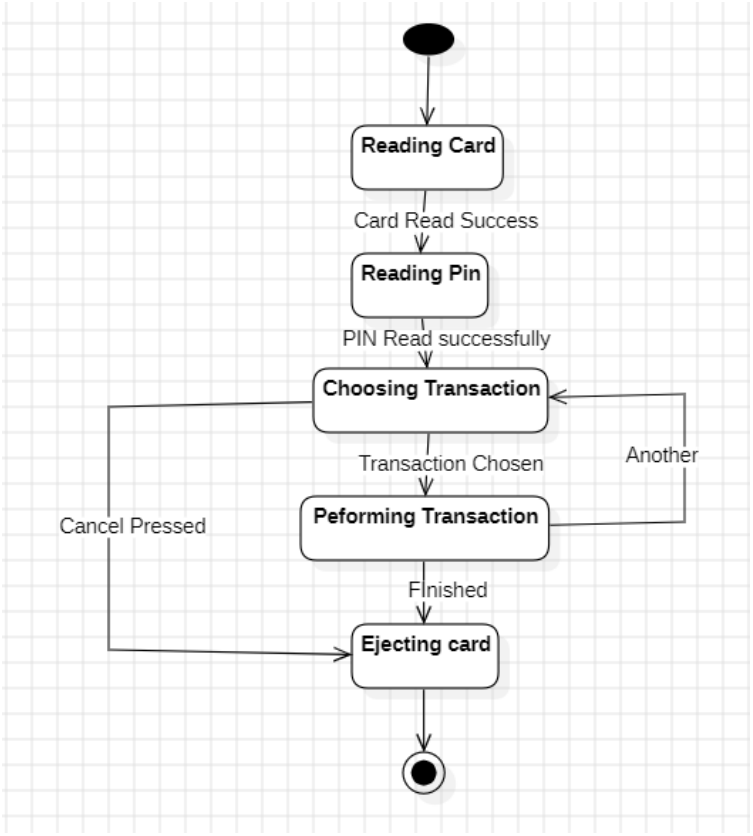
b. Class Diagram



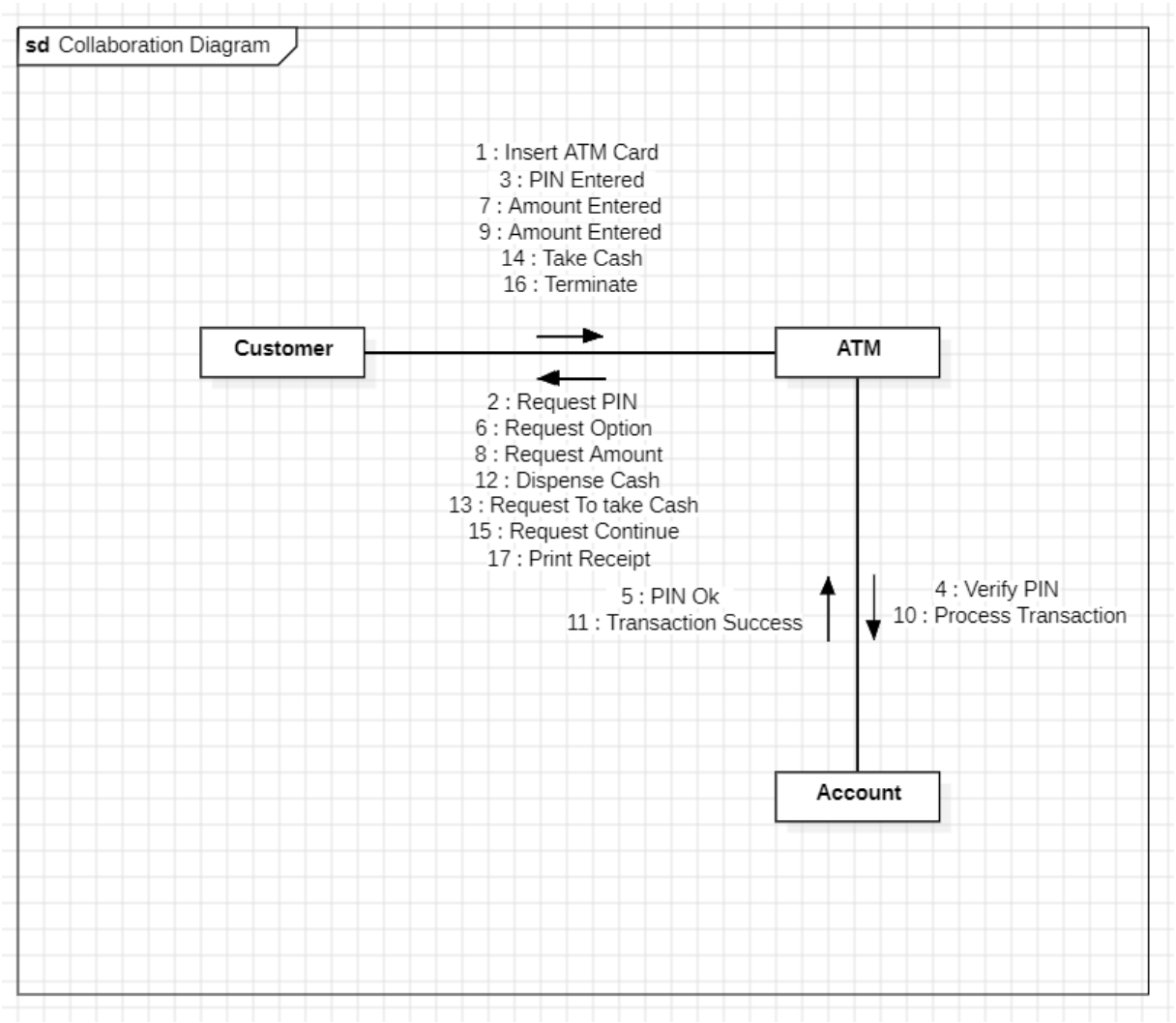
c. Sequence Diagram



d. State Diagram

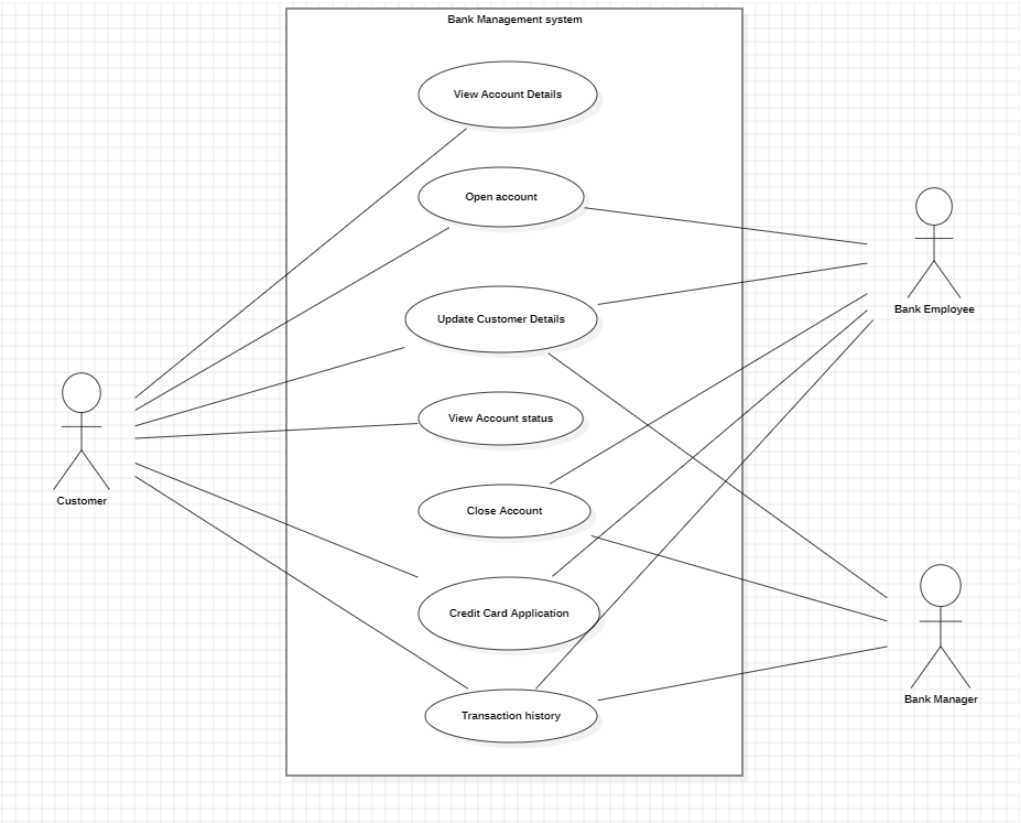


e. Collaboration Diagram

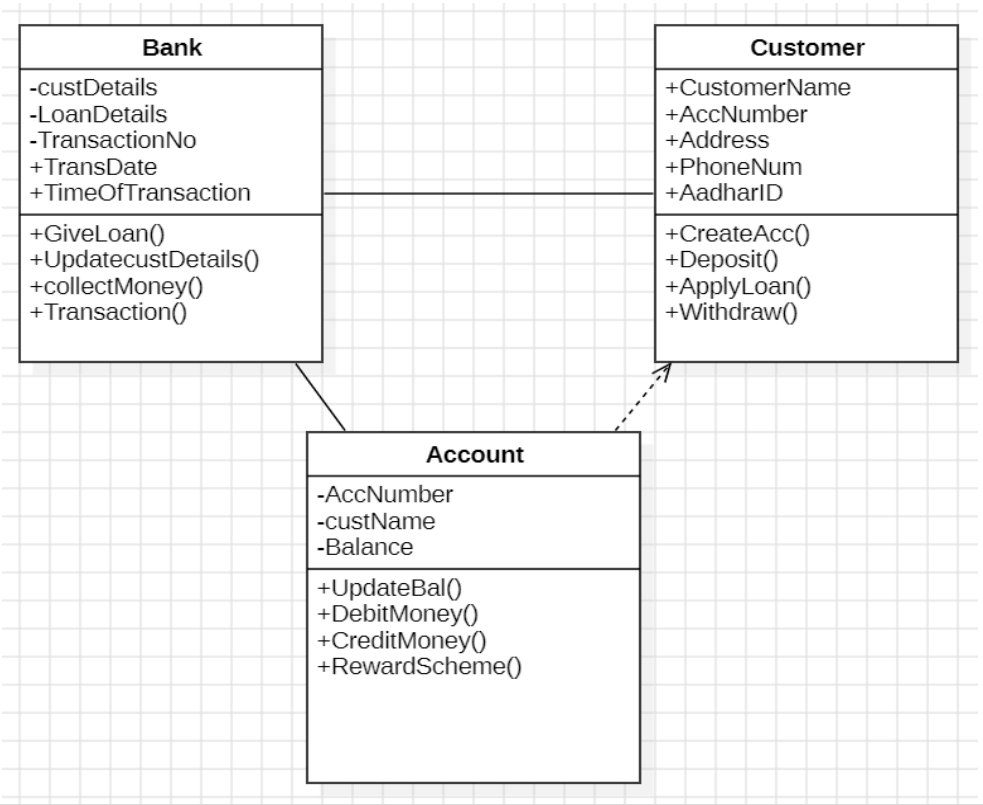


Problem 2 – Bank Management System

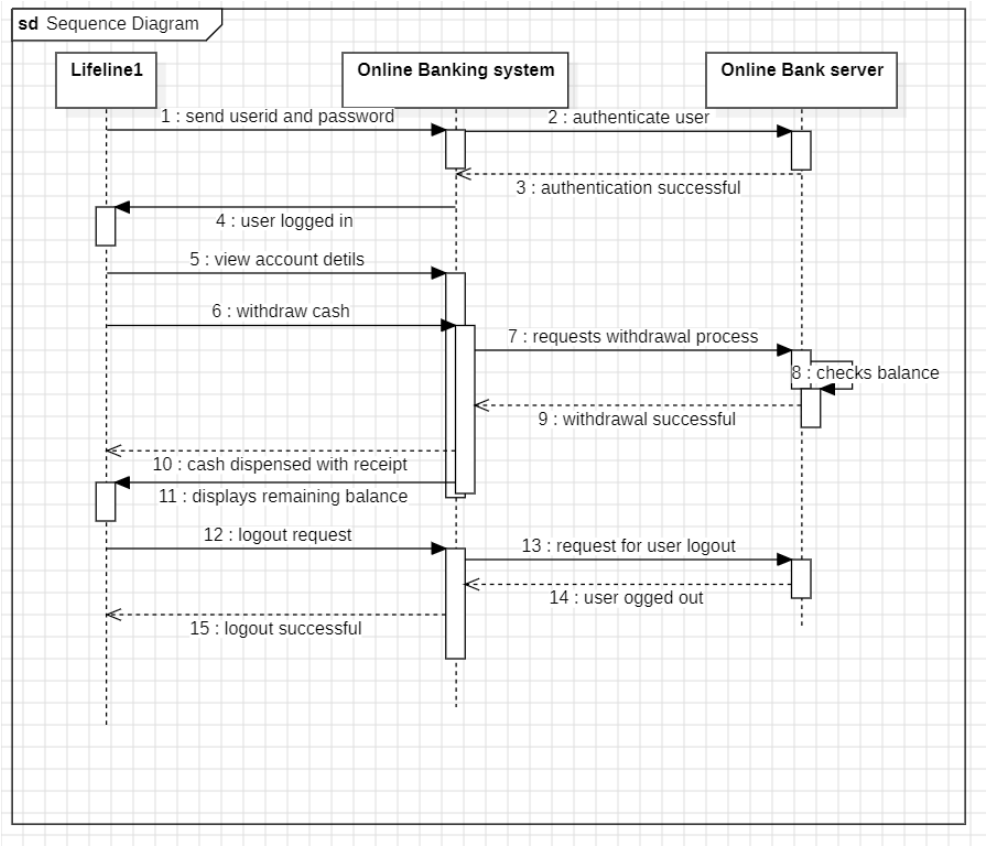
a. Use Case Diagram



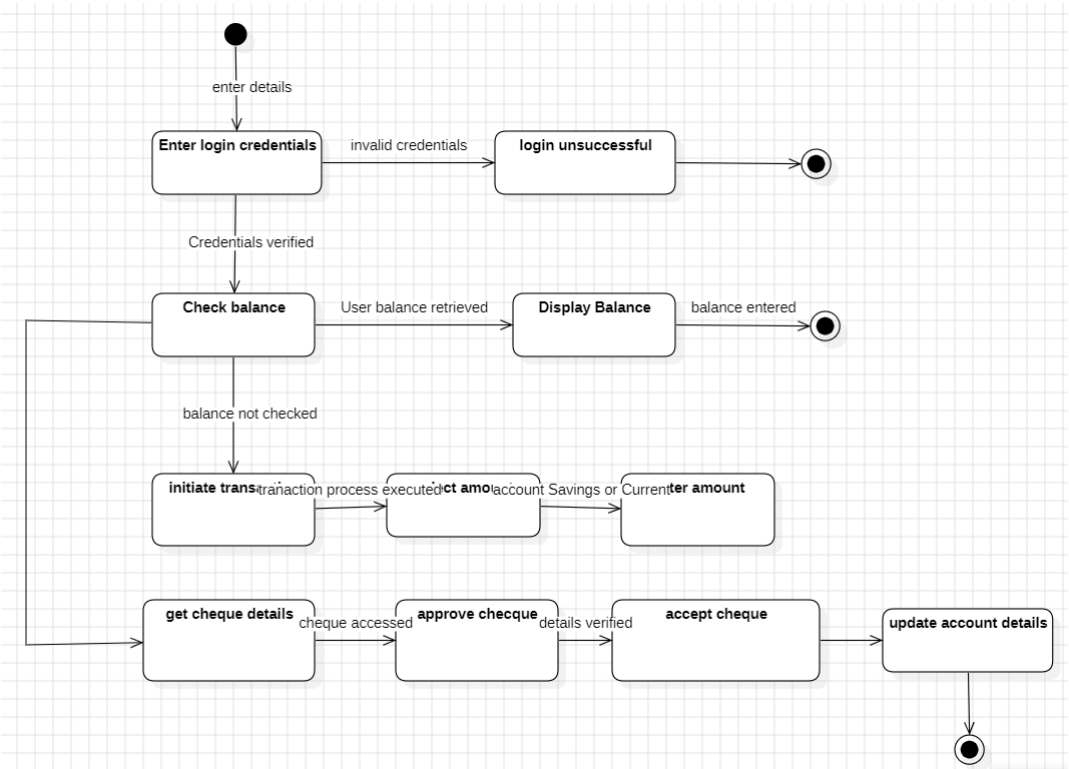
b. Class Diagram



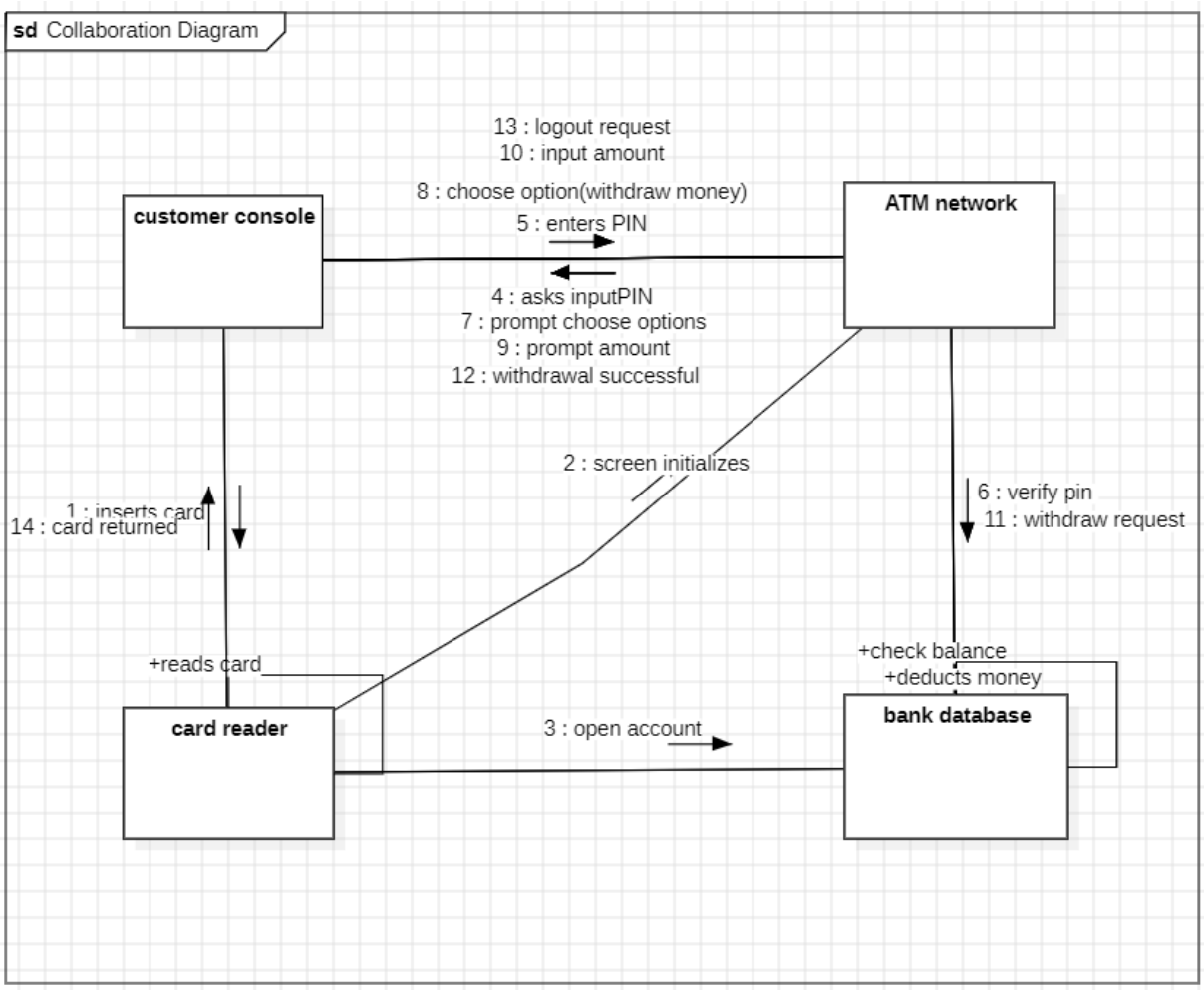
c. Sequence Diagram



d. State Diagram



