SCHOOL OF COMPUTING

G. BHAANU TEJA REDDY

CH.SC.U4CSE24017

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.U4CSE24017 – G BHAANU TEJA REDDY 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 on held on

Internal Examiner 1 Internal Examiner 2

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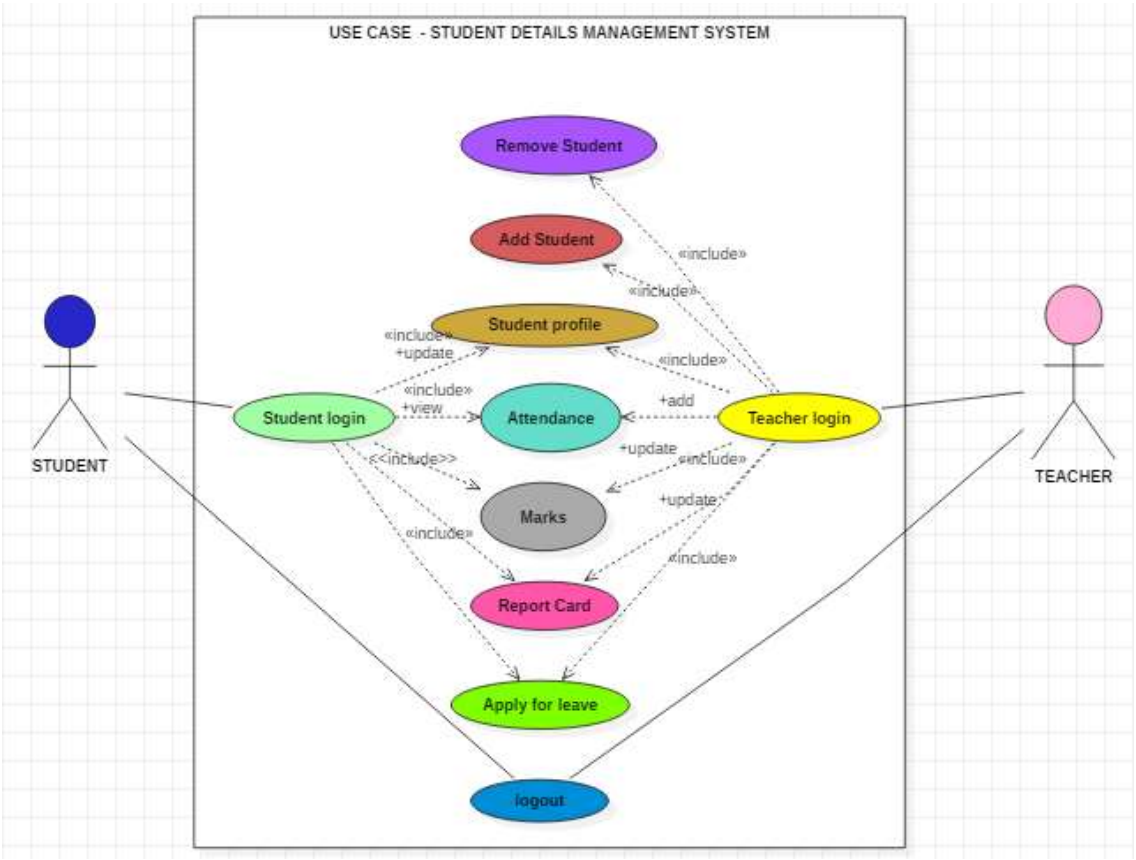
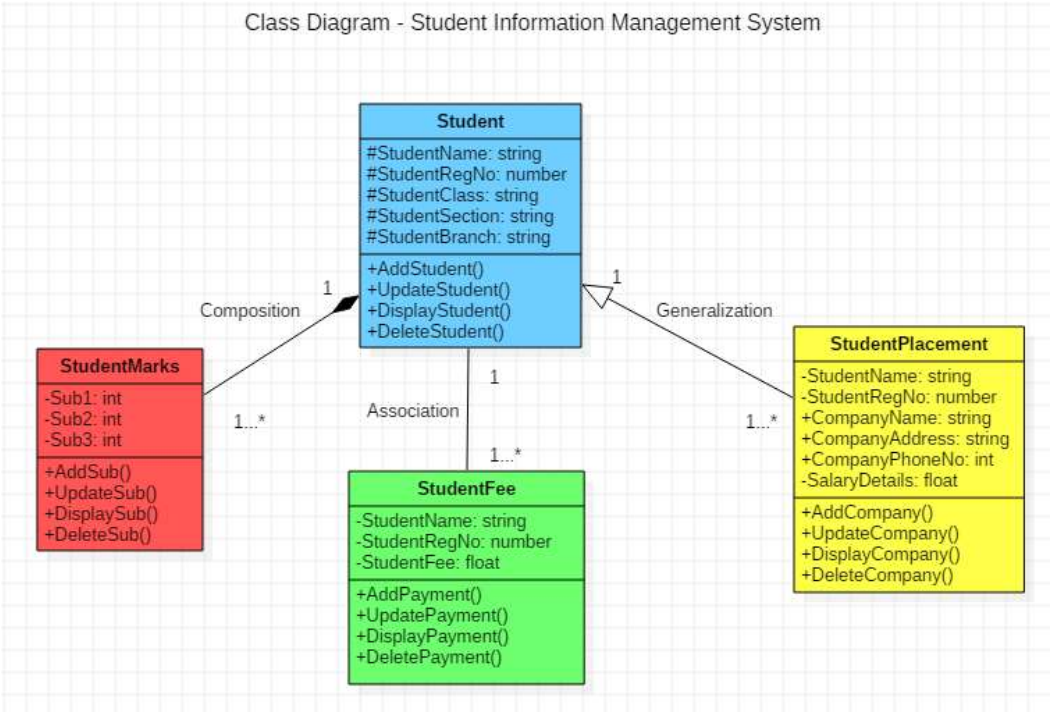
UML DIAGRAMS

