SCHOOL OF
COMPUTING

HARISH.R

CH.SC.U4CSE24163

OBJECT ORIENTED PROGRAMMING (23CSE111)

LAB RECORD

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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.U4CSE24163 – HARISH.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 examination held on

Internal Examiner 1 Internal Examiner 2

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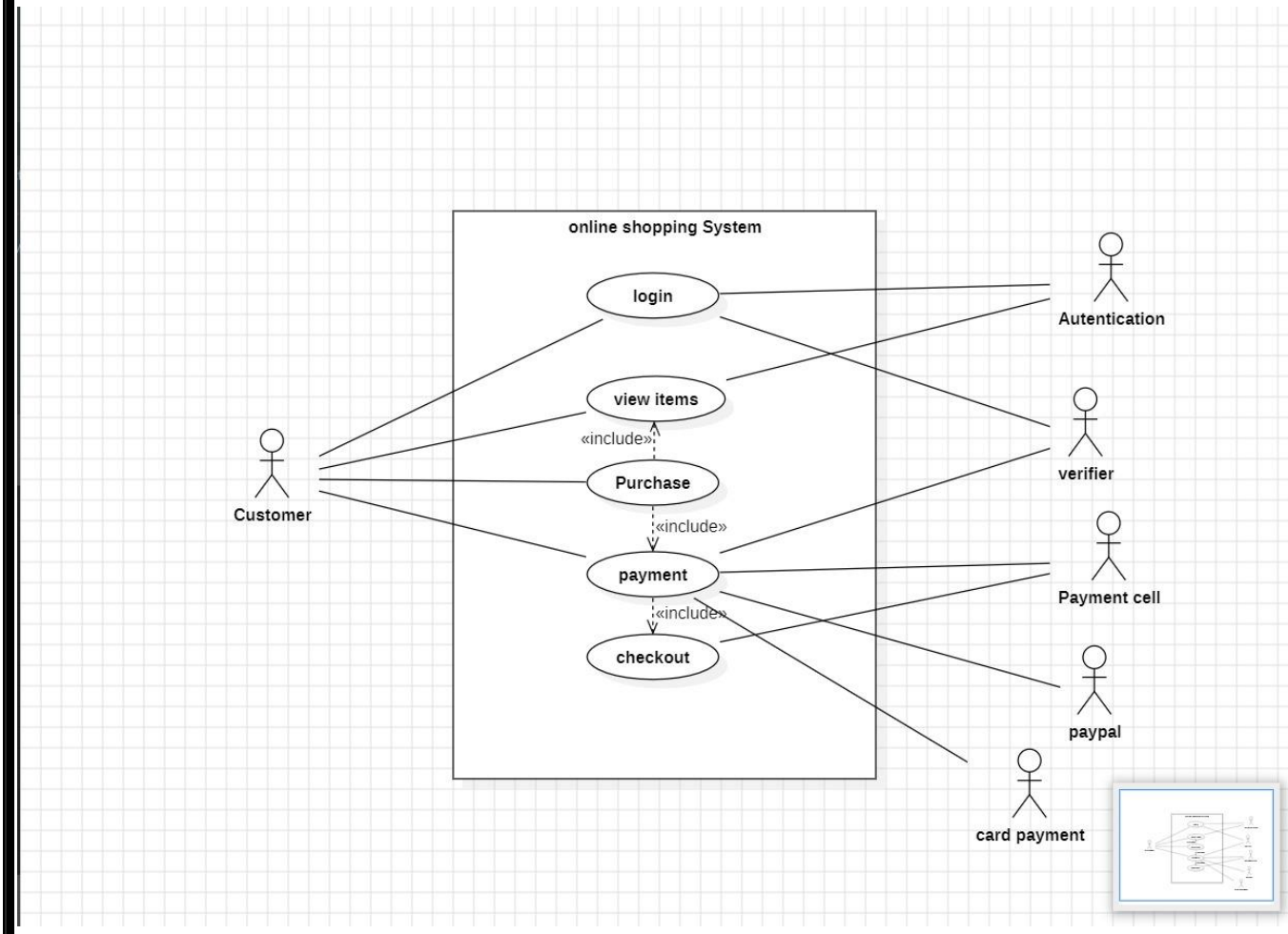
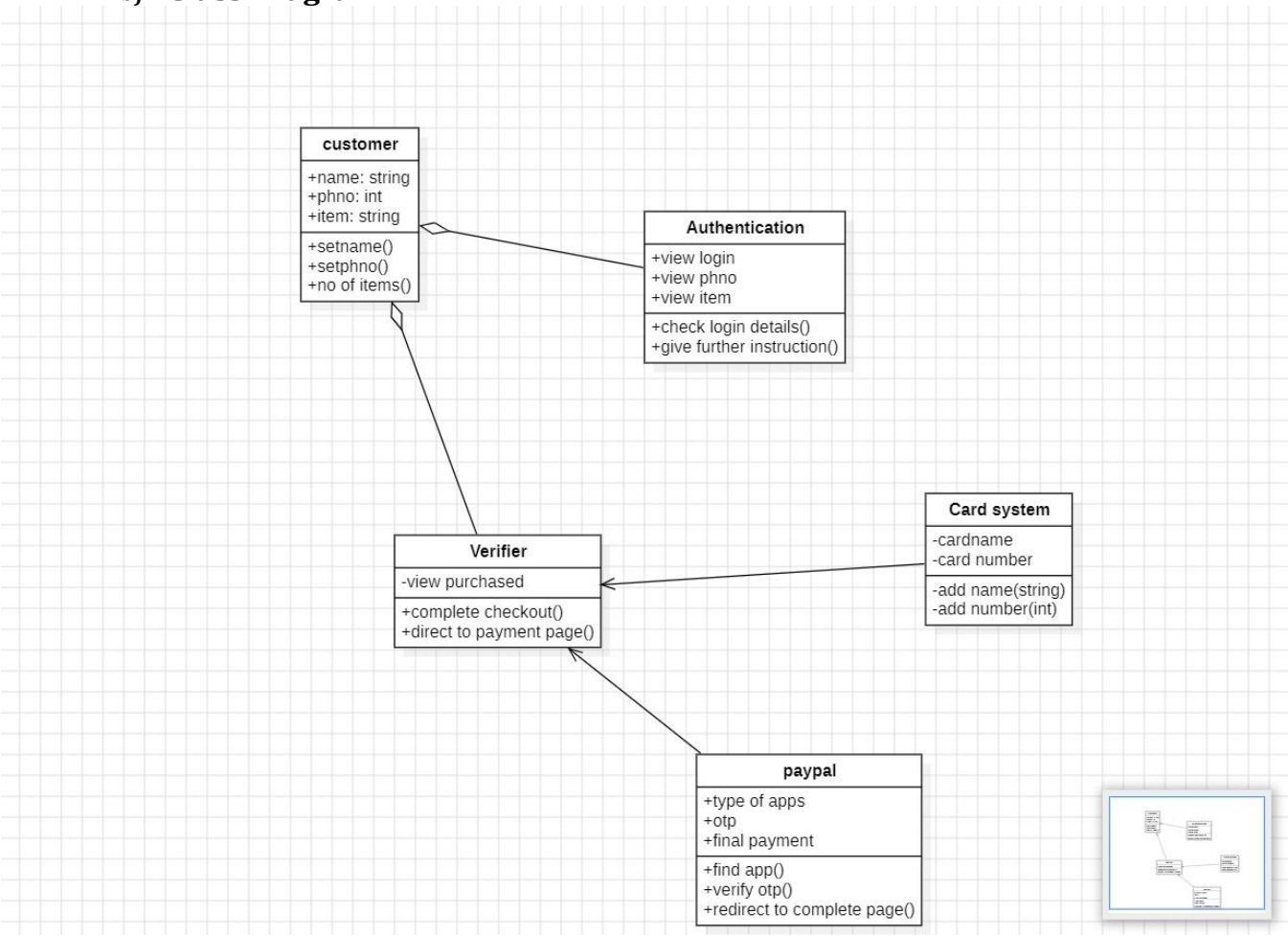
UML DIAGRAMS