e. Collaboration Diagram



2. Java Basic Programs

1. BMI Calculator program in java

Program:

```
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:

```
16            System.out.println("Category: Normal weight");
17        } else if (bmi < 29.9) {
```

input

```
56
Enter height in meters: 2.5
Your BMI is: 8.96
Category: Underweight
```

2. Reverse multiplication program in java

Program:

```
import java.util.Scanner;

public class ReverseMultiplicationTable {

    public static void main(String[] args) {

        Scanner scanner = new Scanner(System.in);

        System.out.print("Enter a number: ");

        int num = scanner.nextInt();

        System.out.print("Enter the range: ");

        int range = scanner.nextInt();

        System.out.println("Multiplication Table of " + num + " in Reverse Order:");

        for (int i = range; i >= 1; i--) {

            System.out.println(num + " x " + i + " = " + (num * i));

        }

        scanner.close();

    }

}
```

Output:

```
16            scanner.close();
17        }
```

input

```
Enter a number: 11
Enter the range: 5
Multiplication Table of 11 in Reverse Order:
11 x 5 = 55
11 x 4 = 44
11 x 3 = 33
11 x 2 = 22
11 x 1 = 11
```

3. Sum of four-digited program in java

Program:

```
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;

            int temp = number;

            while (temp > 0) {

                sum += temp % 10;

                temp /= 10;