1. STUDENT INFORMATION MANAGEMENT SYSTEM

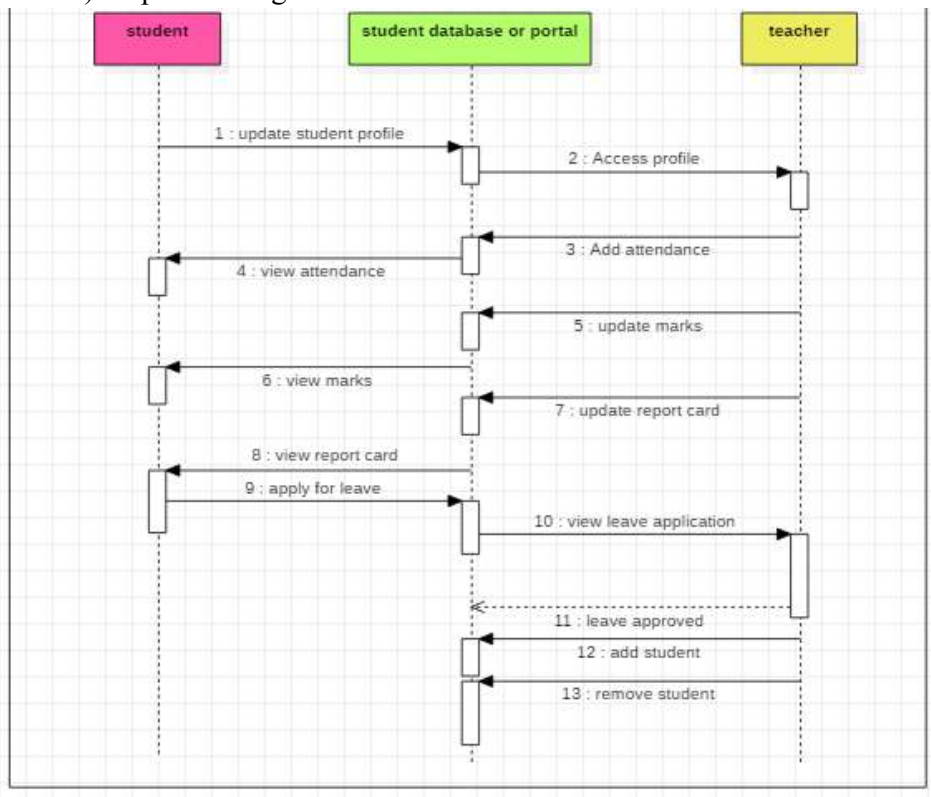
1.a) Use Case Diagram:



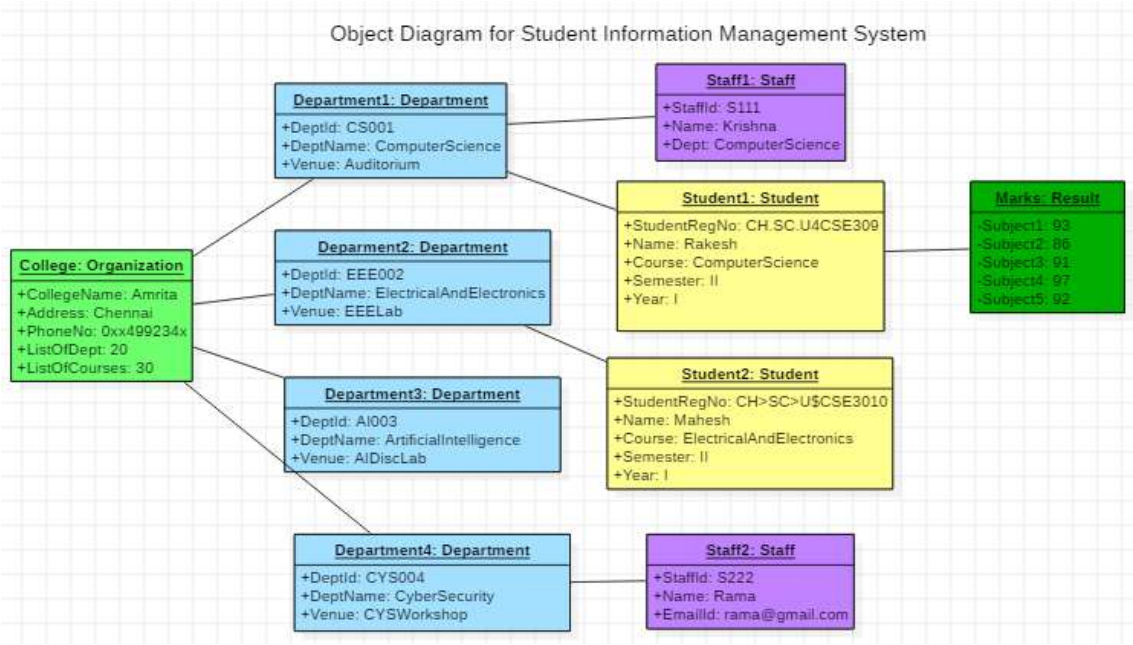
1.b) Class Diagram:



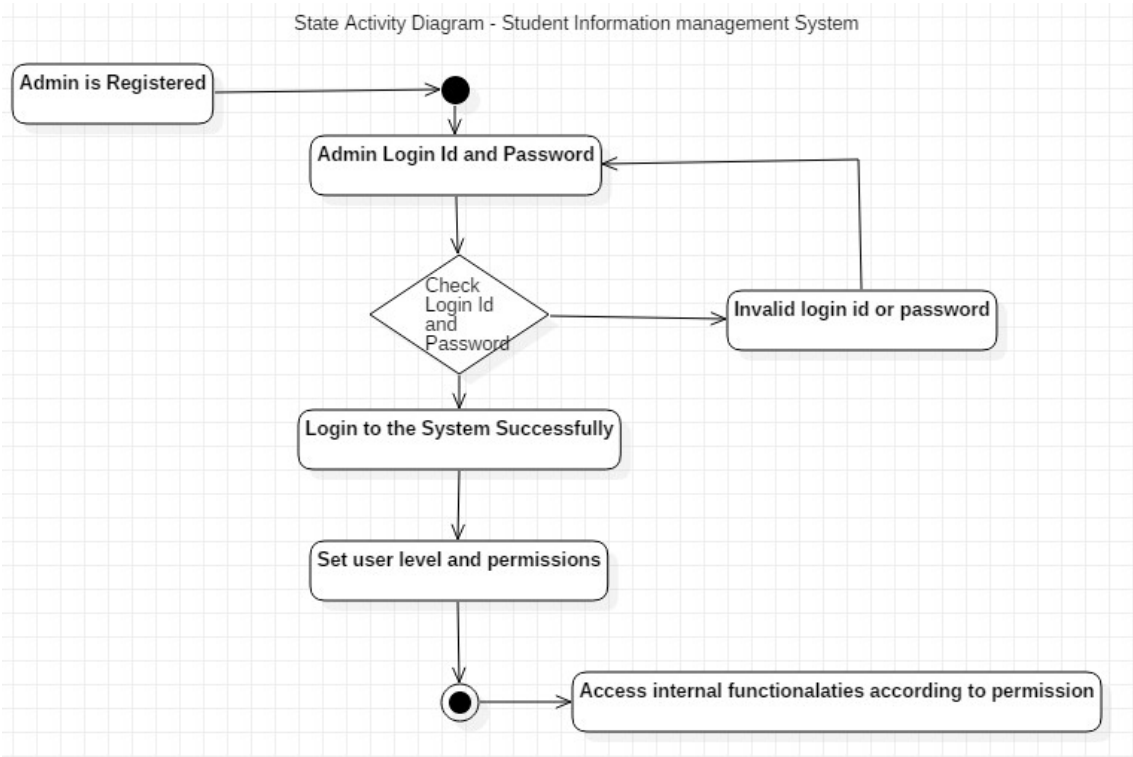
1.c) Sequence Diagram:



1.d) Object Diagram:

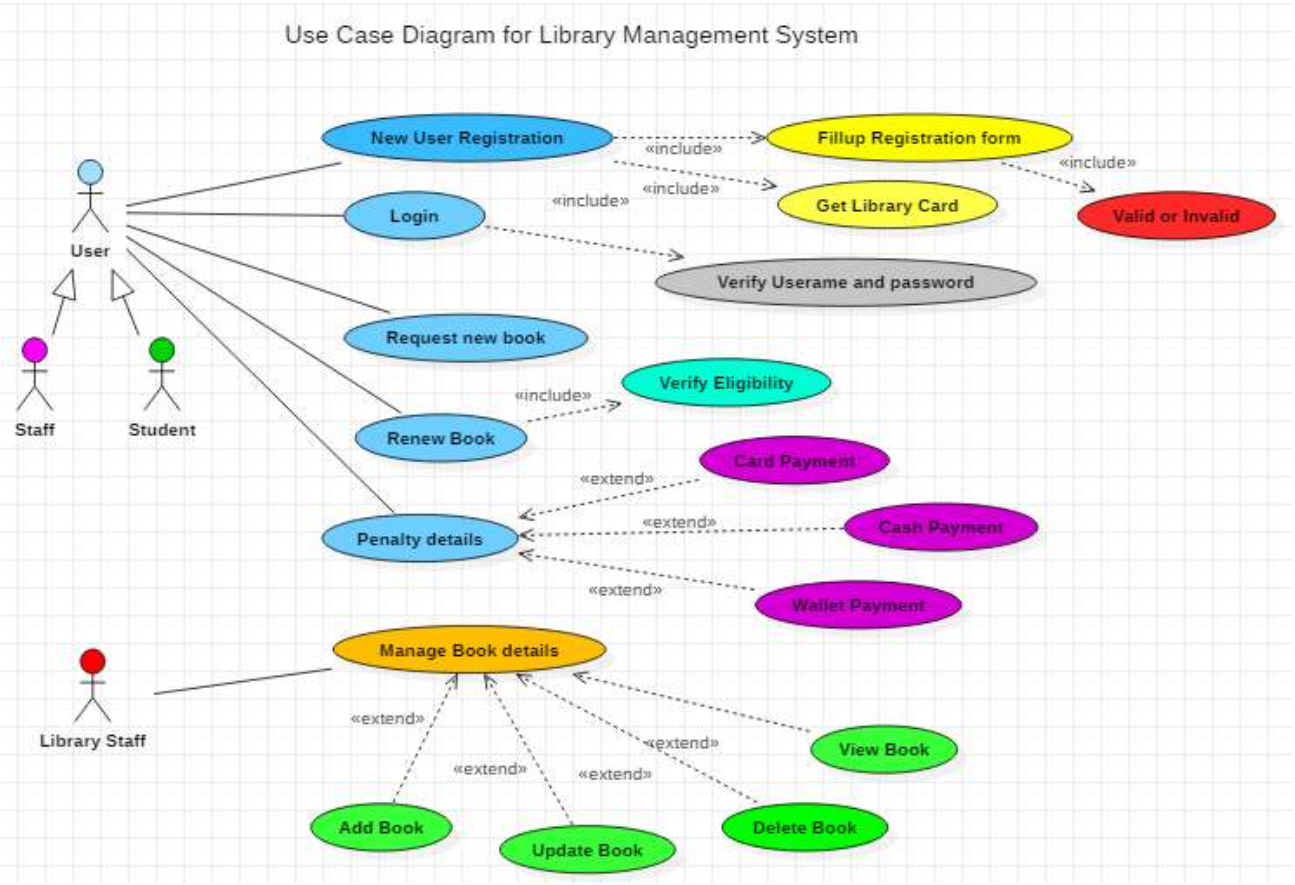


1.e) State-Activity Diagram:

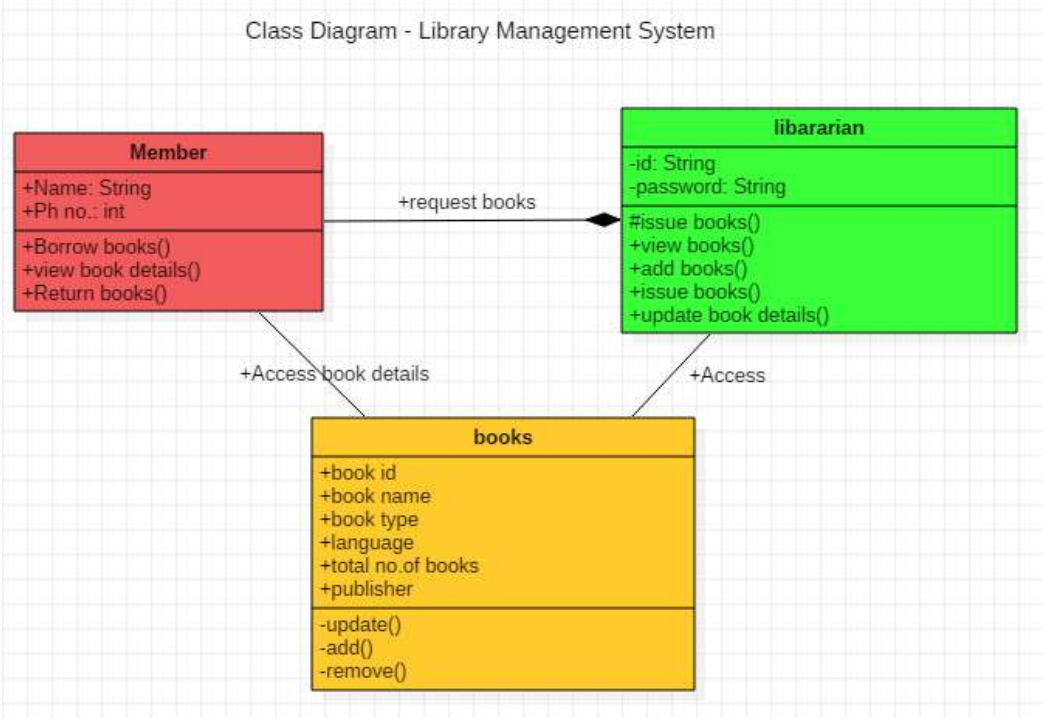


2. LIBRARY MANAGEMENT SYSTEM

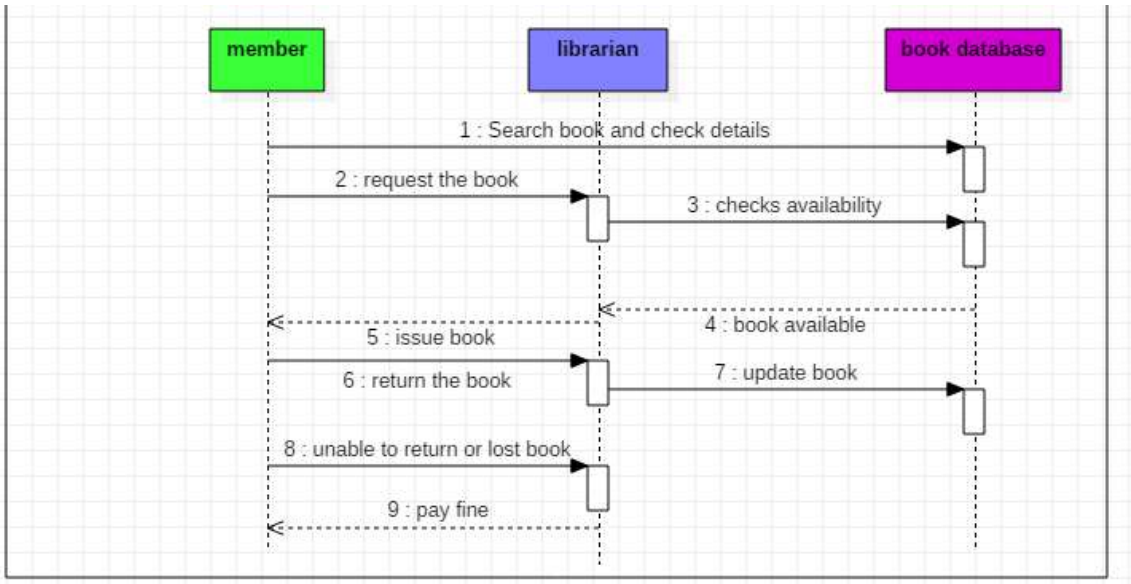
