BH.SUMITRANAND

CH.SC.U4CSE24162

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.U4CSE24162 – BH.SUMITRANAND*** 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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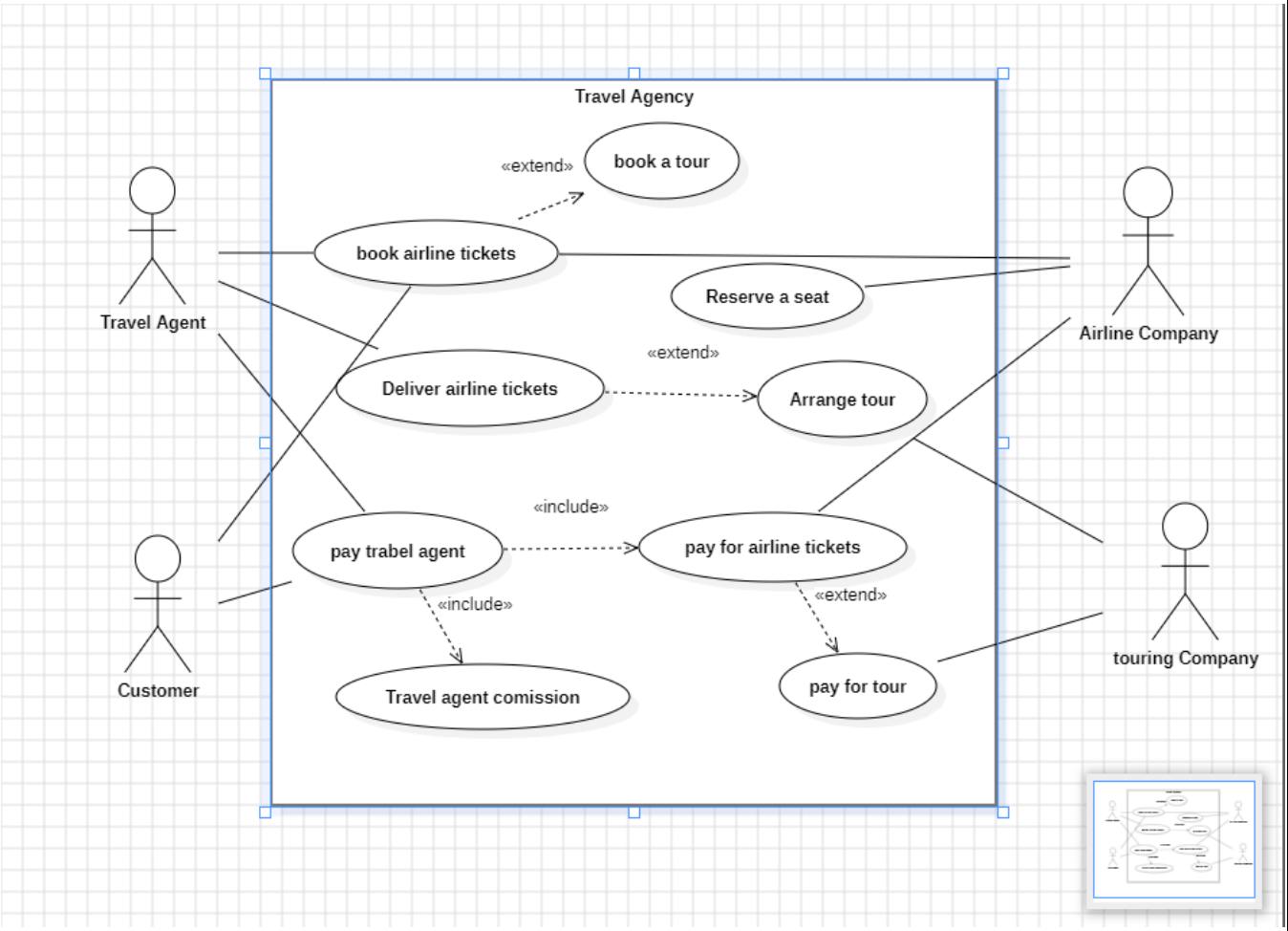
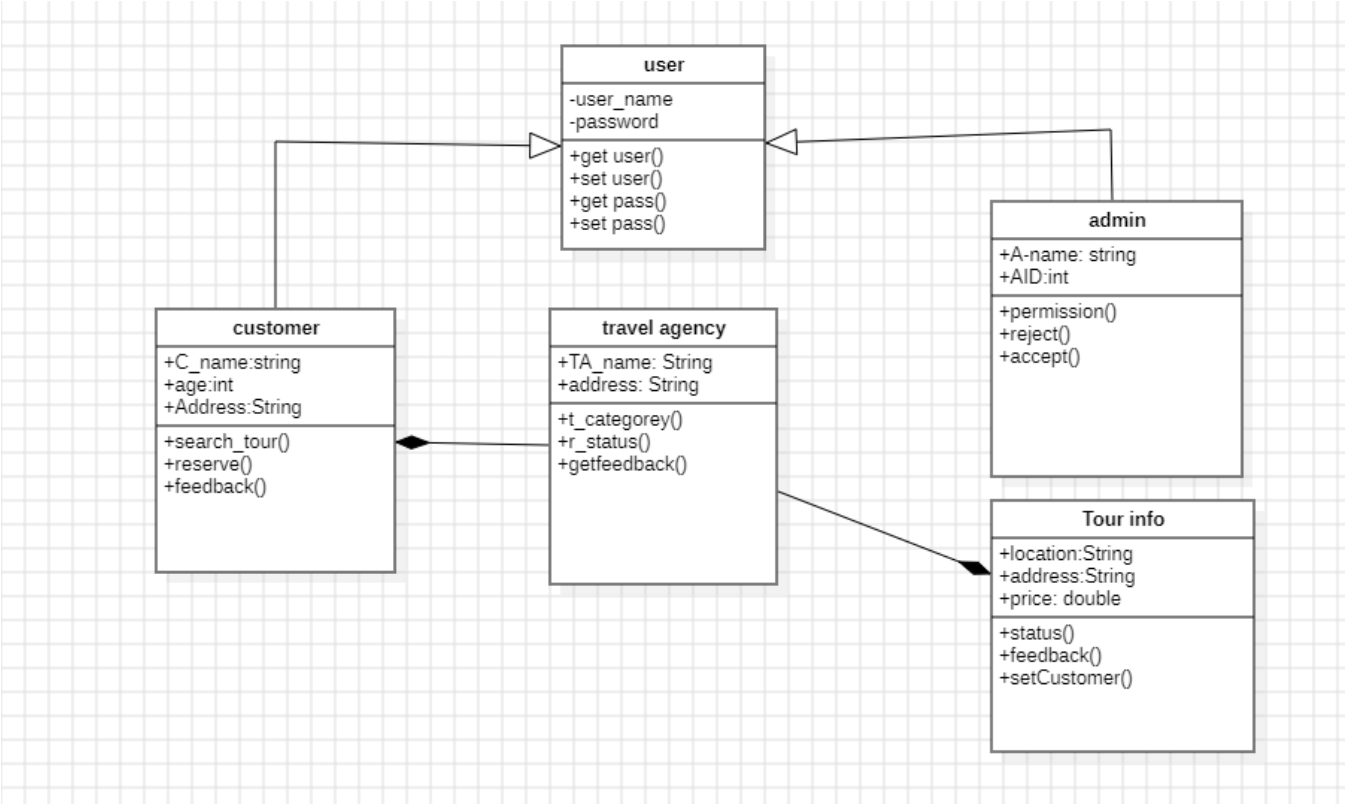
UML DIAGRAMS

