LAB RECORD

23CSE111- Object Oriented Programming

Submitted by

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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.U4CSE24119 – Kavin.J.S*** 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 13/03/2025

Internal Examiner 1 Internal Examiner 2

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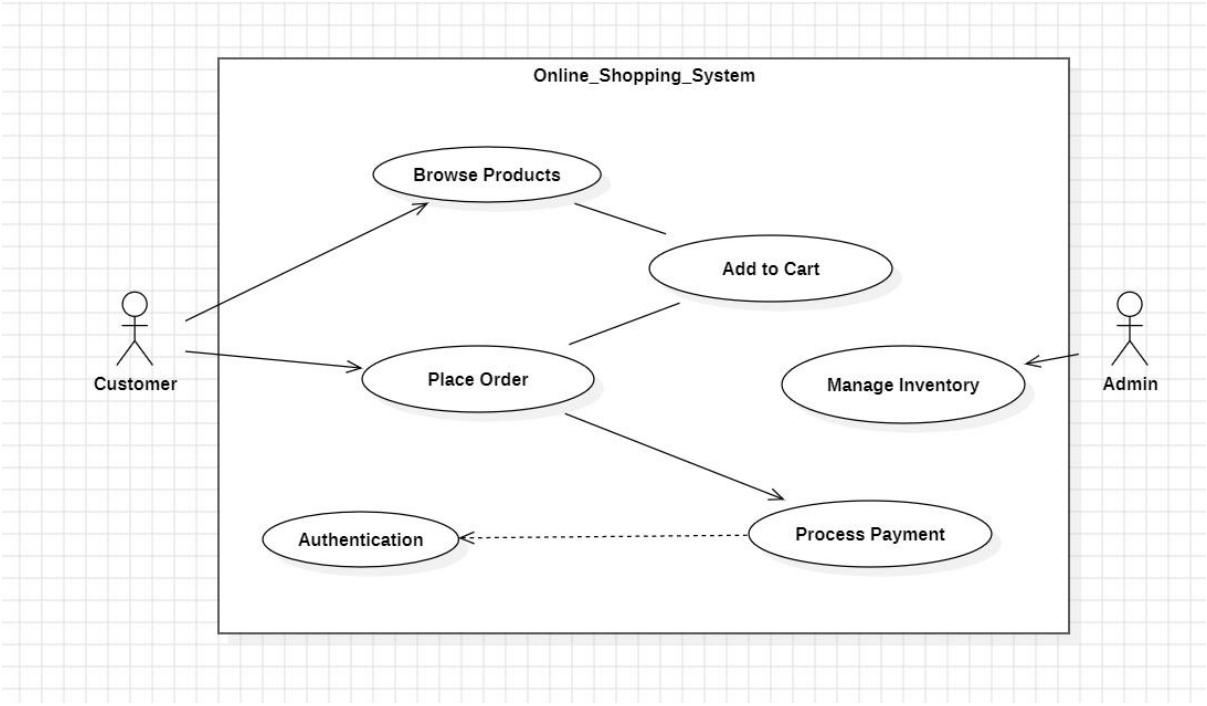
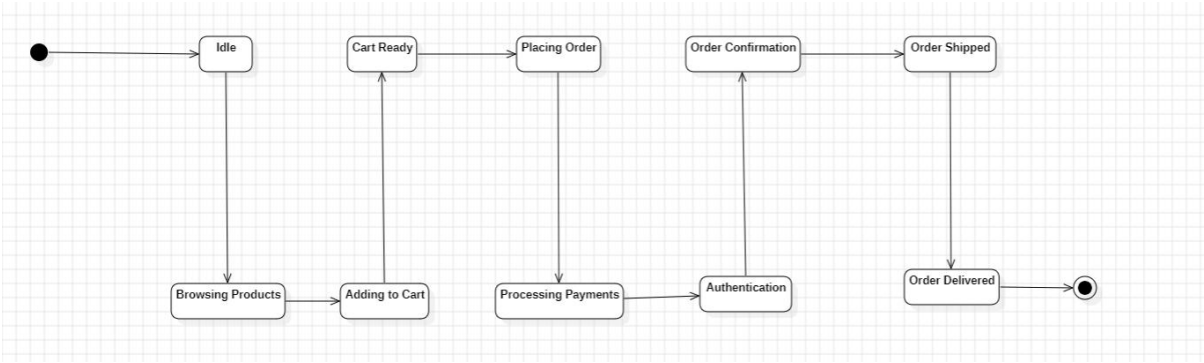
UML DIAGRAMS

1) Online Shopping System:

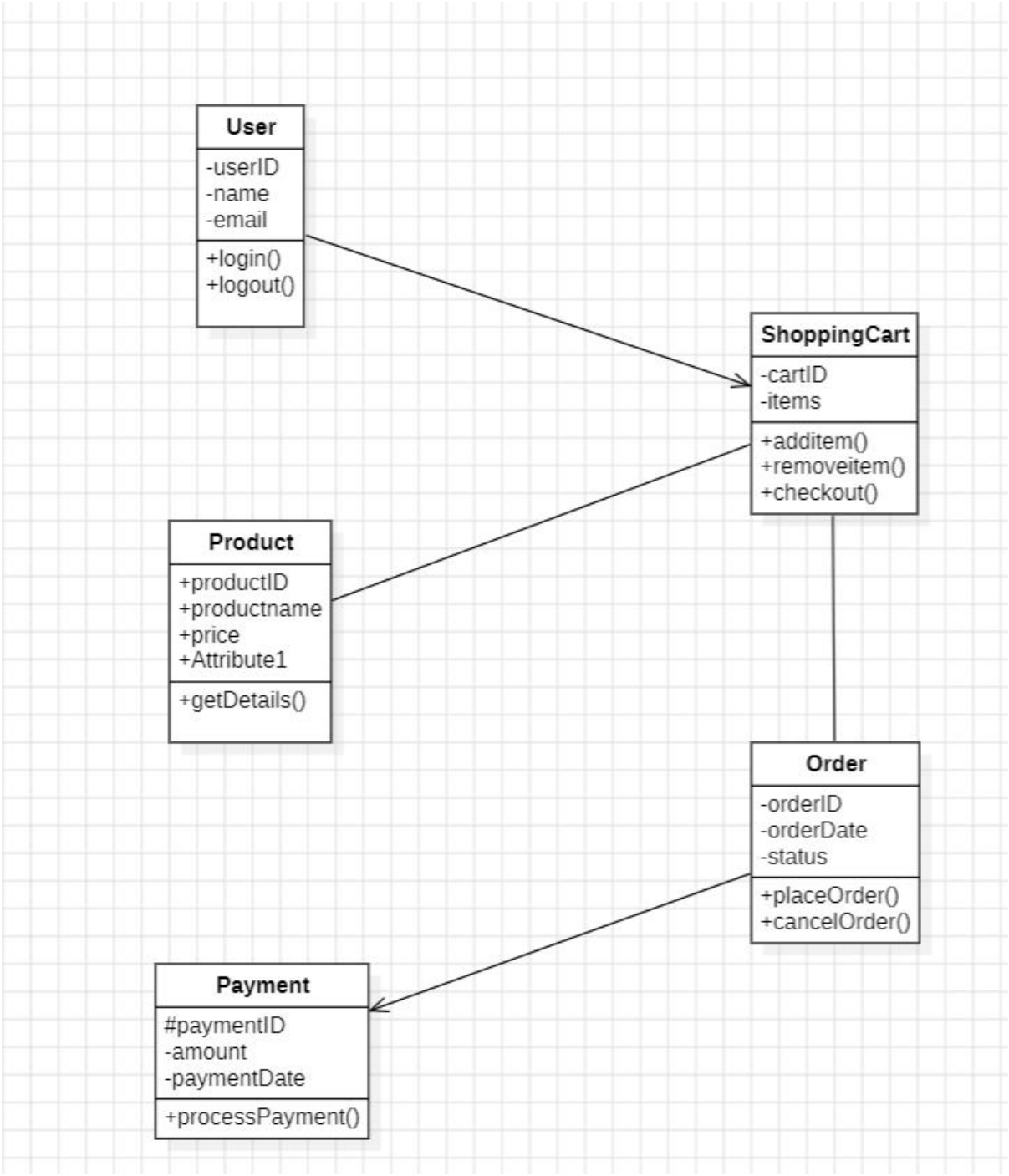
a) Use Case Diagram



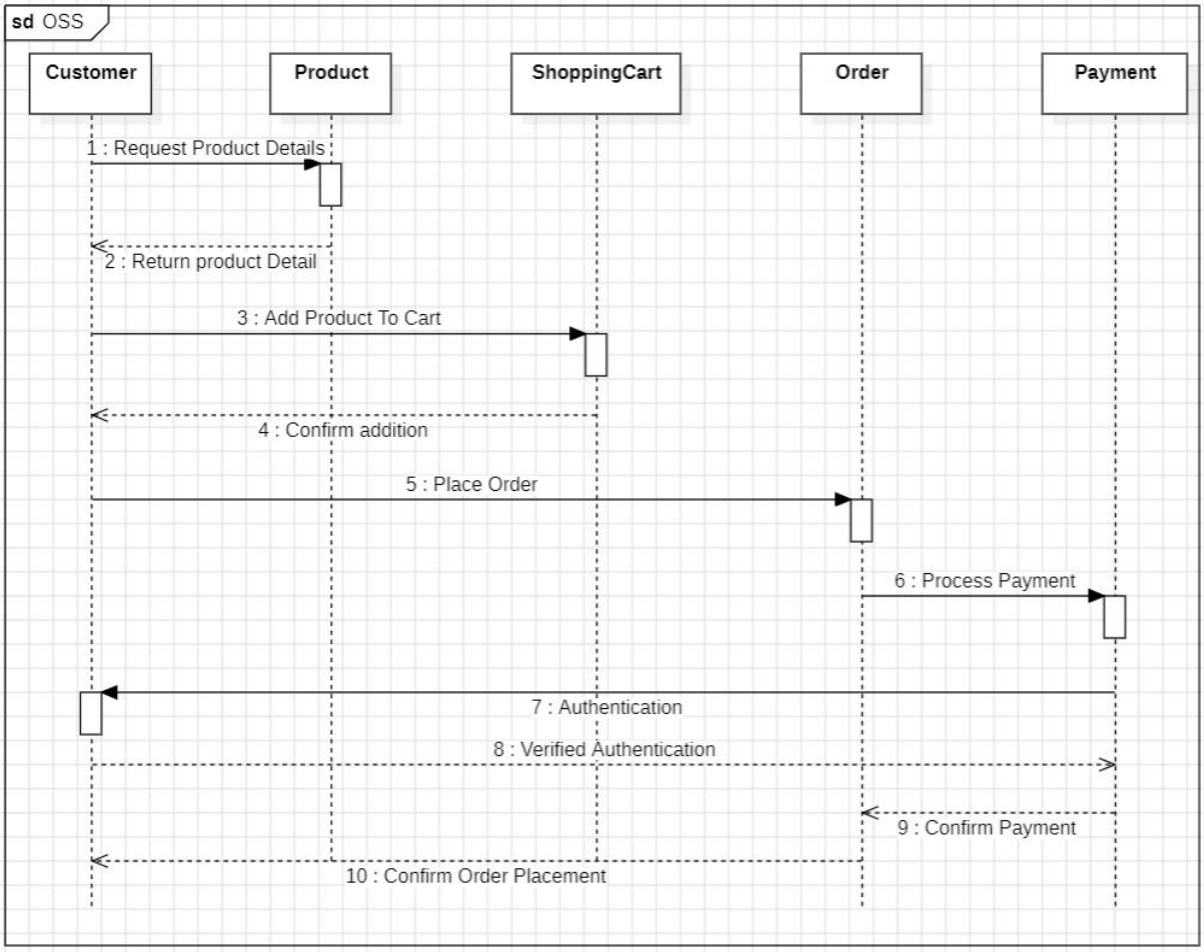
b) State Diagram



