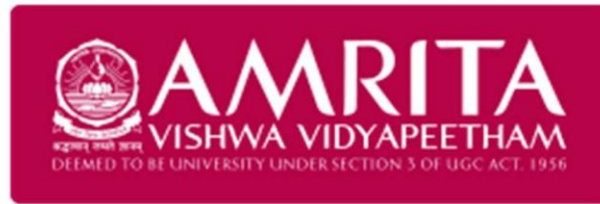




**SCHOOL OF  
COMPUTING**

DHUSYANTH R  
CH.SC.U4CSE24161  
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.U4CSE24161 – DHUSYANTH R** 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 examiner on held on

Internal Examiner 1

Internal Examiner 2

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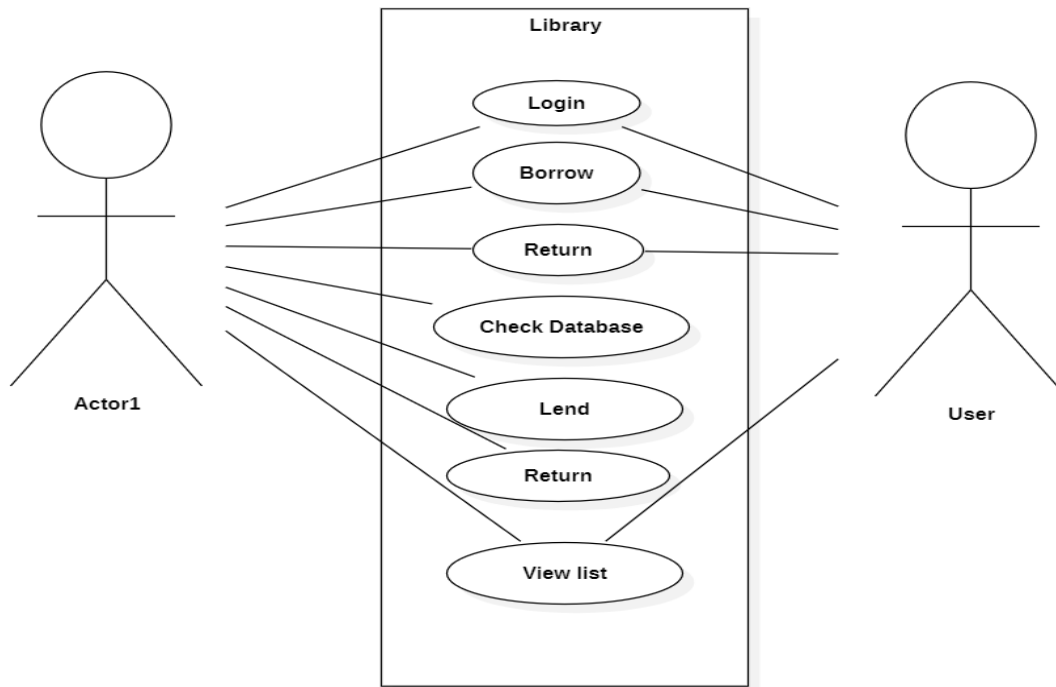
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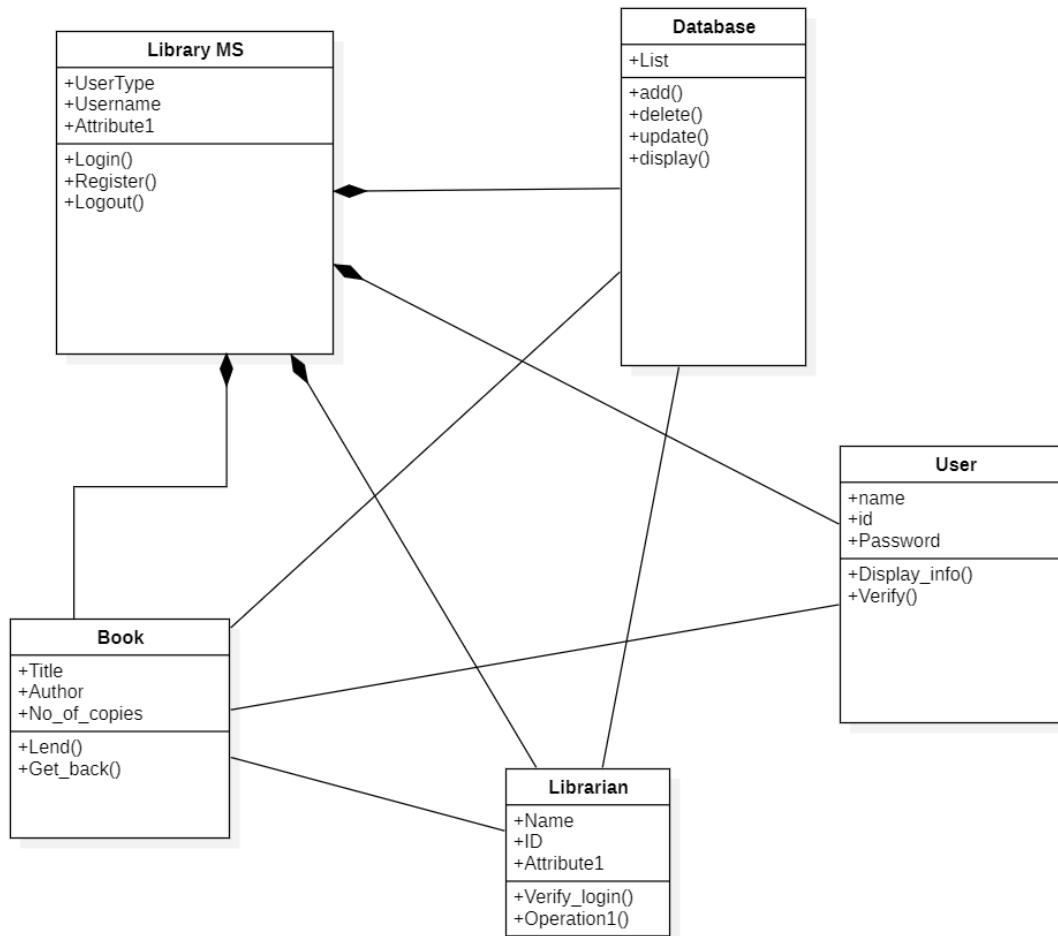
# UML DIAGRAMS