            }

            System.out.println("Sum of digits: " + sum);

        }

        scanner.close();

    }

}
```

Output:

```
16          }
17          System.out.println("Sum of digits: " + sum);
18      }
```

input

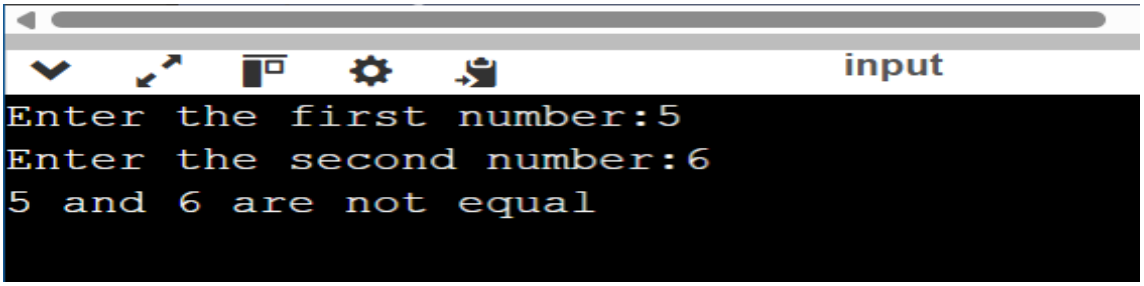
```
Enter a four-digit number: 3463
Sum of digits: 16
```

4. Java Program to check if two numbers are equal.

Program:

```
import java.util.Scanner;

public class Equal_Integer

{

   public static void main(String[] args)