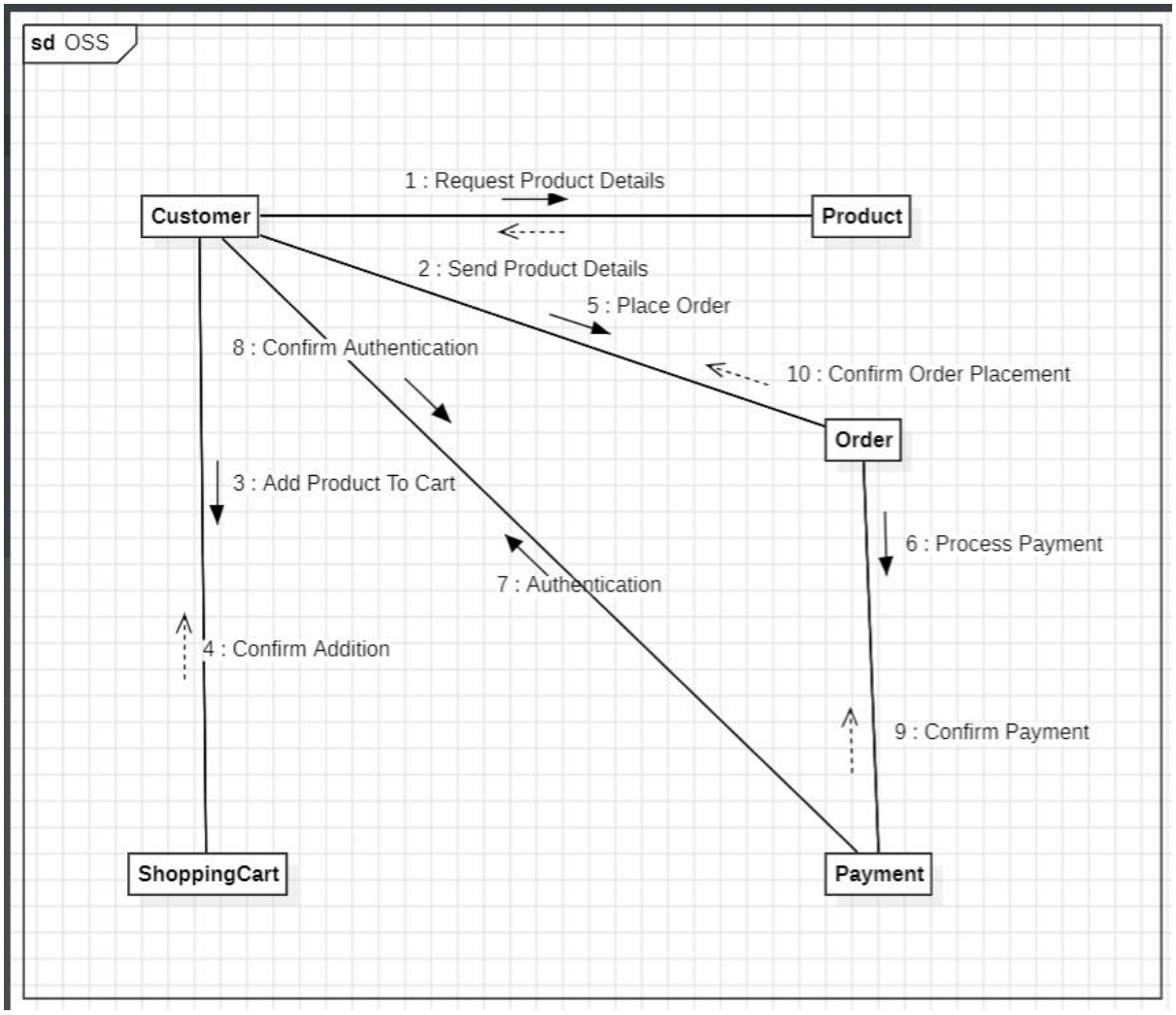
c) Class Diagram



d) Sequence Diagram

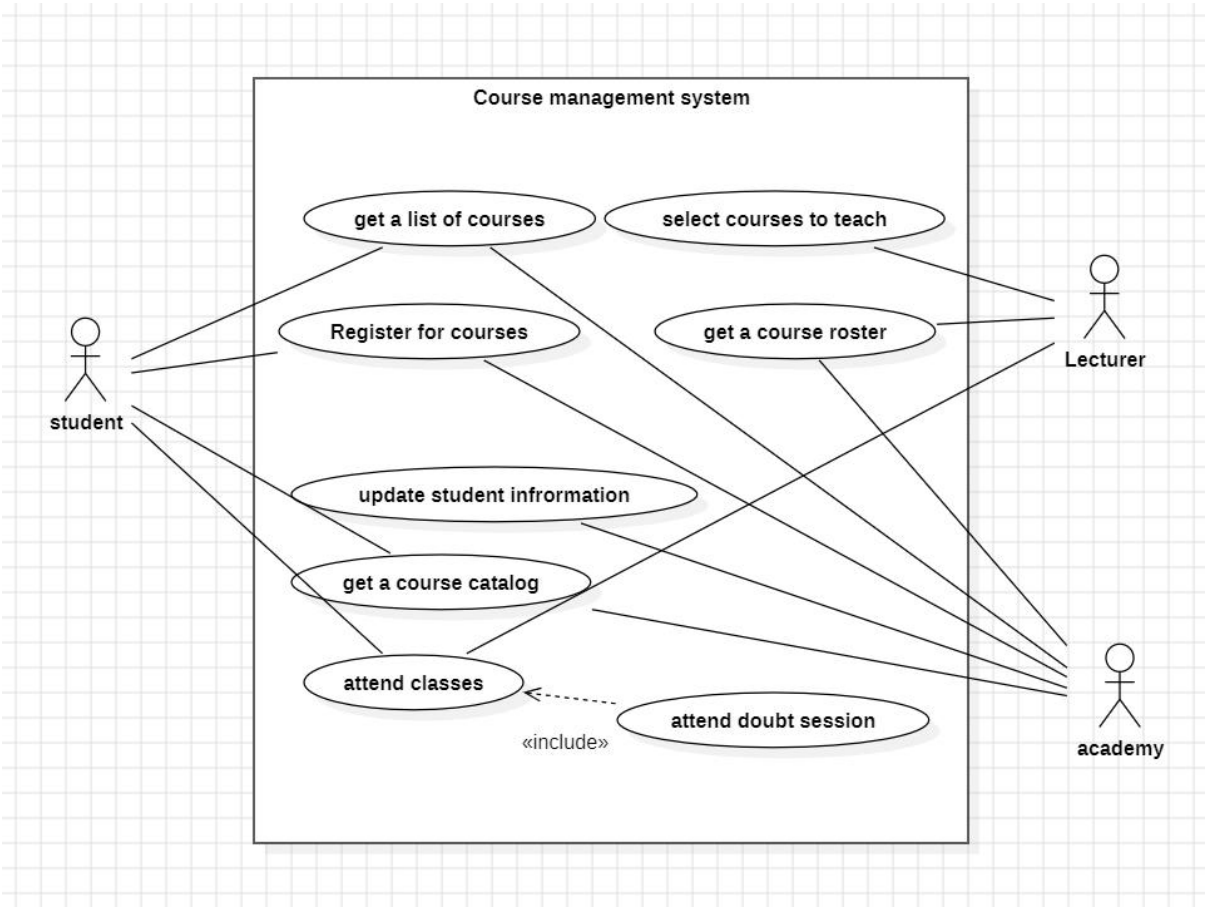