## LIBRARY MANAGEMENT SYSTEM

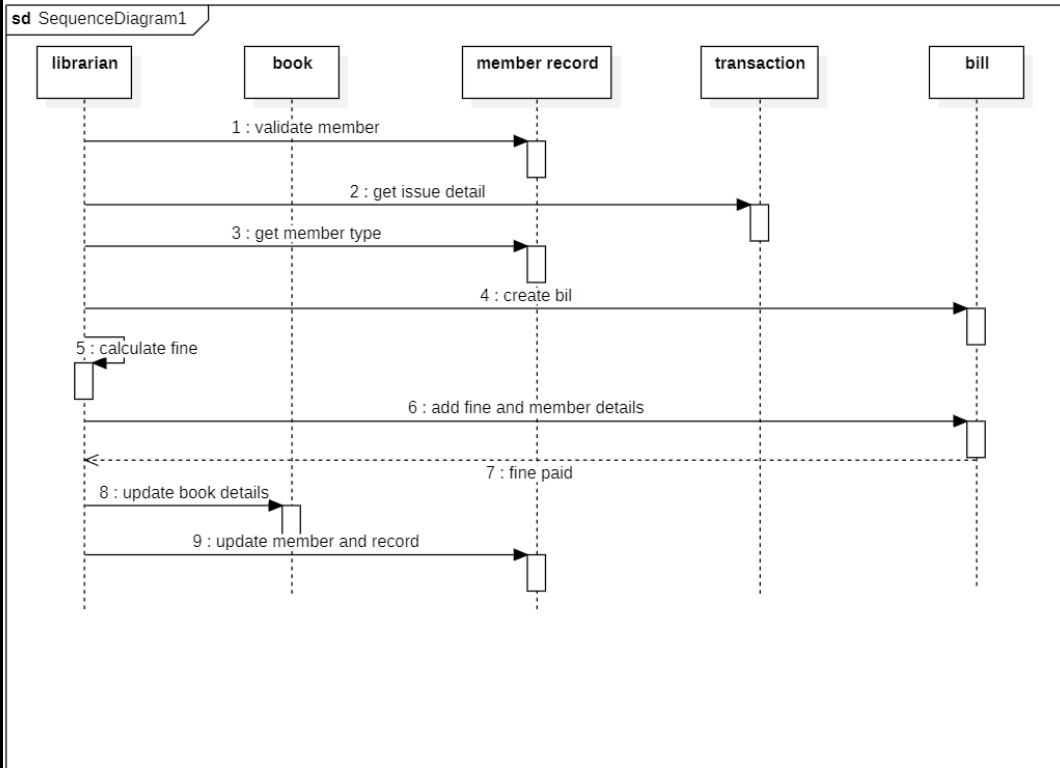
1.a) Use Case Diagram:



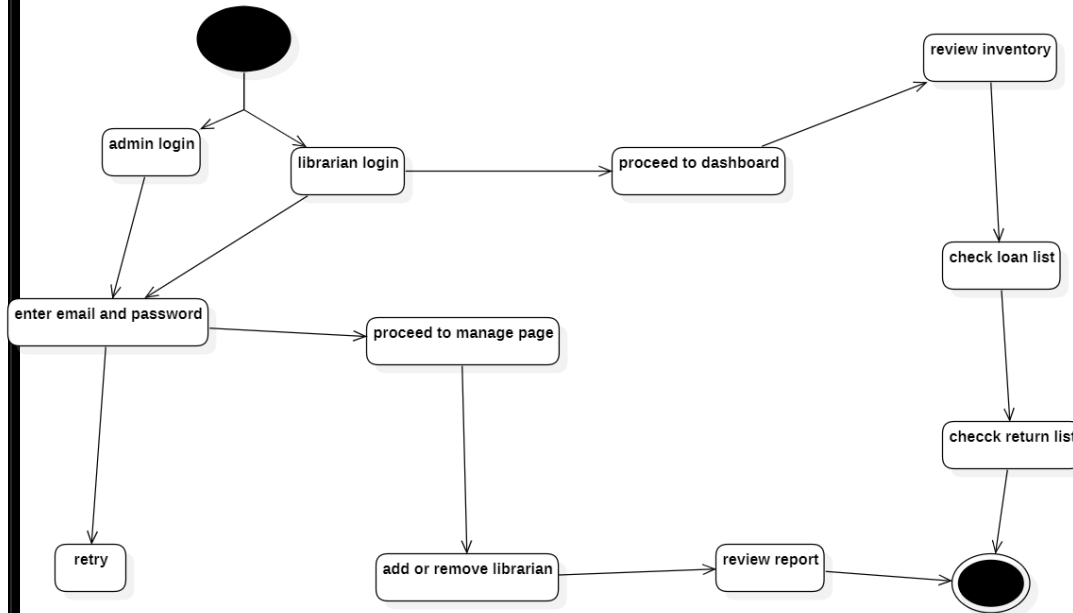
## 1.b) Class Diagram:



## 1.c) Sequence Diagram:

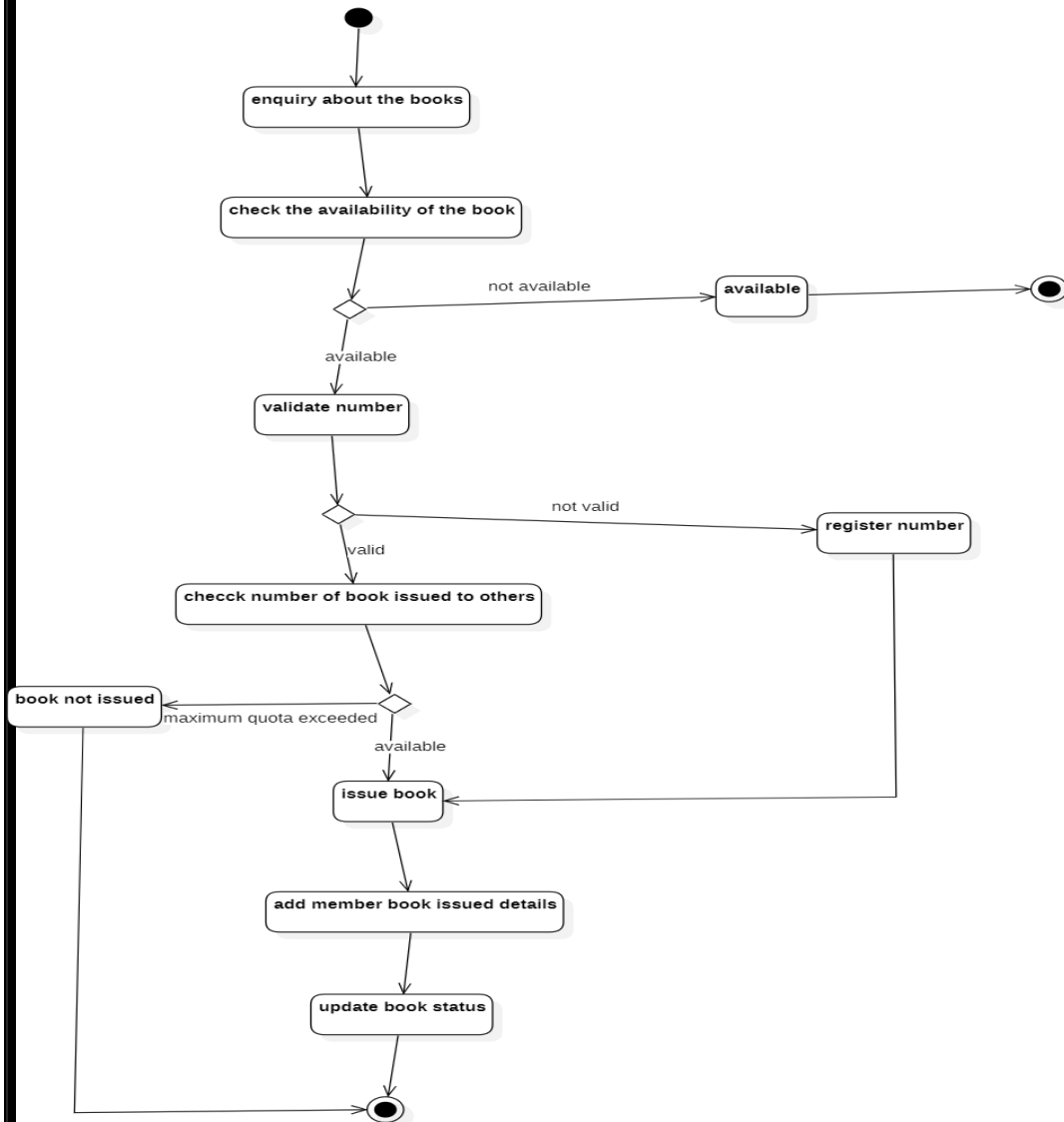


## 1.d) STATE Diagram:



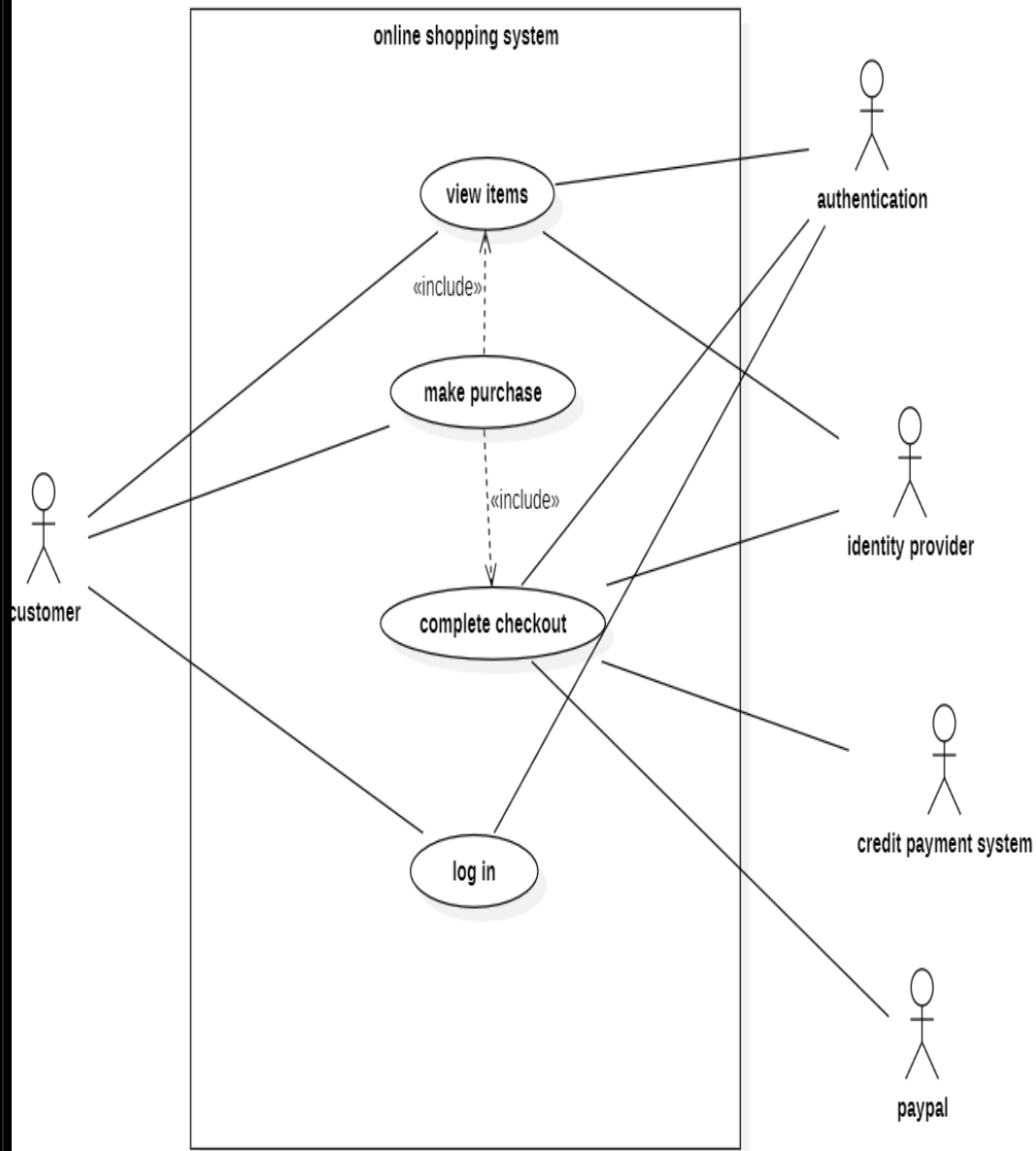


## 1.e) Activity Diagram:

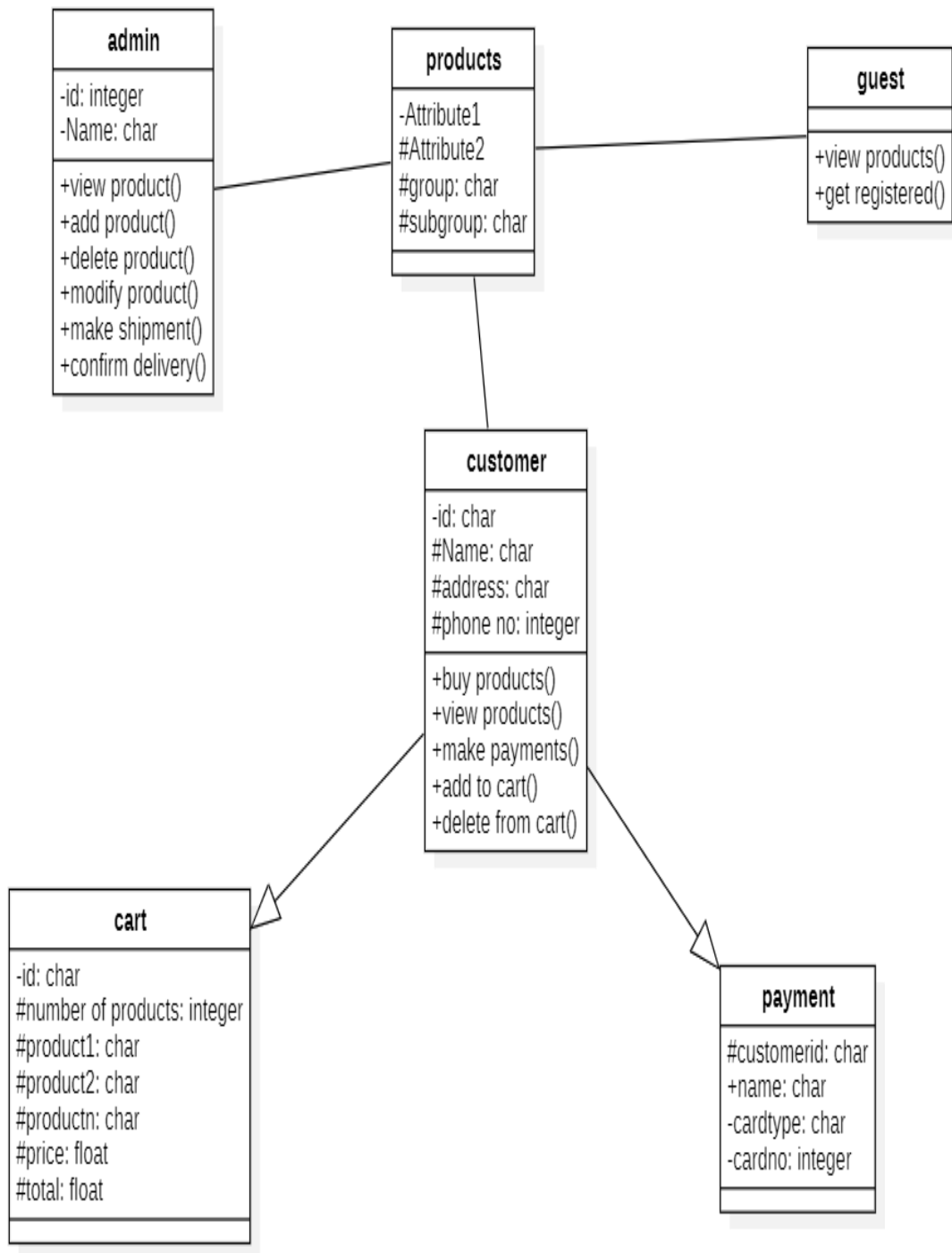