   {

      int m, n;

      Scanner s = new Scanner(System.in);

      System.out.print("Enter the first number:");

      m = s.nextInt();

      System.out.print("Enter the second number:");

      n = s.nextInt();

      if(m == n)

      {

         System.out.println(m+" and "+n+" are equal ");

      }

      else

      {

         System.out.println(m+" and "+n+" are not equal ");

      }

   }

}
```

Output:



5. Java Program to reverse a number.

Program:

```
import java.util.Scanner;

public class Reverse_Number

{

   public static void main(String args[])

   {

      int m, n, sum = 0;

      Scanner s = new Scanner(System.in);

      System.out.print("Enter the number:");

      m = s.nextInt();

      while(m > 0)

      {

         n = m % 10;

         sum = sum * 10 + n;

         m = m / 10;

      }

      System.out.println("Reverse of a Number is "+sum);

   }

}
```

Output:

```
Enter the number:75734
Reverse of a Number is 43757
```

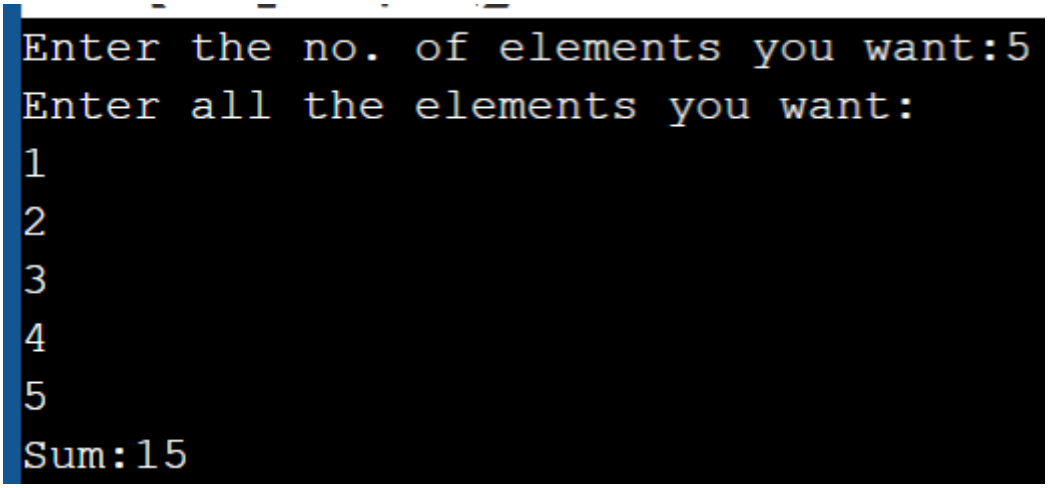
6. Java Program to find sum of first n natural numbers.

Program:

```
import java.util.Scanner;
public class Sum_Numbers
{
   int sum = 0, j = 0;
   public static void main(String[] args)
   {
      int n;
      Scanner s = new Scanner(System.in);
      System.out.print("Enter the no. of elements you want:");
      n = s.nextInt();
      int a[] = new int[n];
      System.out.print("Enter all the elements you want:");
      for(int i = 0; i < n; i++)
      {
         a[i] = s.nextInt();
      }
      Sum_Numbers obj = new Sum_Numbers();
      int x = obj.add(a, a.length, 0);
      System.out.println("Sum:"+x);
```

```
    }
    int add(int a[], int n, int i)
    {
        if(i < n)
        {
            return a[i] + add(a, n, ++i);
        }
        else
        {
            return 0;
        }
    }
}
```

Output:



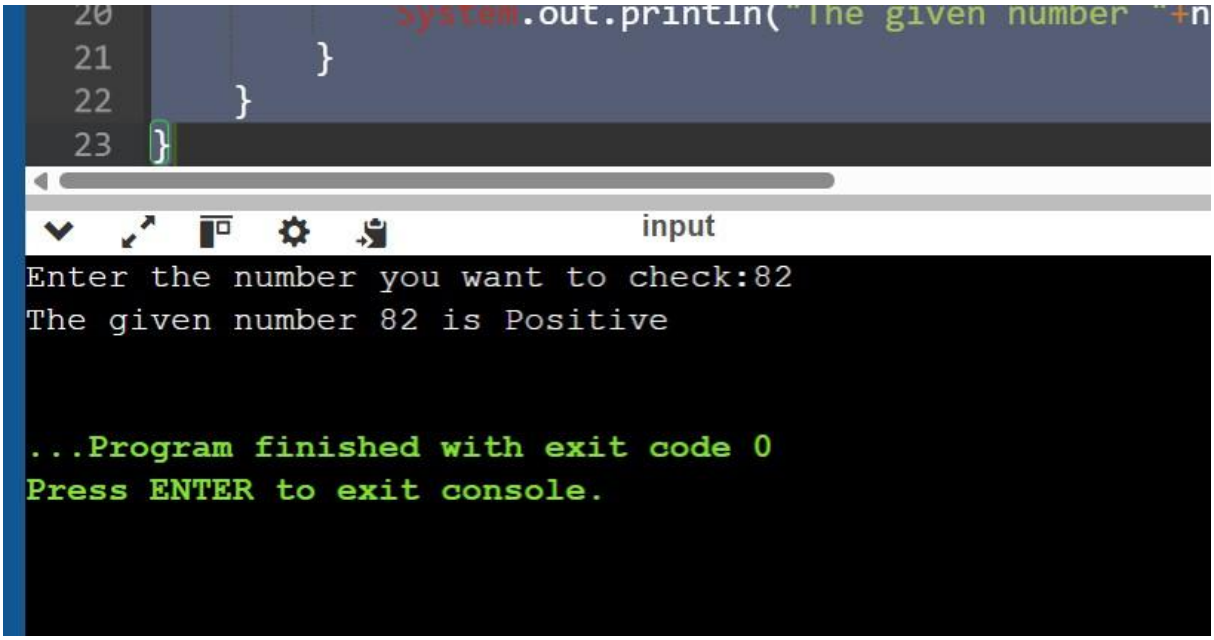
7. Java Program to find whether number is positive or negative.

Program:

```
import java.util.Scanner;
public class Postive_Negative
{
    public static void main(String[] args)
    {
```

```
        int n;
        Scanner s = new Scanner(System.in);
        System.out.print("Enter the number you want to check:");
        n = s.nextInt();
        if(n > 0)
        {
           System.out.println("The given number "+n+" is Positive");
        }
        else if(n < 0)
        {
           System.out.println("The given number "+n+" is Negative");
        }
        else
        {
           System.out.println("The given number "+n+" is neither Positive nor Negative ");
        }
    }
}
```

Output:



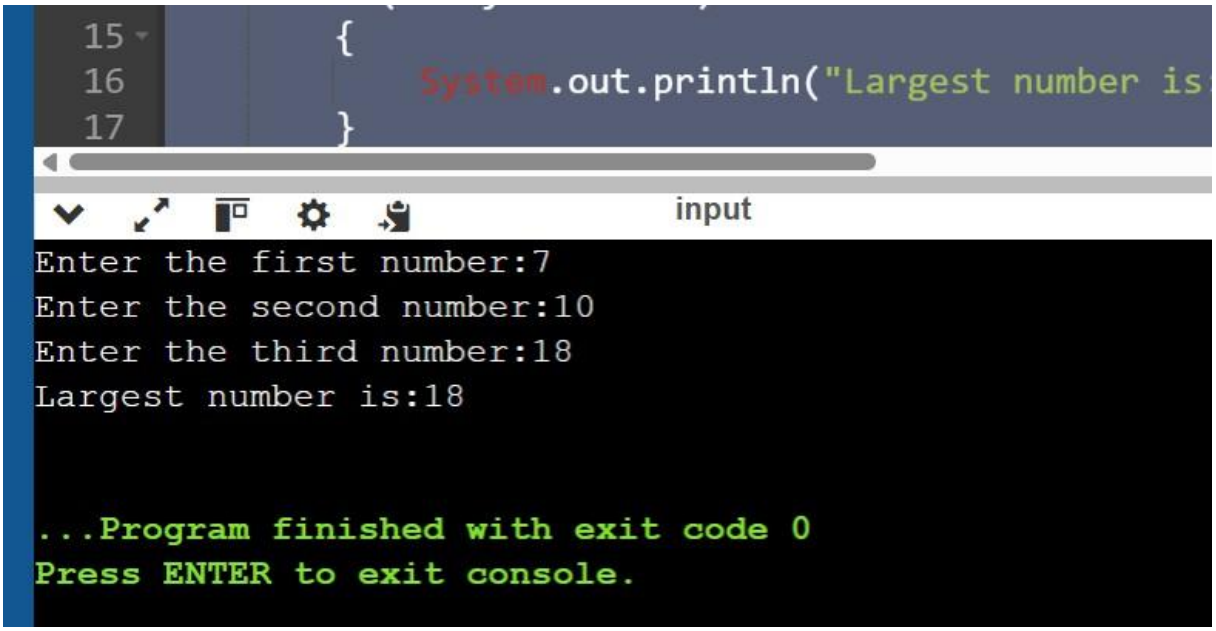
8. Java Program to find the largest among three numbers.

Program:

```
import java.util.Scanner;

public class Biggest_Number

{

   public static void main(String[] args)

   {

      int x, y, z;

      Scanner s = new Scanner(System.in);