2.a) Use Case Diagram:



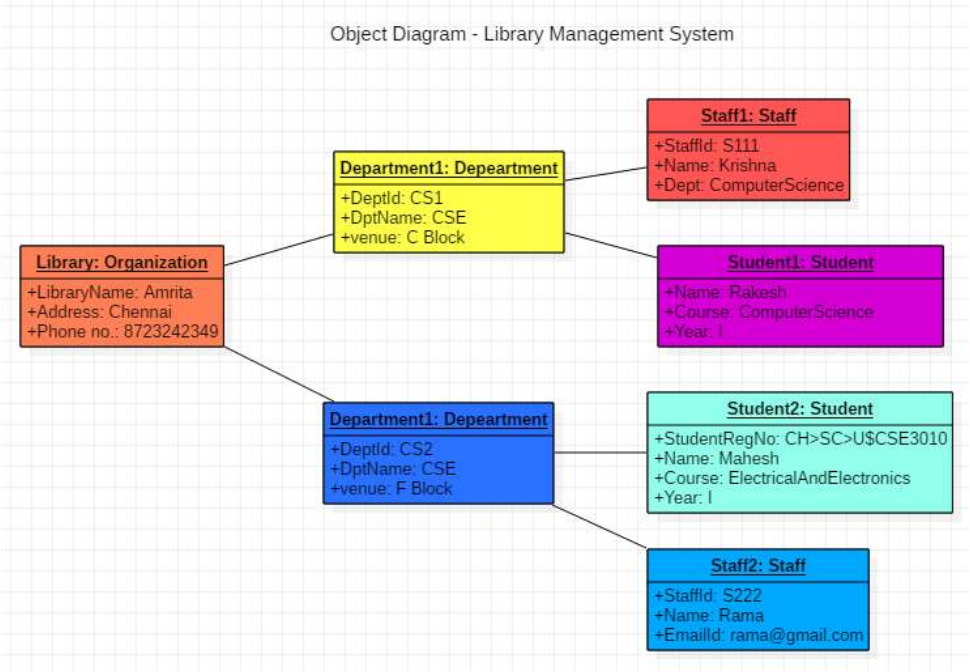
2.b) Class Diagram:



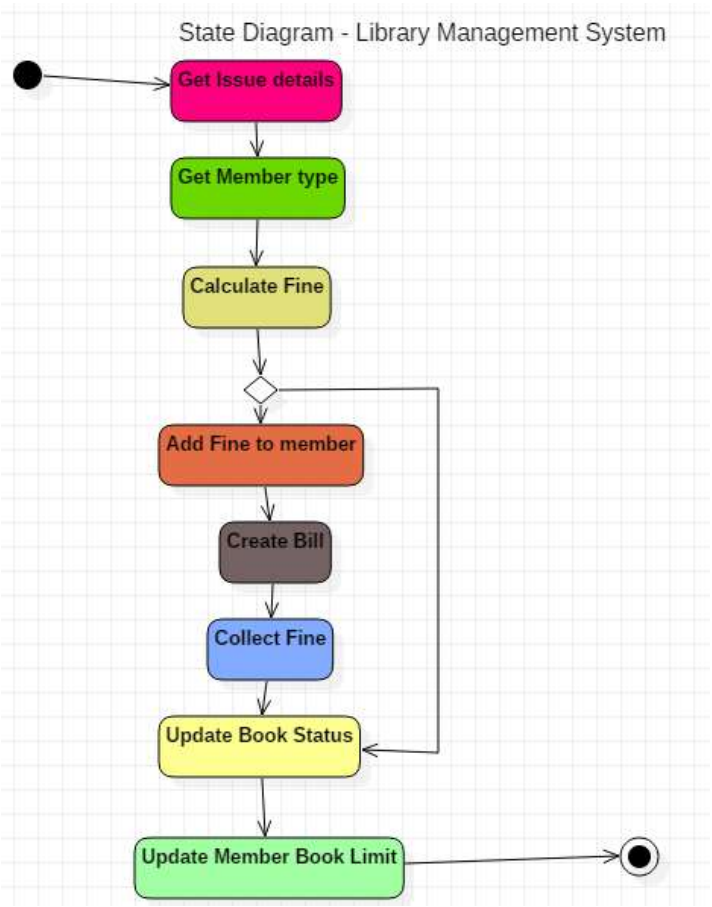
2.c) Sequence Diagram:



2.d) Object Diagram:



2.e) **State-Activity Diagram:**



3.Basic Java Programs

3.a) Reverse String Recursion :

Code:

```
public class ReverseStringRecursion {
    public static String reverse(String str) {
        if (str.isEmpty()) {
            return str;
        }
        return reverse(str.substring(1)) + str.charAt(0);
    }
    public static void main(String[] args) {
        String input = "hello";
        System.out.println("Original: " + input);
        System.out.println("Reversed: " + reverse(input));
    }
}
```

Output:

```
C:\Users\acer\OneDrive\Desktop\java files>javac ReverseStringRecursion.java

C:\Users\acer\OneDrive\Desktop\java files>java ReverseStringRecursion
Original: hello
Reversed: olleh
```

3.b) Grade of Student :

Code:

```
import java.util.Scanner;
public class Grade_Of_Student {
public static void main(String[] args) {
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the marks of the student: ");
```

```
        int marks = scanner.nextInt();
        char grade;
        if (marks >= 90) {
       grade = 'A';
        } else if (marks >= 75) {
        grade = 'B';
        } else if (marks >= 50) {
        grade = 'C';
        } else if (marks >= 35) {
        grade = 'D';
        } else {
        grade = 'F';  // Fail
        }
        System.out.println("The grade of the student is: " + grade);
        scanner.close();
    }
}
```

Output:

```
C:\Users\acer\OneDrive\Desktop\java files>javac Grade_Of_Student.java

C:\Users\acer\OneDrive\Desktop\java files>java Grade_Of_Student
Enter the marks of the student: 78
The grade of the student is: B
```

3.c) Even or Odd :

Code:

```
import java.util.Scanner;
public class EvenOdd {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
```

```
        System.out.print("Enter a number: ");
        int num = scanner.nextInt();
        if (num % 2 == 0) {
            System.out.println(num + " is even.");
        } else {
            System.out.println(num + " is odd.");
        }
        scanner.close();
    }
}
```

Output:

```
C:\Users\acer\OneDrive\Desktop\java files>javac EvenOdd.java

C:\Users\acer\OneDrive\Desktop\java files>java EvenOdd
Enter a number: 456
456 is even.
```

3.d) Area of Triangle:

Code:

```
import java.io.*;
class Area_Of_Triangle {
    static double area(double h, double b)
    {
        return (h * b) / 2;
    }
    public static void main(String[] args)
    {
        double h = 10;
        double b = 5;
        System.out.println("Area of the triangle: " + area(h, b));    }
```

Output :

```
C:\Users\acer\OneDrive\Desktop\java files>javac Area_Of_Triangle.java

C:\Users\acer\OneDrive\Desktop\java files>java Area_Of_Triangle
Area of the triangle: 25.0
```

3.e) **Arithematic Operations :**

Code:

```
public class Arithematic_Operators {
    public static void main(String[] args) {
        int num1 = 10;
        int num2 = 5;
        int sum = num1 + num2;
        System.out.println("Sum: " + sum);
        int difference = num1 - num2;
        System.out.println("Difference: " + difference);
        int product = num1 * num2;
        System.out.println("Product: " + product);
        int quotient = num1 / num2;
        System.out.println("Quotient: " + quotient);
        int remainder = num1 % num2;
        System.out.println("Remainder: " + remainder);
    }
}
```

Output:

```
C:\Users\acer\OneDrive\Desktop\java files>javac Arithematic_Operators.java

C:\Users\acer\OneDrive\Desktop\java files>java Arithematic_Operators
Sum: 15
Difference: 5
Product: 50
Quotient: 2
Remainder: 0
```

3.f) Average of Three Numbers:

Code:

```
public class Avg_Of_Three_Numbers {
    public static void main(String[] args) {
        double num1 = 10.5;
        double num2 = 20.3;
        double num3 = 30.7;
        double average = (num1 + num2 + num3) / 3;
        System.out.println("The average of the three numbers is: " + average);
    }
}
```

Output:

```
C:\Users\acer\OneDrive\Desktop\java files>javac Avg_Of_Three_Numbers.java

C:\Users\acer\OneDrive\Desktop\java files>java Avg_Of_Three_Numbers
The average of the three numbers is: 20.5
```

3.g) Factorial of a number :

Code:

```
import java.util.Scanner;
public class Factorial {
    public static int factorial(int n) {
        if (n == 0) return 1;
        return n * factorial(n - 1);
    }
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
    System.out.print("Enter a number: ");
```

```
        int num = scanner.nextInt();
        System.out.println("Factorial of " + num + " is " + factorial(num));
        scanner.close();
    }
}
```

Output:

```
C:\Users\acer\OneDrive\Desktop\java files>javac Factorial.java

C:\Users\acer\OneDrive\Desktop\java files>java Factorial
Enter a number: 7
Factorial of 7 is 5040
```

3.h) **Check if a number is Prime :**

Code:

```
import java.util.Scanner;
public class PrimeCheck {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = scanner.nextInt();
        boolean isPrime = num > 1;
        for (int i = 2; i <= Math.sqrt(num); 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.");
        scanner.close();
    }
}
```

Output:

```
C:\Users\acer\OneDrive\Desktop\java files>javac PrimeCheck.java

C:\Users\acer\OneDrive\Desktop\java files>java PrimeCheck
Enter a number: 87
87 is not a prime number.
```

3.i) Fibonacci :

Code:

```
import java.util.Scanner;
public class Fibonacci {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter the number of terms: ");
        int n = scanner.nextInt();
        int a = 0, b = 1;
        System.out.print("Fibonacci Series: " + a + " " + b + " ");
        for (int i = 2; i < n; i++) {
            int next = a + b;
            System.out.print(next + " ");
            a = b;
            b = next;
        }
scanner.close();    }}
```

Output:

```
PS D:\OOP\Exp 3 Basic Java Programs> javac ReverseNumber.java
PS D:\OOP\Exp 3 Basic Java Programs> java ReverseNumber.java
Reversed Number: 54321
```

3.j) **Palindrome :**

Code:

```
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 reversed = new StringBuilder(str).reverse().toString();
        if (str.equals(reversed))
            System.out.println(str + " is a palindrome.");
        else
            System.out.println(str + " is not a palindrome.");
        scanner.close();
    }
}
```

Output:

```
C:\Users\acer\OneDrive\Desktop\java files>javac Palindrome.java

C:\Users\acer\OneDrive\Desktop\java files>java Palindrome
Enter a string: rotator
rotator is a palindrome.
```