## 2.ONLINE SHOPPING SYSTEM

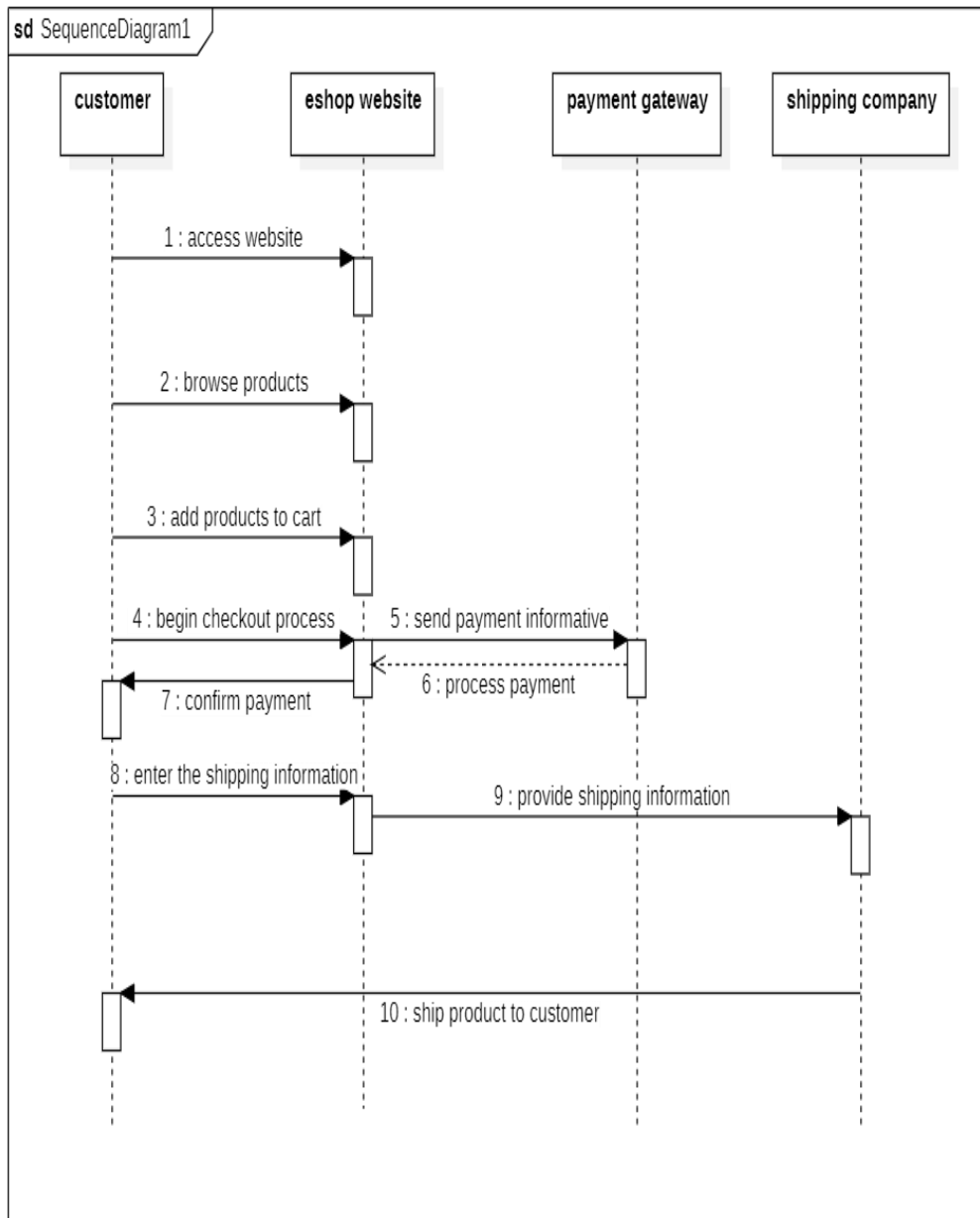
2.a) Use Case Diagram:



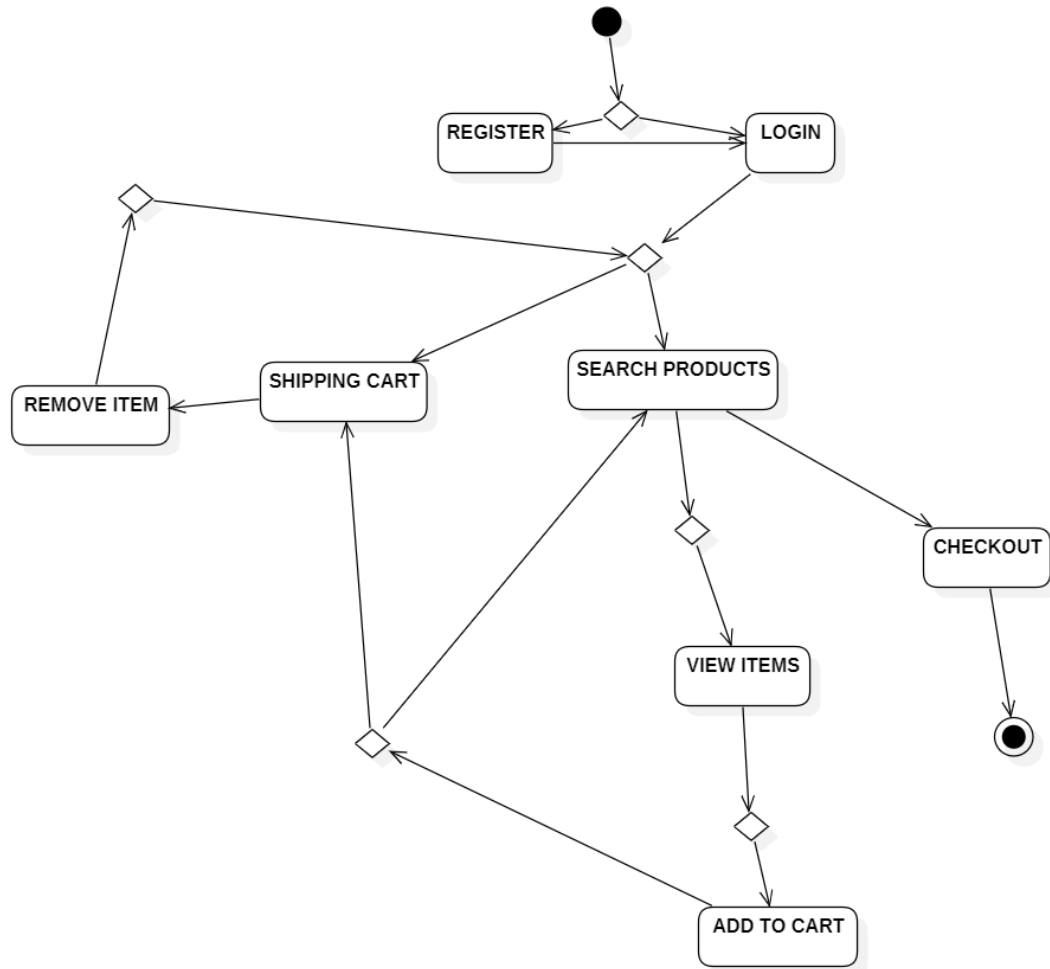
## 2.b) Class Diagram:



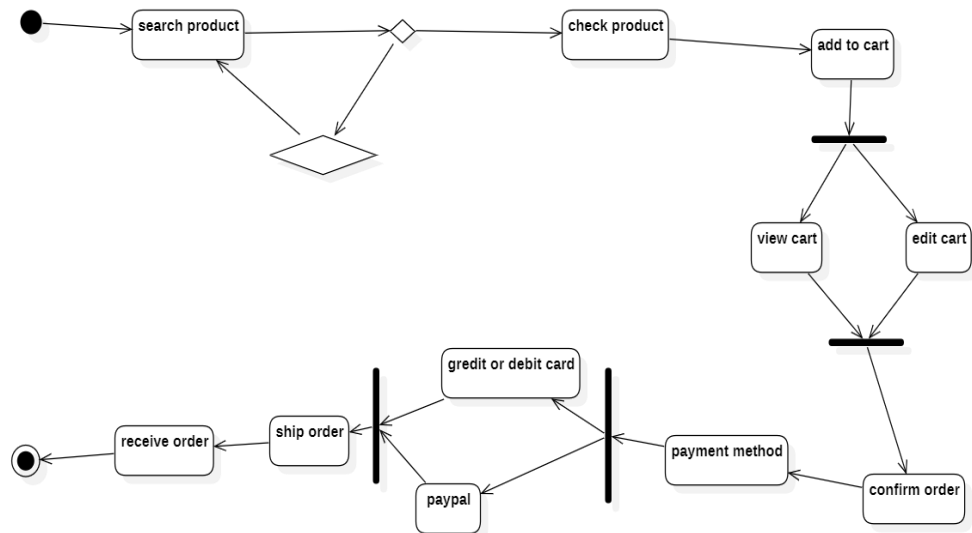
## 2.c) Sequence Diagram:



## 2.d) STATE-DIAGRAM:



## 2.e) Activity Diagram:



### 3.BASIC JAVA PROGRAMS

#### 1.) Check vowel:

```
public class CheckVowel {  
    public static void main(String[] args) {  
        char ch = 'a';  
        if ("AEIOUaeiou".indexOf(ch) != -1) {  
            System.out.println(ch + " is a vowel.");  
        } else {  
            System.out.println(ch + " is not a vowel.");  
        }  
    }  
}
```