e) Communication Diagram

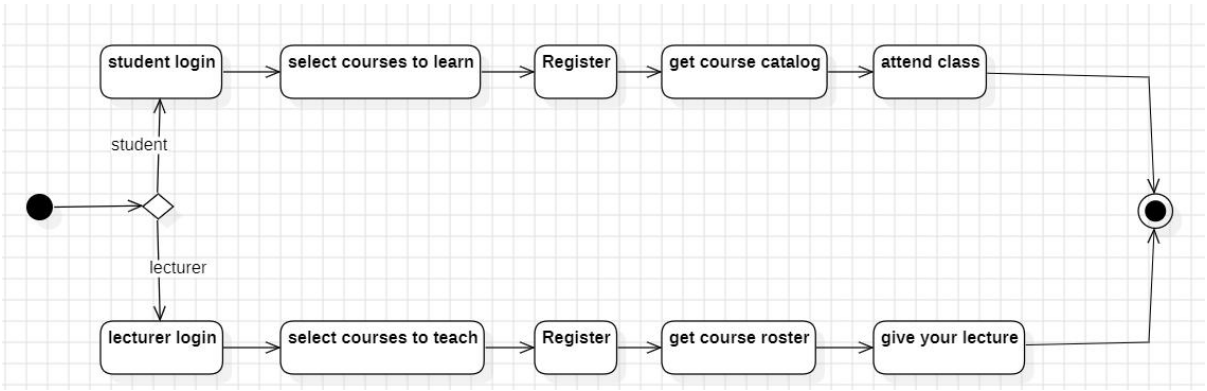


2) Course Management System:

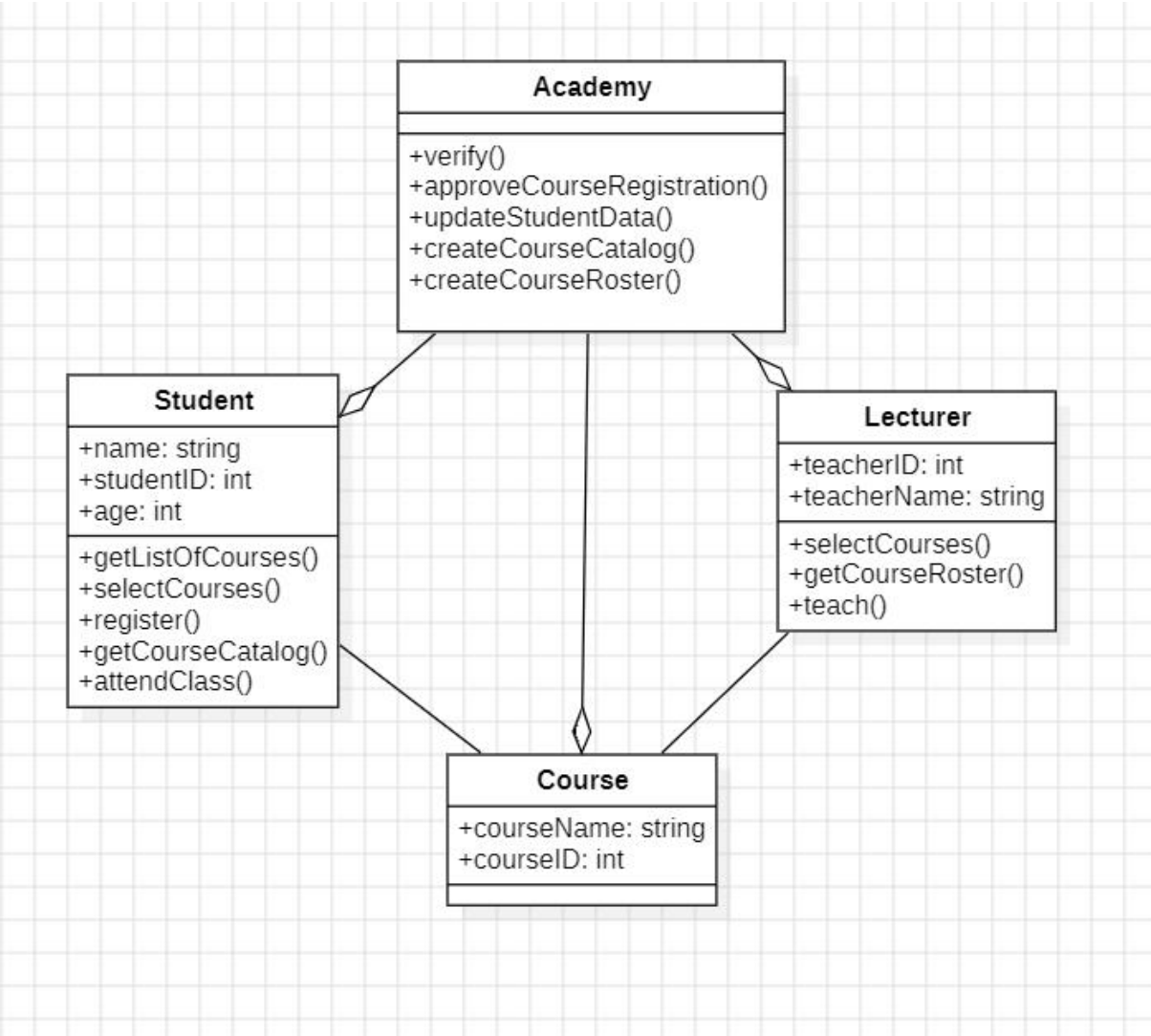
a) Use Case Diagram



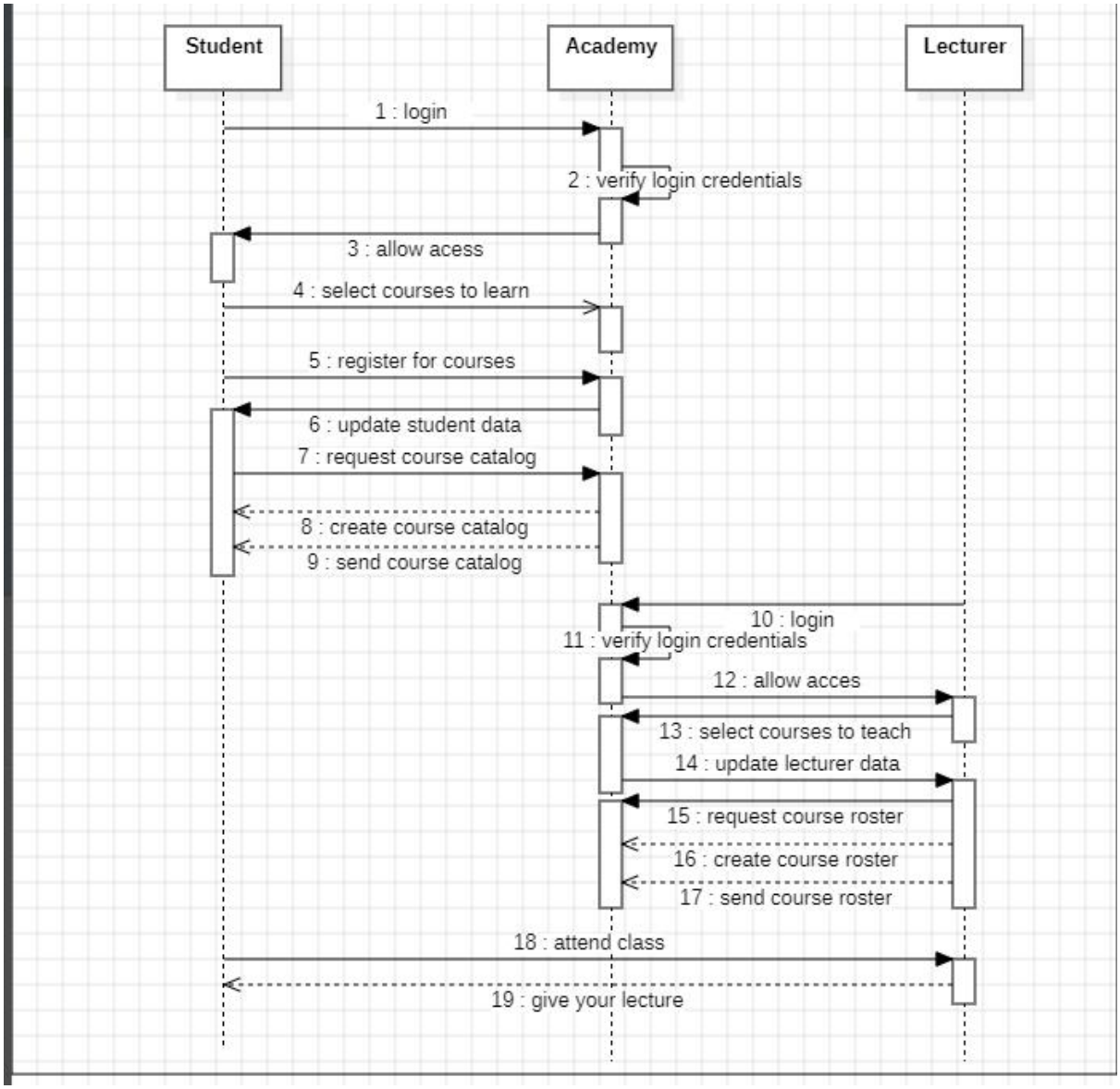
b)State Diagram



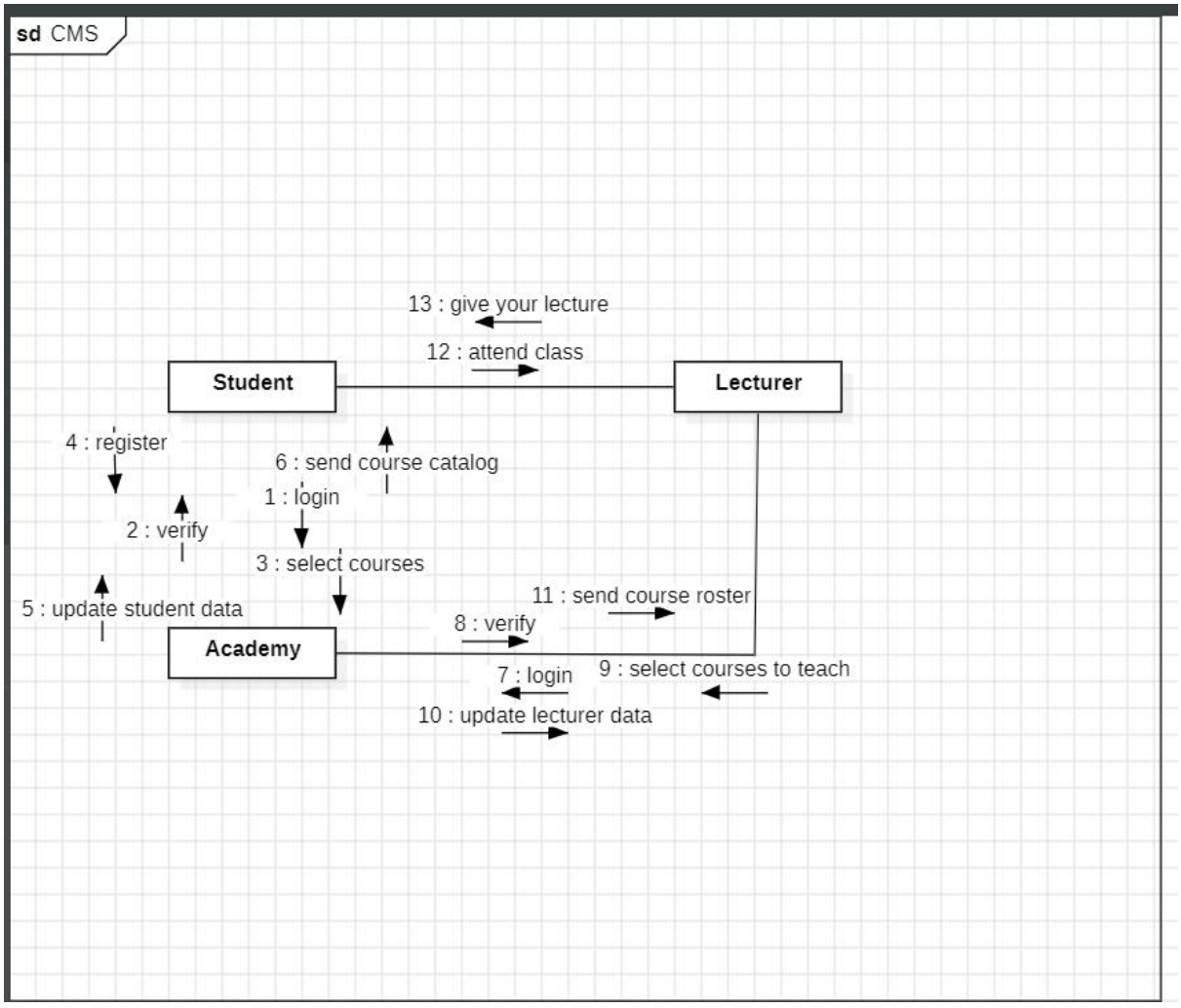
c) Class Diagram



d) Sequence Diagram



e) Communication Diagram



BASIC JAVA PROGRAMS

1) Average Calculator

CODE:

Average.java

```java
import java.util.Scanner;

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

        System.out.print("Enter the number of elements: ");
        int n = scanner.nextInt();

        double[] numArray = new double[n];
        double sum = 0.0;

        System.out.println("Enter the numbers:");
        for (int i = 0; i < n; i++) {
            numArray[i] = scanner.nextDouble();
            sum += numArray[i];
        }

        double average = sum / n;
        System.out.printf("The average is: %.2f%n", average);

        scanner.close();
    }
}
```

OUTPUT:

```
Microsoft Windows [Version 10.0.26120.3380]
(c) Microsoft Corporation. All rights reserved.

E:\Java\Java Programs>javac Average.java

E:\Java\Java Programs>java Average.java
Enter the number of elements: 4
Enter the numbers:
44
33
22
11
The average is: 27.50

E:\Java\Java Programs>
```

2) Capitalize

CODE:

Capitalize.java > ...

```java
import java.util.Scanner;

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

        System.out.print("Enter a string: ");