      System.out.print("Enter the first number:");
```

```
        x = s.nextInt();
        System.out.print("Enter the second number:");
        y = s.nextInt();
        System.out.print("Enter the third number:");
        z = s.nextInt();
        if(x > y && x > z)
        {
           System.out.println("Largest number is:"+x);
        }
        else if(y > z)
        {
           System.out.println("Largest number is:"+y);
        }
        else
        {
           System.out.println("Largest number is:"+z);
        }

    }
}
```

Output:

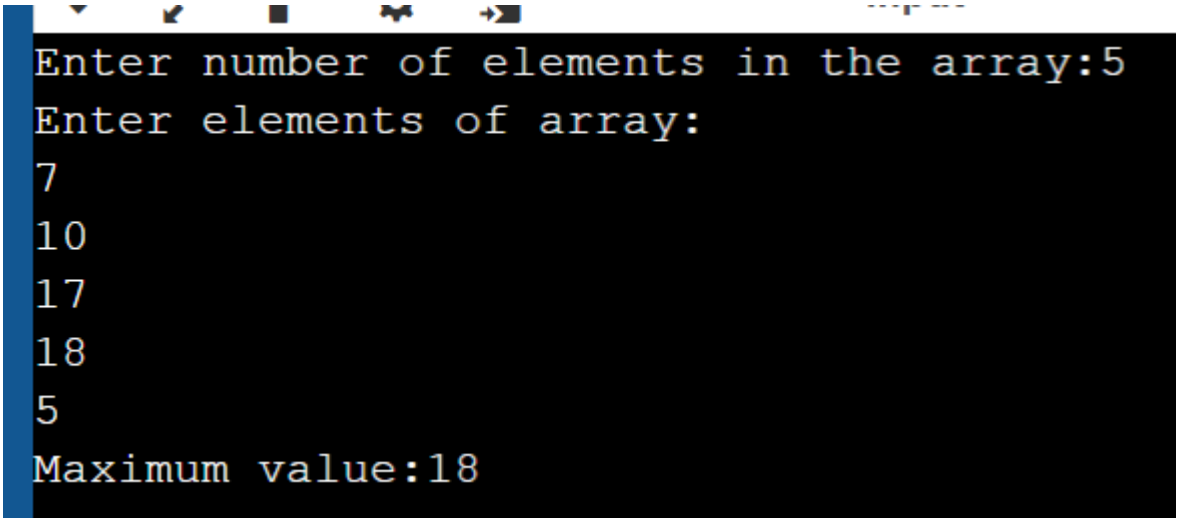


9. Java Program to find the largest element in an array.

Program:

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

Output:



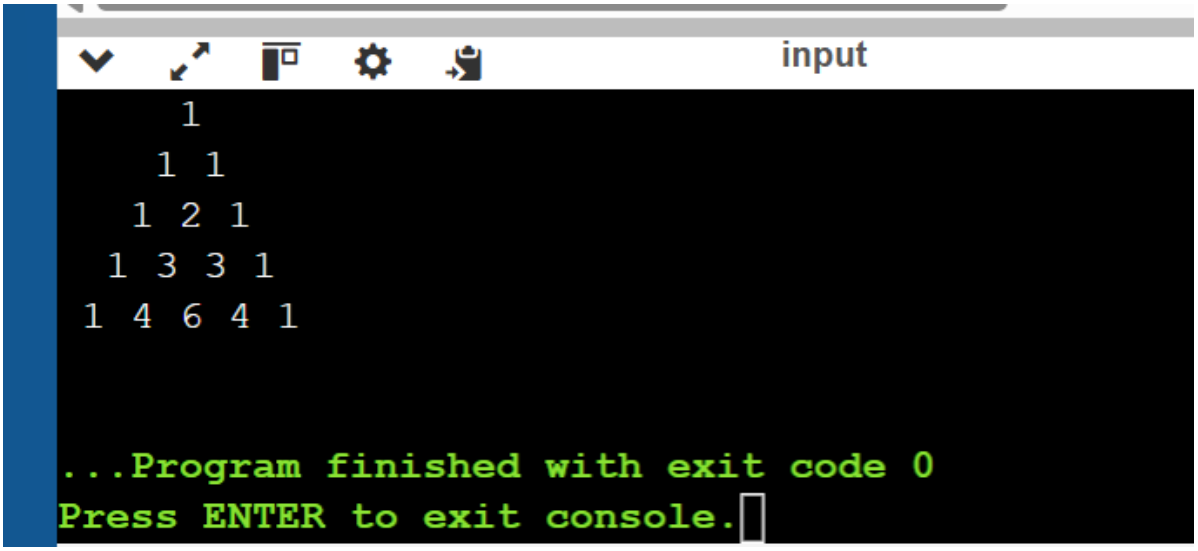
10. Java Program to print Pascal's Triangle.

Program:

```
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:


input
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
...Program finished with exit code 0
Press ENTER to exit console.