1. ONLINE SHOPPING

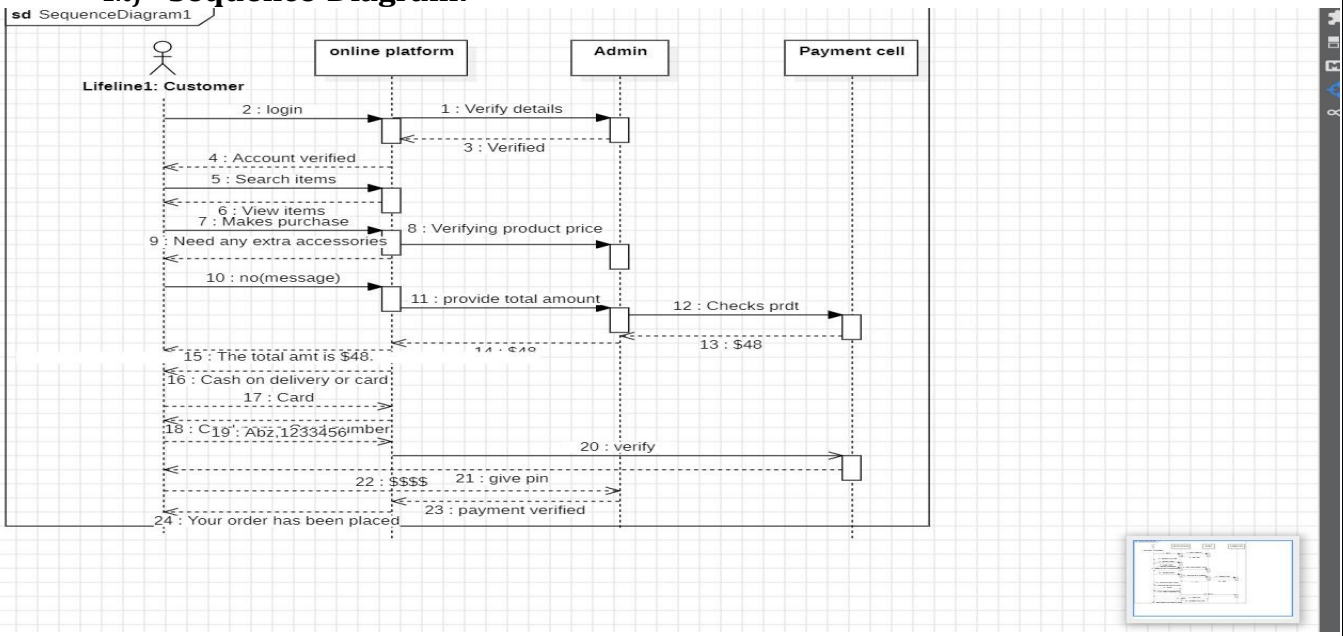
1.a) Use Case Diagram:



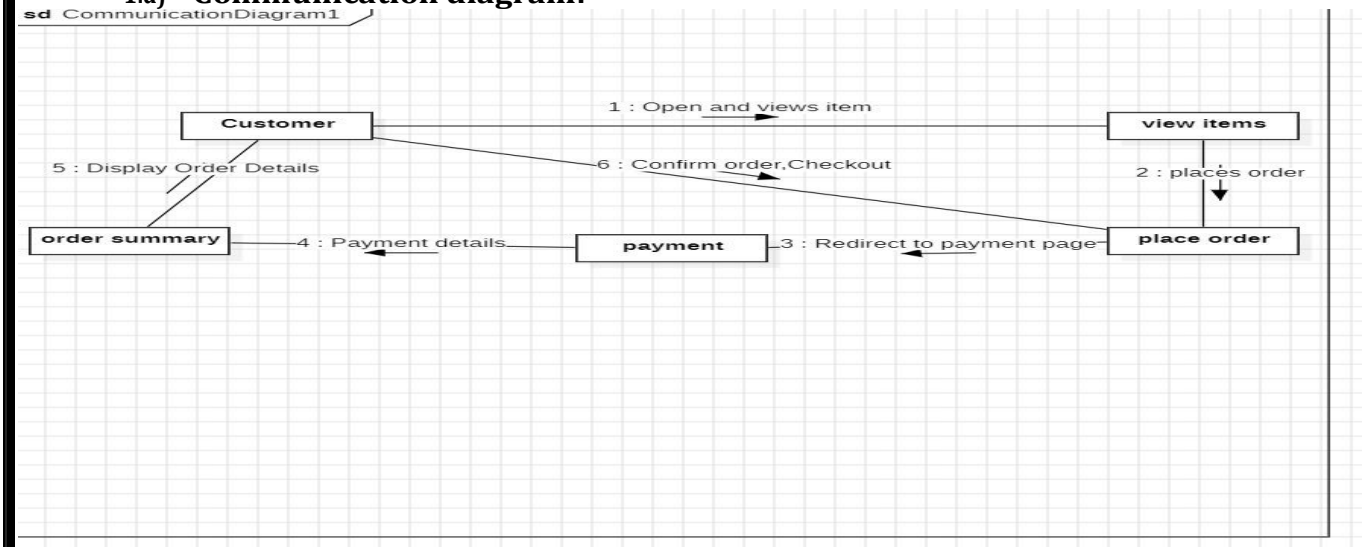
1.b) Class Diagram:



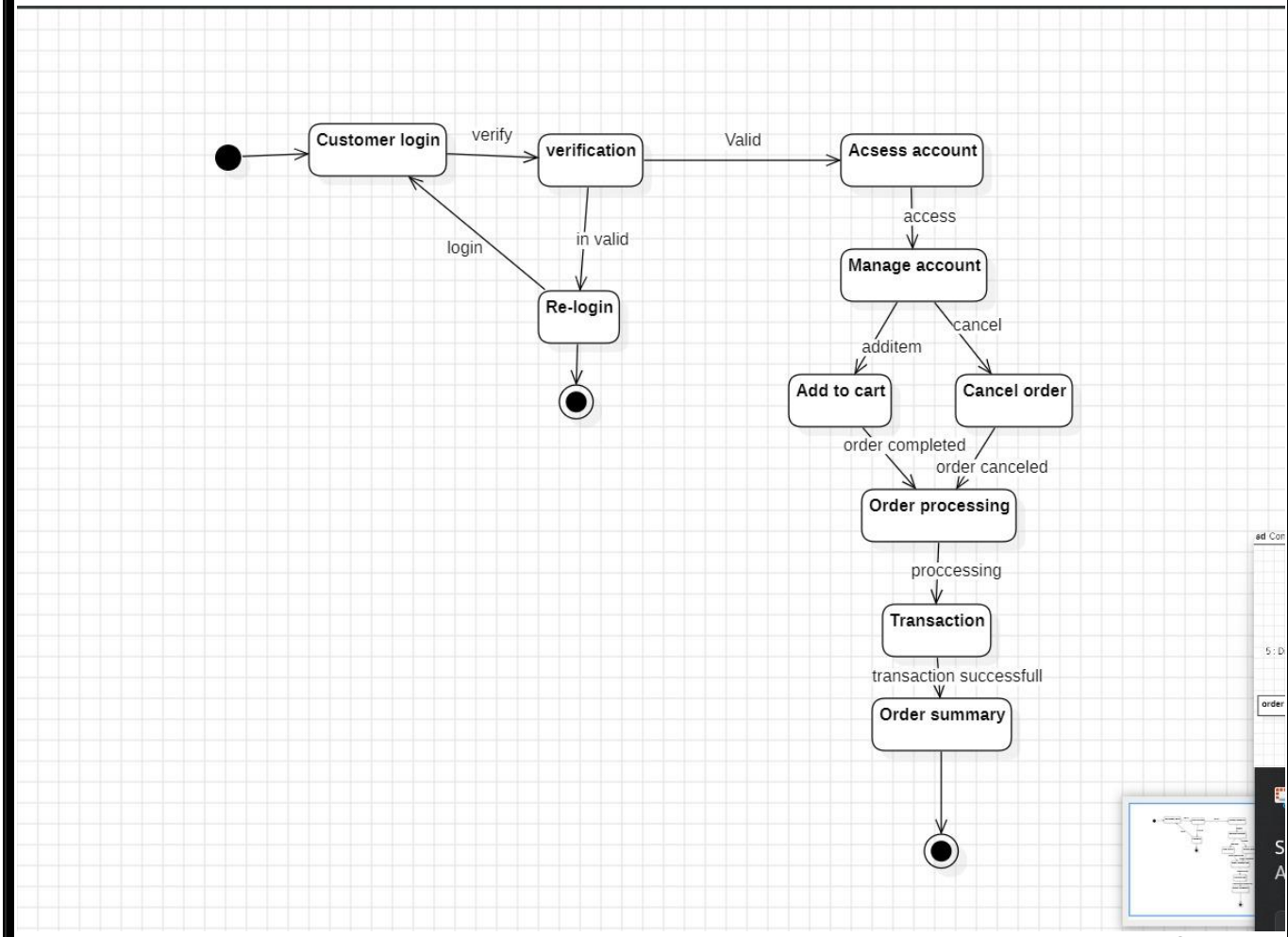
1.c) Sequence Diagram:



1.d) Communication diagram:

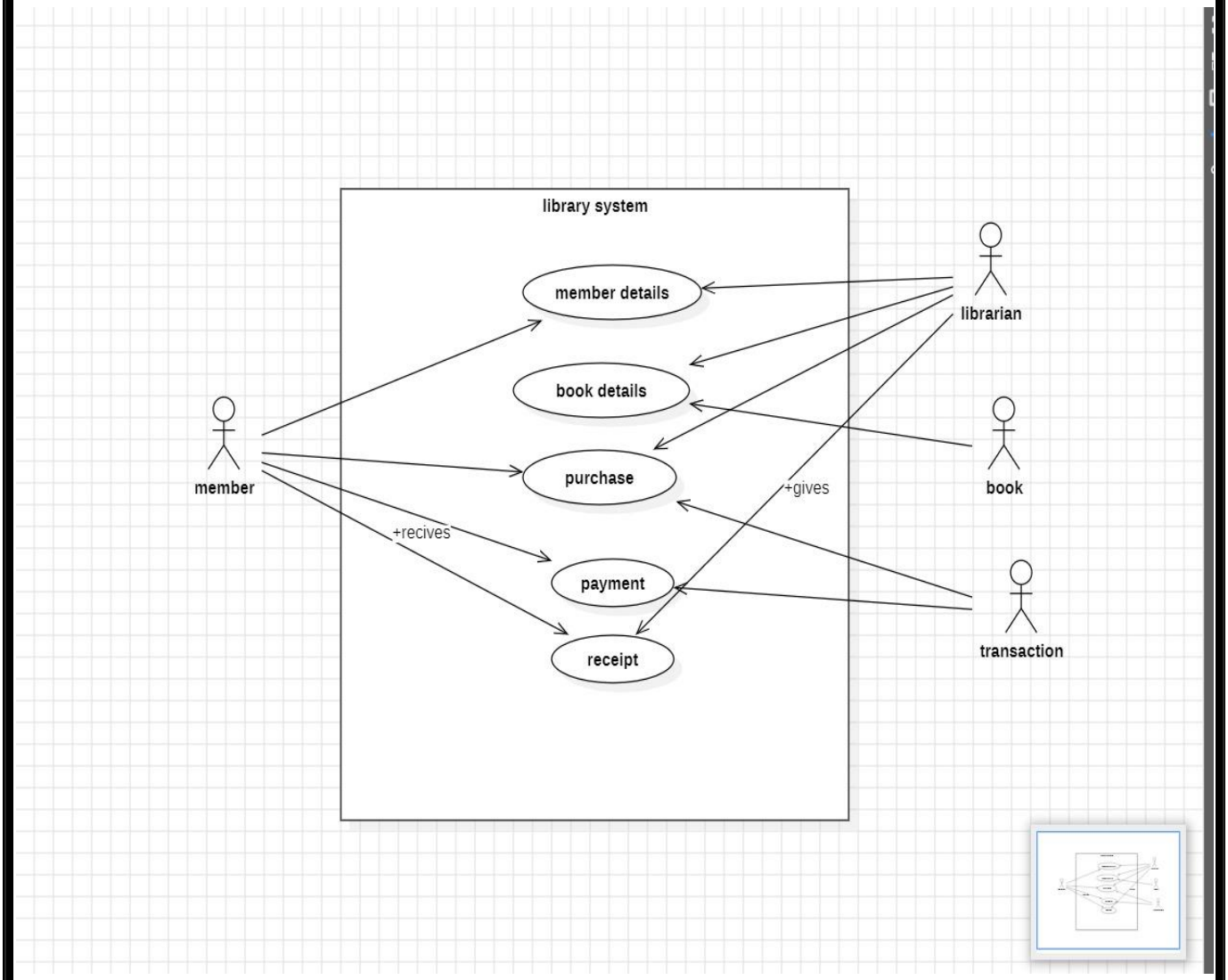


1.e) State-Activity Diagram:

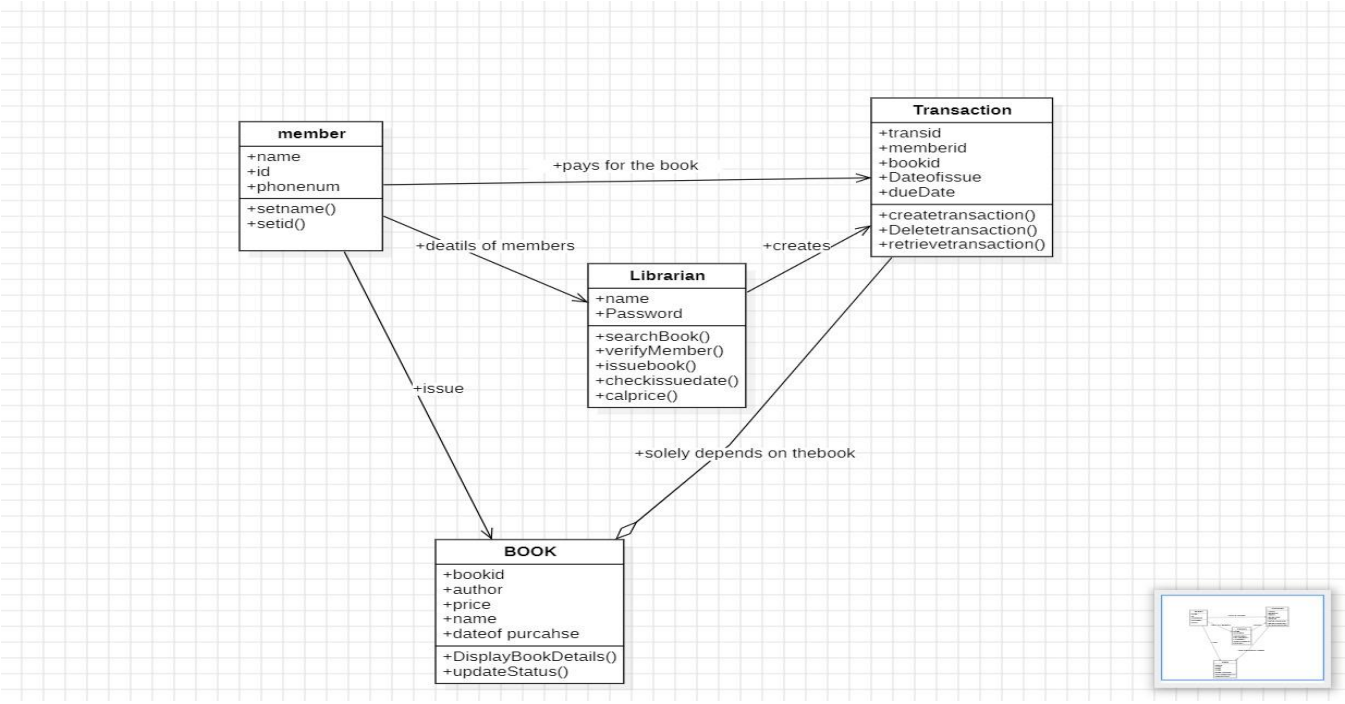


2. LIBRARY MANAGEMENT SYSTEM

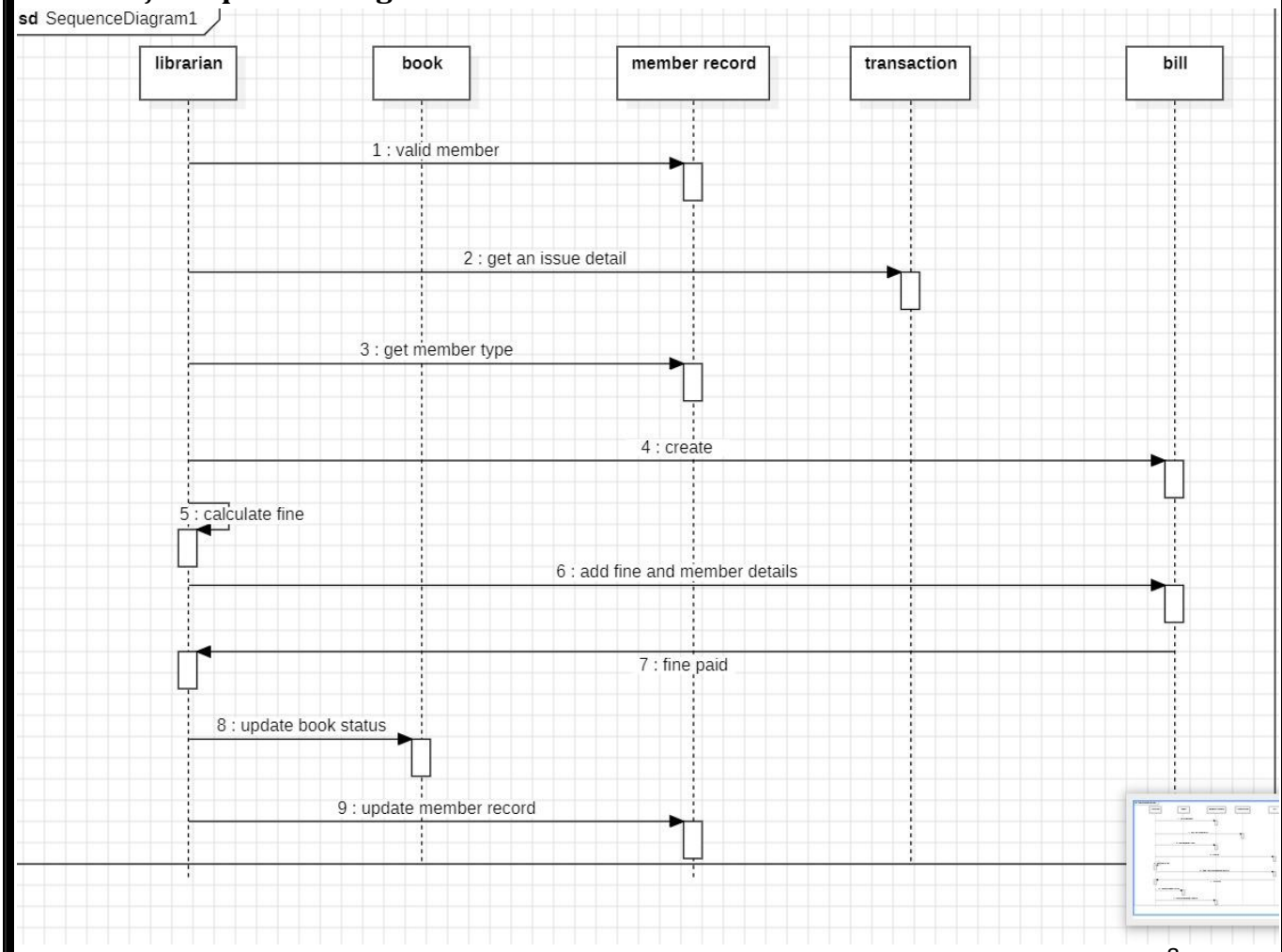
2.a) Use Case Diagram:



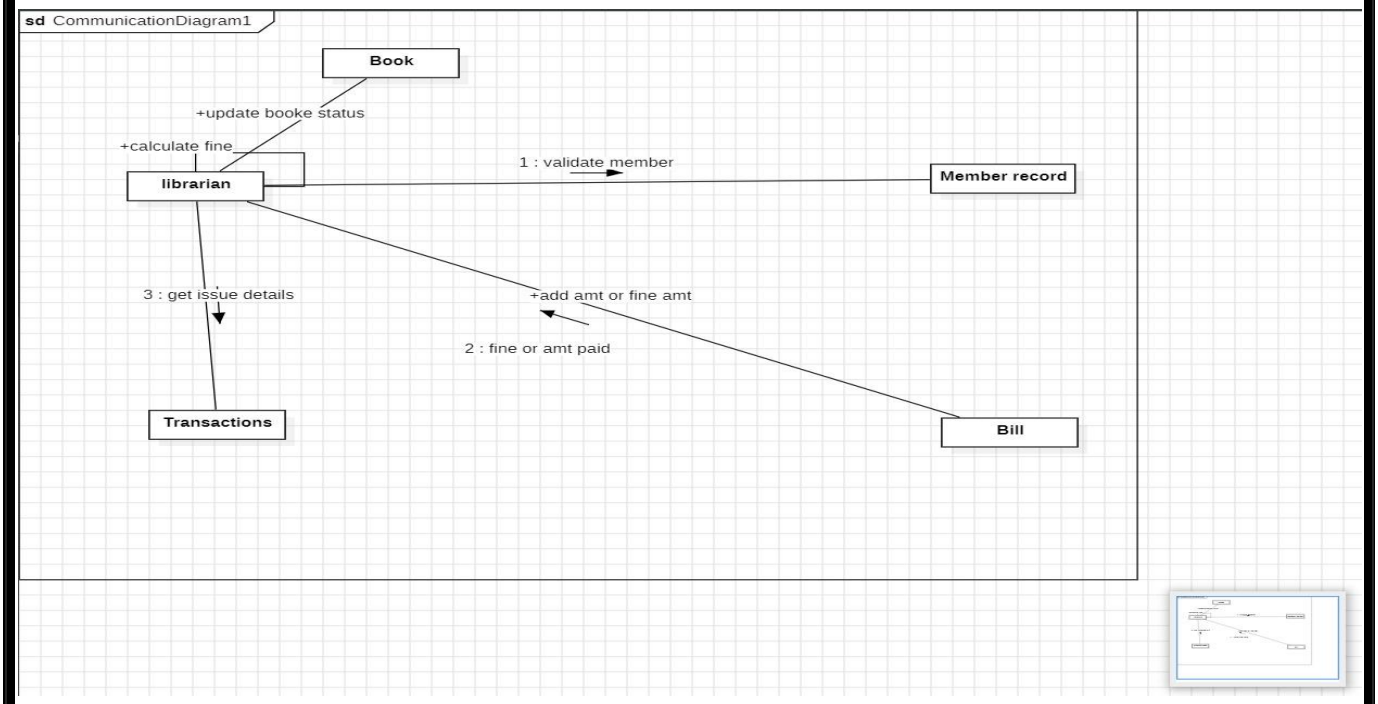
2.b) Class Diagram:



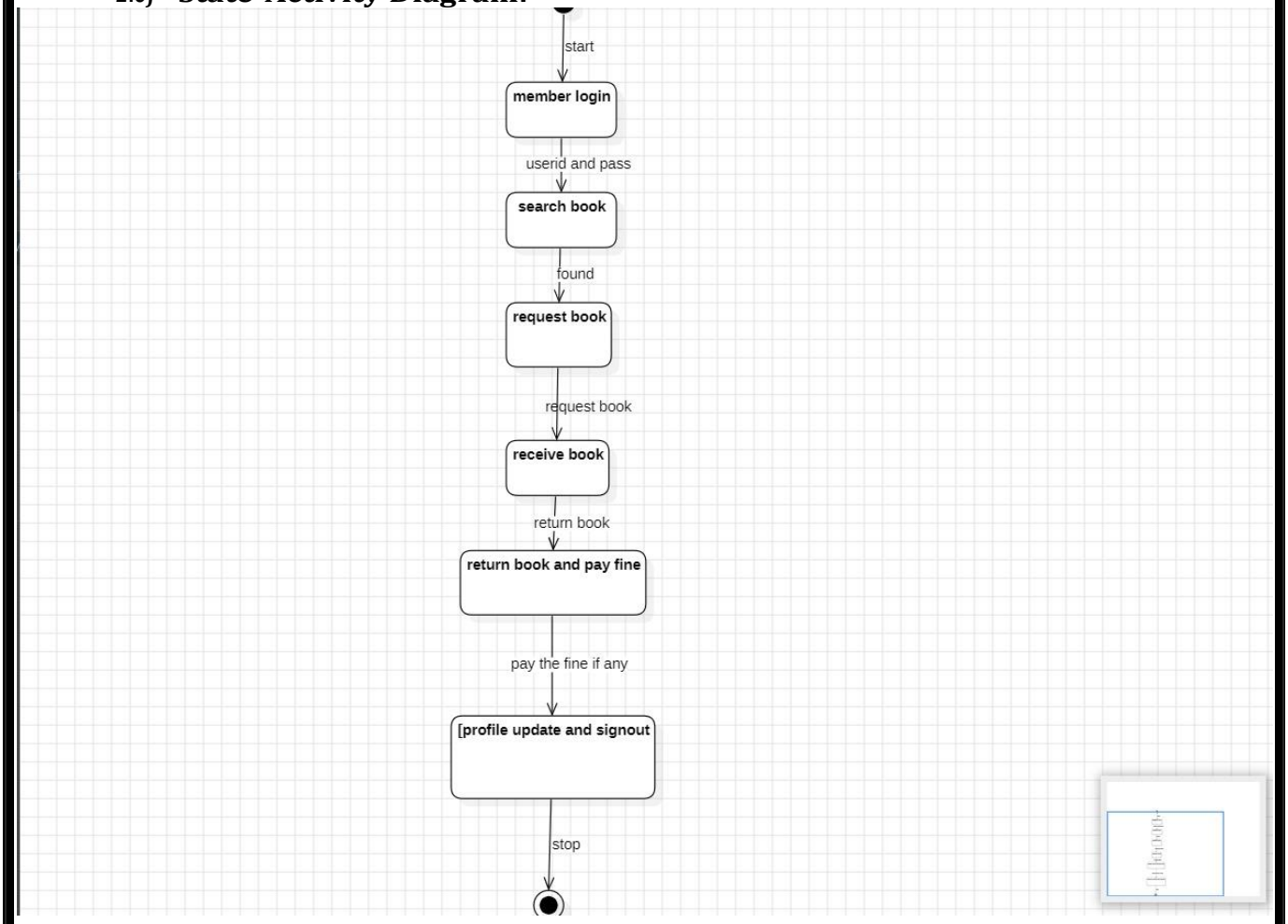
2.c) Sequence Diagram:



2.d) Communication Diagram:



2.e) State-Activity Diagram:



3. Basic Java Programs

3.a) 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.");
        }

    }
}
```

Output:

```
Install the latest PowerShell for new features and improvements! https://aka

PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\evenodd.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\evenodd.java"
Enter a number: 2
2 is even.
PS C:\Users\hp>
```

3.b) Sum of Digits:

Code:

```
import java.util.Scanner;

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

        while (num != 0) {
            sum += num % 10;
            num /= 10;
        }

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

    }
}
```

Output:

```
PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\SumOfDigits.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\SumOfDigits.java"
Enter a number: 11
Sum of digits: 2
```

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();
        long fact = 1;

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

        System.out.println("Factorial: " + fact);

    }
}
```

Output:

```
Factorial: 0
PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\Factorial.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\Factorial.java"
Enter a number: 98
Factorial: 0
PS C:\Users\hp>
```

3.d) Fibonacci Series:

Code:

```
import java.util.Scanner;

public class fibonacci1 {
    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, next;

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

    }
}
```

Output;

```
PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\fibonacci1.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\fibonacci1.java"
Enter the number of terms: 5
0 1 1 2 3
```

3.e) Product :

Code:

```
import java.util.Scanner;

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

        for (int i = 1; i <= 10; i++) {
            System.out.println(num + " x " + i + " = " + (num * i));
        }

    }
}
```

Output:

```
PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\Product.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\Product.java"
Enter a number: 6
6 x 1 = 6
6 x 2 = 12
6 x 3 = 18
6 x 4 = 24
6 x 5 = 30
6 x 6 = 36
6 x 7 = 42
6 x 8 = 48
6 x 9 = 54
```

3.f) Largest number:

Code:

```
import java.util.Scanner;

public class LargestNUmber {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter three numbers: ");
        int a = sc.nextInt(), b = sc.nextInt(), c = sc.nextInt();

        if (a >= b && a >= c) {
            System.out.println(a + " is the largest.");
        } else if (b >= a && b >= c) {
            System.out.println(b + " is the largest.");
        } else {
            System.out.println(c + " is the largest.");
        }

    }
}
```

Output:

```
PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\LargestNUmber.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\LargestNUmber.java"
Enter three numbers: 123

23
3
123 is the largest.
```

3.g) Palindrome Check:

Code:

```
import java.util.Scanner;

public class PalindromeWord {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a word: ");
        String word = sc.nextLine();
        int length = word.length();
        boolean isPalindrome = true;
        for (int i = 0; i < length / 2; i++) {
            if (word.charAt(i) != word.charAt(length - i - 1)) {
                isPalindrome = false;
                break; // Exit loop early if mismatch found
            }
        }
        if (isPalindrome) {
            System.out.println(word + " is a palindrome.");
        } else {
            System.out.println(word + " is not a palindrome.");
        }


    }
}
```

Output:

```
PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\PalindromeWord.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\PalindromeWord.java"
Enter a word: nun
nun is a palindrome.
PS C:\Users\hp>
```

3.h) Prime Checker:

Code:

```
import java.util.Scanner;

public class PrimeNumber {
    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 <= num / 2; 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.");




    }

}
```

Output:

```
PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\PrimeNumber.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\PrimeNumber.java"
Enter a number: 97
97 is a prime number.
```

3.i) 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) {
            rev = rev * 10 + num % 10;
            num /= 10;
        }

        System.out.println("Reversed number: " + rev);

    }
}
```

Output:

```
PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\ReverseNumber.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\ReverseNumber.java"
Enter a number: 68
Reversed number: 86
PS C:\Users\hp>
```

3.j) Perfect number:

Code:

```
import java.util.Scanner;

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

        for (int i = 1; i < num; i++) {
            if (num % i == 0) {
                sum += i;
            }
        }

        if (sum == num) {
            System.out.println(num + " is a perfect number.");
        } else {
            System.out.println(num + " is not a perfect number.");
        }

    }
}
```

Output:

```
PS C:\Users\hp> javac "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\PerfectNumber.java"
PS C:\Users\hp> java "C:\Users\hp\Desktop\record\discrete\OOPS\java basic\PerfectNumber.java"
Enter a number: 25
25 is not a perfect number.
PS C:\Users\hp>
```