        String name = scanner.nextLine();

        if (!name.isEmpty()) {
            String firstLetter = name.substring(0, 1).toUpperCase();
            String remainingLetters = name.substring(1);
            name = firstLetter + remainingLetters;
        }

        System.out.println("Capitalized String: " + name);
        scanner.close();
    }
}

```

OUTPUT:

```
E:\Java\Java Programs>javac Capitalize.java

E:\Java\Java Programs>java Capitalize.java
Enter a string: abcdefg
Capitalized String: Abcdefg
```

3)EvenOdd

CODE:

EvenOdd.java > ...

```java
import java.util.Scanner;
```

a\Java Programs\Average.class

```java
public class EvenOdd {

    public static void main(String[] args) {

        Scanner reader = new Scanner(System.in);

        System.out.print("Enter a number: ");
        int num = reader.nextInt();

        if(num % 2 == 0)
            System.out.println(num + " is even");
        else
            System.out.println(num + " is odd");
    }
}
```

OUTPUT:

```
E:\Java\Java Programs>javac EvenOdd.java

E:\Java\Java Programs>java EvenOdd.java
Enter a number: 7
7 is odd

E:\Java\Java Programs>javac EvenOdd.java

E:\Java\Java Programs>java EvenOdd.java
Enter a number: 4
4 is even
```

4) Factorial

CODE:

Factorial.java > ...

```java
import java.util.Scanner;

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

        System.out.print("Enter a positive integer: ");
        int num = scanner.nextInt();

        if (num < 0) {
            System.out.println("Factorial is not defined for negative numbers.");
        } else {
            long factorial = 1;

            for (int i = 1; i <= num; ++i) {
                factorial *= i;
            }

            System.out.printf("Factorial of %d = %d%n", num, factorial);
        }

        scanner.close();
    }
}
```

OUTPUT:

```
E:\Java\Java Programs>javac Factorial.java

E:\Java\Java Programs>java Factorial.java
Enter a positive integer: 8
Factorial of 8 = 40320
```

5) Fibonacci

CODE:

Fibonacci.java 1

```java
import java.util.Scanner;

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

        // Get input from the user
        System.out.print("Enter the number of terms: ");
        int n = scanner.nextInt();

        int firstTerm = 0, secondTerm = 1;

        System.out.println("Fibonacci Series till " + n + " terms:");

        for (int i = 1; i <= n; i++) {
            System.out.print(firstTerm + (i < n ? ", " : "\n")); // Print comma except for the last term

            int nextTerm = firstTerm + secondTerm;
            firstTerm = secondTerm;
            secondTerm = nextTerm;
        }

        scanner.close();
    }
}
```