#### Output:

```
Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.  
  
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows  
  
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs> javac CheckVowel.java  
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs> java CheckVowel.java  
a is a vowel.  
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
```

#### 2.)count of digits:

```
public class CountDigits {  
    public static void main(String[] args) {  
        int num = 123456, count = 0;  
        while (num != 0) {  
            count++;  
            num /= 10;  
        }  
        System.out.println("Number of digits: " + count);  
    }  
}
```

#### Output:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\program> javac CountDigits.java
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\program> java CountDigits.java
Number of digits: 6
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\program>
```

### 3.)count vowel:

```
public class CountVowel {
    public static void main(String[] args) {
        String str = "Hello World";
        int count = 0;
        for (char ch : str.toCharArray()) {
            if ("AEIOUaeiou".indexOf(ch) != -1) {
                count++;
            }
        }
        System.out.println("Number of vowels: " + count);
    }
}
```

### Output:

```
Windows PowerShell
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PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\program> javac CountVowel.java
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\program> java CountVowel.java
Number of vowels: 3
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\program>
```

### 4.)GCD:

```
public class GCD {
    public static void main(String[] args) {
        int a = 56, b = 98;
        while (b != 0) {
            int temp = b;
            b = a % b;
            a = temp;
        }
        System.out.println("GCD: " + a);
    }
}
```

### Output:



```
Windows PowerShell
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PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\p>
javac GCD.java
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\p>
java GCD.java
GCD: 14
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\p>
```

5.)Largest three digit number:

```
public class LargestThreeDigitNumber {
    public static void main(String[] args) {
        System.out.println("Largest three-digit number: 999");
    }
}
```

Output:

```
Windows PowerShell
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PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
javac LargestThreeDigitNumber.java
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
java LargestThreeDigitNumber.java
Largest three-digit number: 999
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
```

6.)LCM:

```
public class LCM {
    public static void main(String[] args) {
        int a = 12, b = 18;
        int lcm = (a * b) / gcd(a, b);
        System.out.println("LCM: " + lcm);
    }

    private static int gcd(int x, int y) {
        while (y != 0) {
            int temp = y;
            y = x % y;
            x = temp;
        }
        return x;
    }
}
```

Output:

```
Windows PowerShell
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PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
javac LCM.java
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
java LCM.java
LCM: 36
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
```

7.)leap year check:

```
public class LeapYearCheck {
    public static void main(String[] args) {
        int year = 2024;
        if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0)) {
            System.out.println(year + " is a leap year.");
        } else {
            System.out.println(year + " is not a leap year.");
        }
    }
}
```

Output:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

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PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
javac LeapYearCheck.java
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
java LeapYearCheck.java
2024 is a leap year.
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
```

8.)palindrome check:

```
public class PalindromeCheck {
    public static void main(String[] args) {
        String str = "madam", rev = "";
        for (int i = str.length() - 1; i >= 0; i--) {
            rev += str.charAt(i);
        }
        if (str.equals(rev)) {
            System.out.println(str + " is a palindrome.");
        } else {
            System.out.println(str + " is not a palindrome.");
        }
    }
}
```

```

    }
}

```

### Output:

```

Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

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PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
javac PalindromCheck.java
error: file not found: PalindromCheck.java
Usage: javac <options> <source files>
use --help for a list of possible options
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
javac PalindromeCheck.java
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
java PalindromeCheck.java
madam is a palindrome.
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>

```

### 9.)ReverseString:

```

public class ReverseString {
    public static void main(String[] args) {
        String str = "hello", rev = "";
        for (int i = str.length() - 1; i >= 0; i--) {
            rev += str.charAt(i);
        }
        System.out.println("Reversed string: " + rev);
    }
}

```

### Output:

```

Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
javac ReverseString.java
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
java ReverseString.java
Reversed string: olleh
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>

```

### 10.)Sum of digits:

```

public class SumOfDigits {
    public static void main(String[] args) {
        int num = 1234, sum = 0;
        while (num != 0) {
            sum += num % 10;
            num /= 10;
        }
        System.out.println("Sum of digits: " + sum);
    }
}

```

```
}  
}
```

**Output:**

```
Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.  
  
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows  
  
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>  
javac SumofDigits.java  
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>  
java SumofDigits.java  
Sum of digits: 10  
PS C:\Users\DHUSYANTH RAMASAMY\OneDrive - Amrita Vishwa Vidyapeetham- Chennai Campus\Documents\sem-2\JAVA\JAVA\programs>
```