OUTPUT:

```
E:\Java\Java Programs>javac Fibonacci.java

E:\Java\Java Programs>java Fibonacci.java
Enter the number of terms: 8
Fibonacci Series till 8 terms:
0, 1, 1, 2, 3, 5, 8, 13
```

6) Multiplication Table

CODE:

```java
MultiplicationTable.java 1 ×
MultiplicationTable.java > ...
import java.util.Scanner;

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

        System.out.print("Enter a number: ");
        int num = scanner.nextInt();

        int i = 1;
        while (i <= 10) {
            System.out.printf("%d * %d = %d%n", num, i, num * i);
            i++;
        }

        scanner.close();
    }
}
```

OUTPUT:

```
E:\Java\Java Programs>javac MultiplicationTable.java

E:\Java\Java Programs>java MultiplicationTable.java
Enter a number: 7
7 * 1 = 7
7 * 2 = 14
7 * 3 = 21
7 * 4 = 28
7 * 5 = 35
7 * 6 = 42
7 * 7 = 49
7 * 8 = 56
7 * 9 = 63
7 * 10 = 70
```

7) Palindrome

Code:

Palindrome.java

```java
import java.util.Scanner;

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

        System.out.print("Enter a string: ");
        String str = scanner.nextLine();

        String reverseStr = "";
        int strLength = str.length();

        for (int i = strLength - 1; i >= 0; --i) {
            reverseStr += str.charAt(i);
        }

        if (str.equalsIgnoreCase(reverseStr)) {
            System.out.println(str + " is a Palindrome String.");
        } else {
            System.out.println(str + " is not a Palindrome String.");
        }

        scanner.close();
    }
}
```

Output:

```
E:\Java\Java Programs>javac Palindrome.java

E:\Java\Java Programs>java Palindrome.java
Enter a string: racecar
racecar is a Palindrome String.
```

8) Prime Or Not

Code:

imeORNot.java ×

rimeORNot.java > ...

```java
import java.util.Scanner;

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

        System.out.print("Enter a number: ");
        int num = scanner.nextInt();
        boolean flag = false;

        if (num < 2) {
            flag = true;
        } else {
            for (int i = 2; i <= num / 2; ++i) {
                if (num % i == 0) {
                    flag = true;
                    break;
                }
            }
        }

        if (!flag)
            System.out.println(num + " is a prime number.");
        else
            System.out.println(num + " is not a prime number.");

        scanner.close();
    }
}
```

Output:

```
E:\Java\Java Programs>javac PrimeORNot.java

E:\Java\Java Programs>java PrimeORNot.java
Enter a number: 2362
2362 is not a prime number.

E:\Java\Java Programs>javac PrimeORNot.java

E:\Java\Java Programs>java PrimeORNot.java
Enter a number: 2
2 is a prime number.
```

9) Simple Calculator

Code:

SimpleCalC.java 2

SimpleCalC.java > ...

```java
import java.util.Scanner;

class SimpleCalC {
    Run main | Debug main
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);

        System.out.println("Choose an operator: +, -, *, or /");
        char operator = input.next().charAt(0);

        System.out.println("Enter first number:");
        double number1 = input.nextDouble();

        System.out.println("Enter second number:");
        double number2 = input.nextDouble();

        double result;

        if (operator == '+') {
            result = number1 + number2;
            System.out.println(number1 + " + " + number2 + " = " + result);
        } else if (operator == '-') {
            result = number1 - number2;
            System.out.println(number1 + " - " + number2 + " = " + result);
        } else if (operator == '*') {
            result = number1 * number2;
            System.out.println(number1 + " * " + number2 + " = " + result);
        } else if (operator == '/') {
            if (number2 != 0) {
                result = number1 / number2;
                System.out.println(number1 + " / " + number2 + " = " + result);
            } else {
                System.out.println("Error! Division by zero is not allowed.");
            }
        } else {
            System.out.println("Invalid operator!");
        }

        input.close();
    }
}
```

Output:

```
E:\Java\Java Programs>java SimpleCalC.java
Choose an operator: +, -, *, or /
+
Enter first number:
33
Enter second number:
44
33.0 + 44.0 = 77.0

E:\Java\Java Programs>java SimpleCalC.java
Choose an operator: +, -, *, or /
-
Enter first number:
44
Enter second number:
33
44.0 - 33.0 = 11.0

E:\Java\Java Programs>java SimpleCalC.java
Choose an operator: +, -, *, or /
/
Enter first number:
44
Enter second number:
33
44.0 / 33.0 = 1.3333333333333333
```

10) Vowel Or Consonant

Code:

VowelConsonant.java > ...

```java
import java.util.Scanner;

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

        System.out.print("Enter a character: ");
        char ch = scanner.next().charAt(0); // Read the first character input

        if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' ||
            ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U') {
            System.out.println(ch + " is a vowel");
        } else if (Character.isLetter(ch)) { // Check if it's a letter
            System.out.println(ch + " is a consonant");
        } else {
            System.out.println("Invalid input! Please enter an alphabetic character.");
        }

        scanner.close();
    }
}

```

Output:

```
E:\Java\Java Programs>java VowelConsonant.java
Enter a character: i
i is a vowel

E:\Java\Java Programs>java VowelConsonant.java
Enter a character: f
f is a consonant
```