1. TRAVEL AGENCY

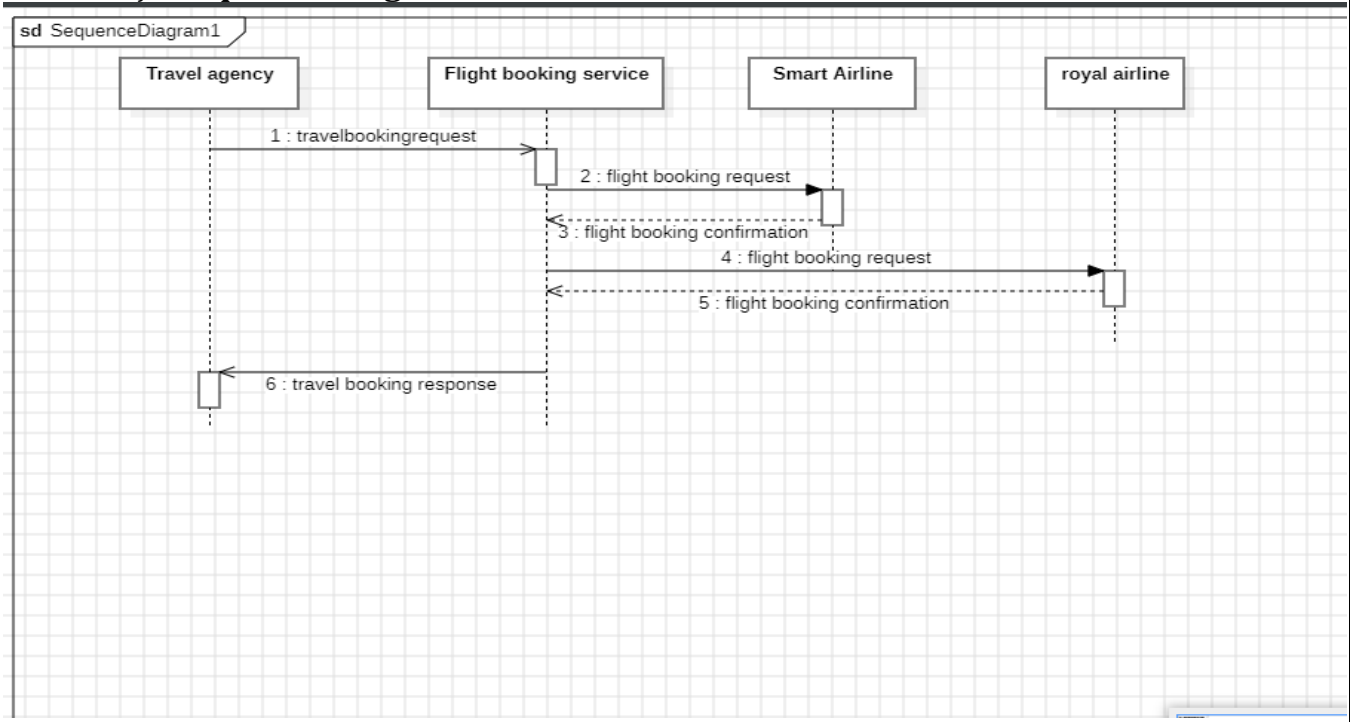
1.a) Use Case Diagram:



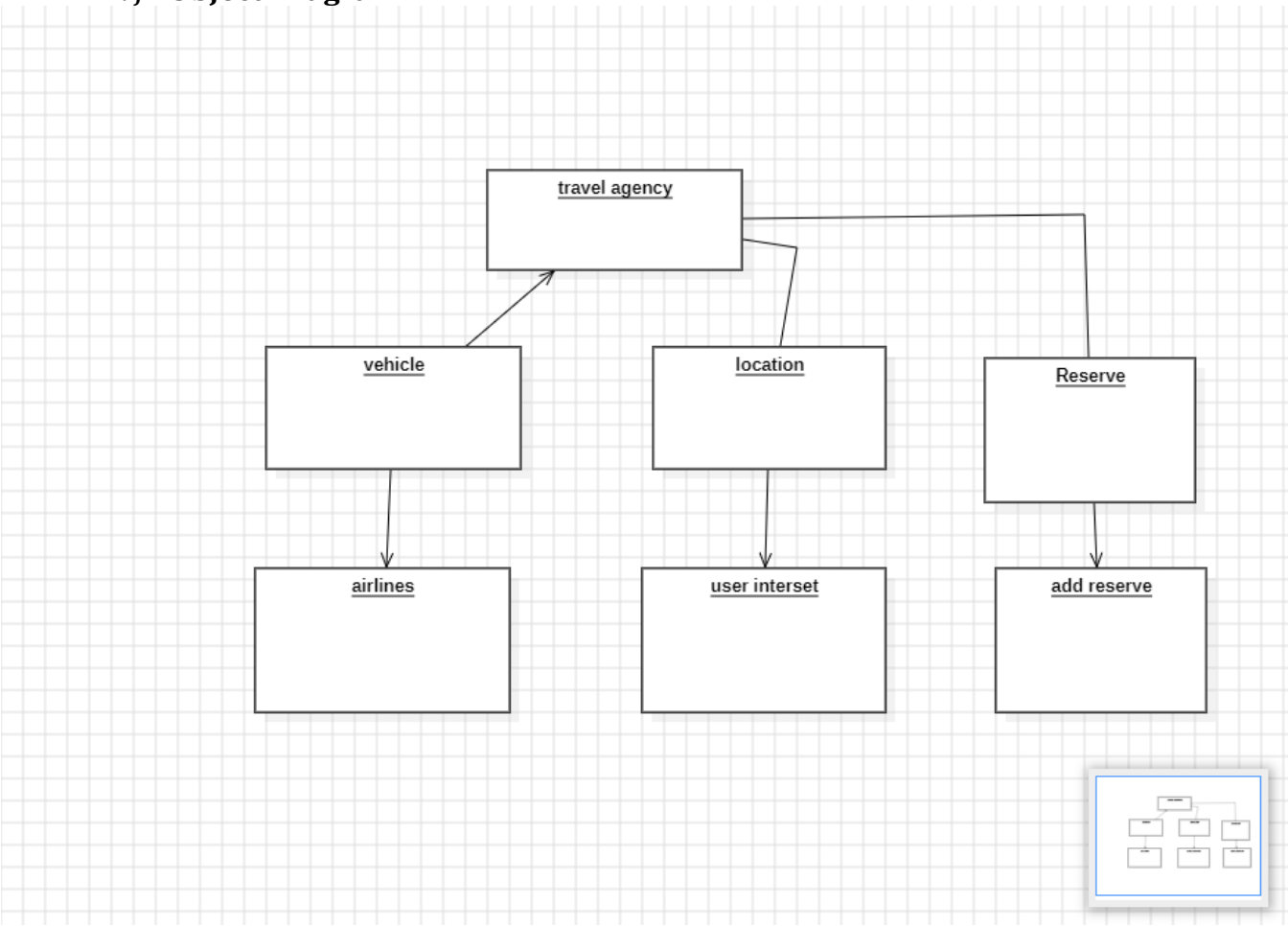
1.b) Class Diagram:



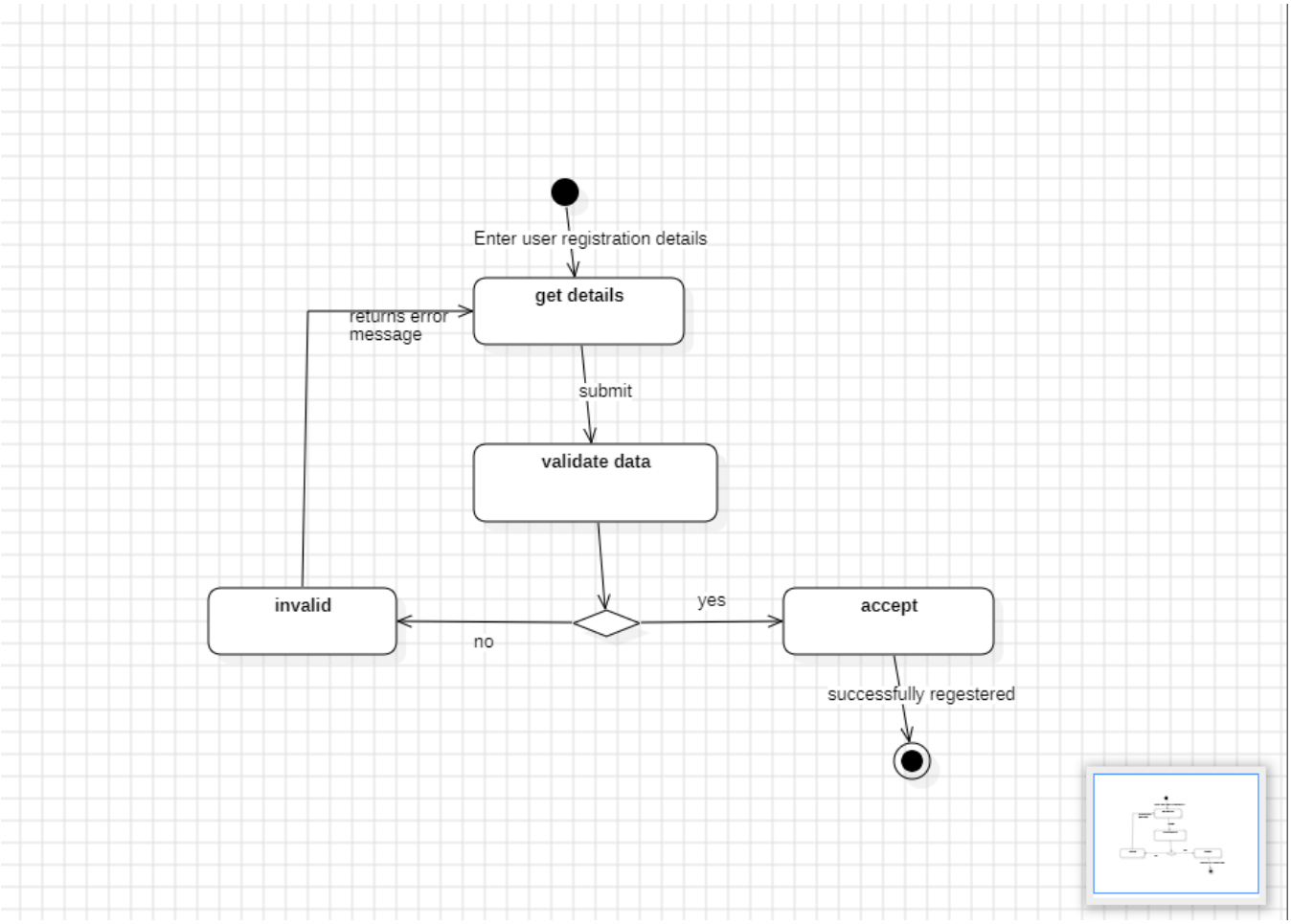
1.c) Sequence Diagram:



1.d) Object Diagram:

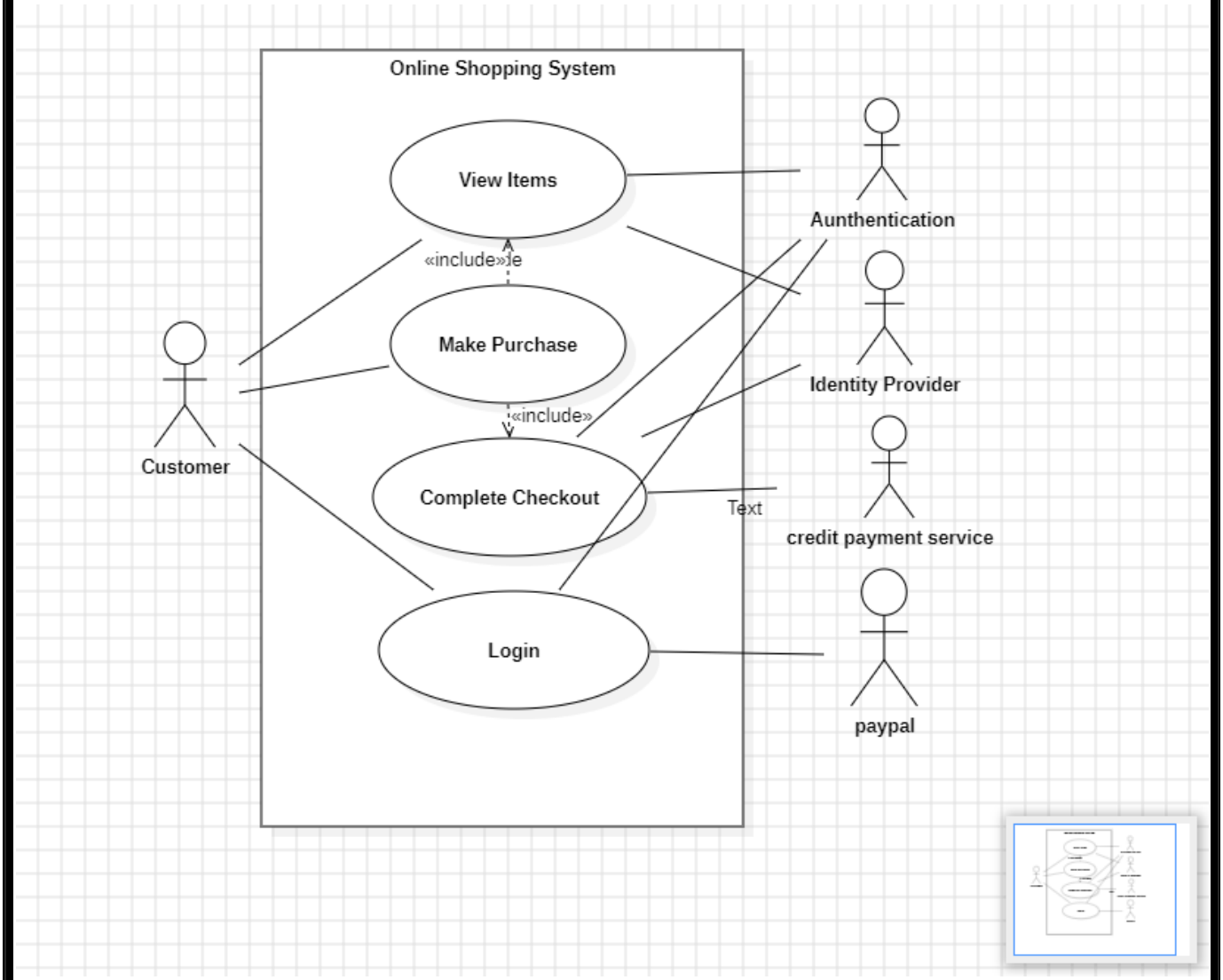


1.e) State-Activity Diagram:

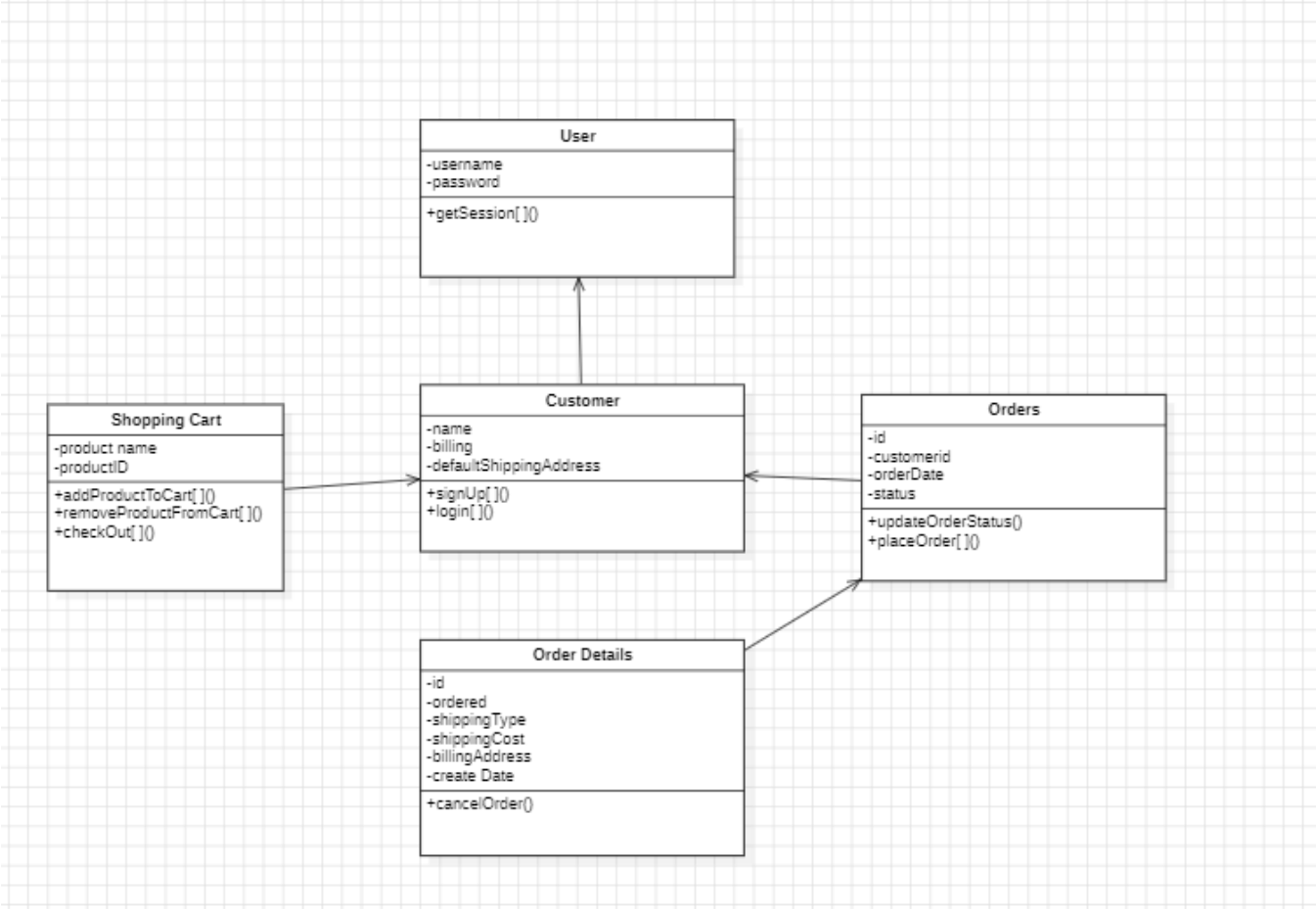

Enter user registration details
get details
returns error message
submit
validate data
invalid
yes
no
accept
successfully regestered

2. ONLINE SHOPPING SYSTEM

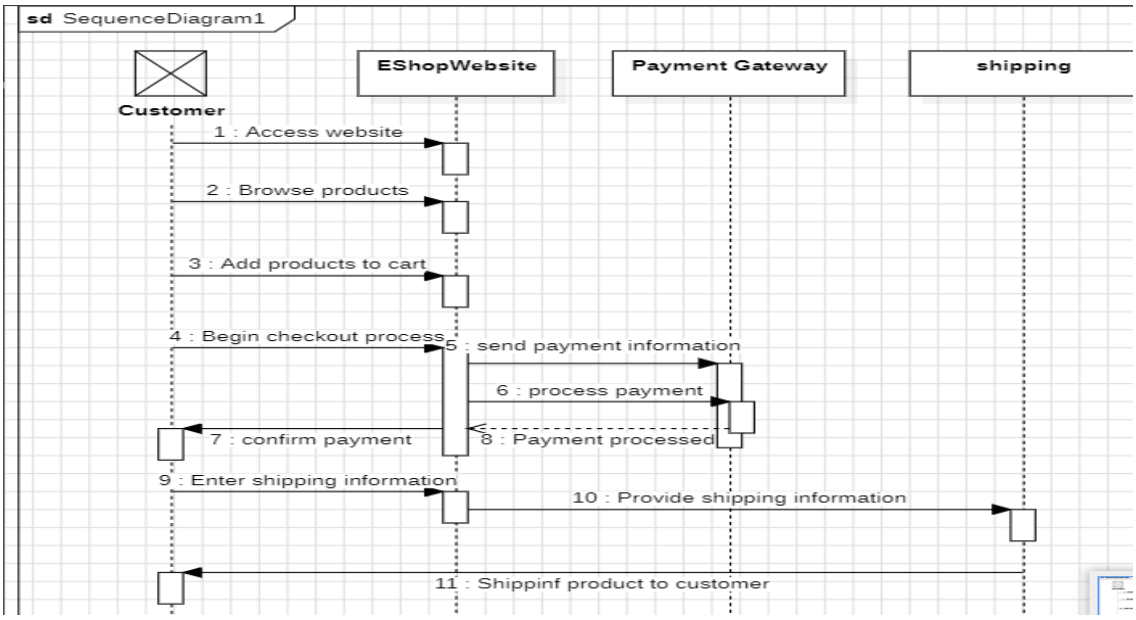
2.a) Use Case Diagram:



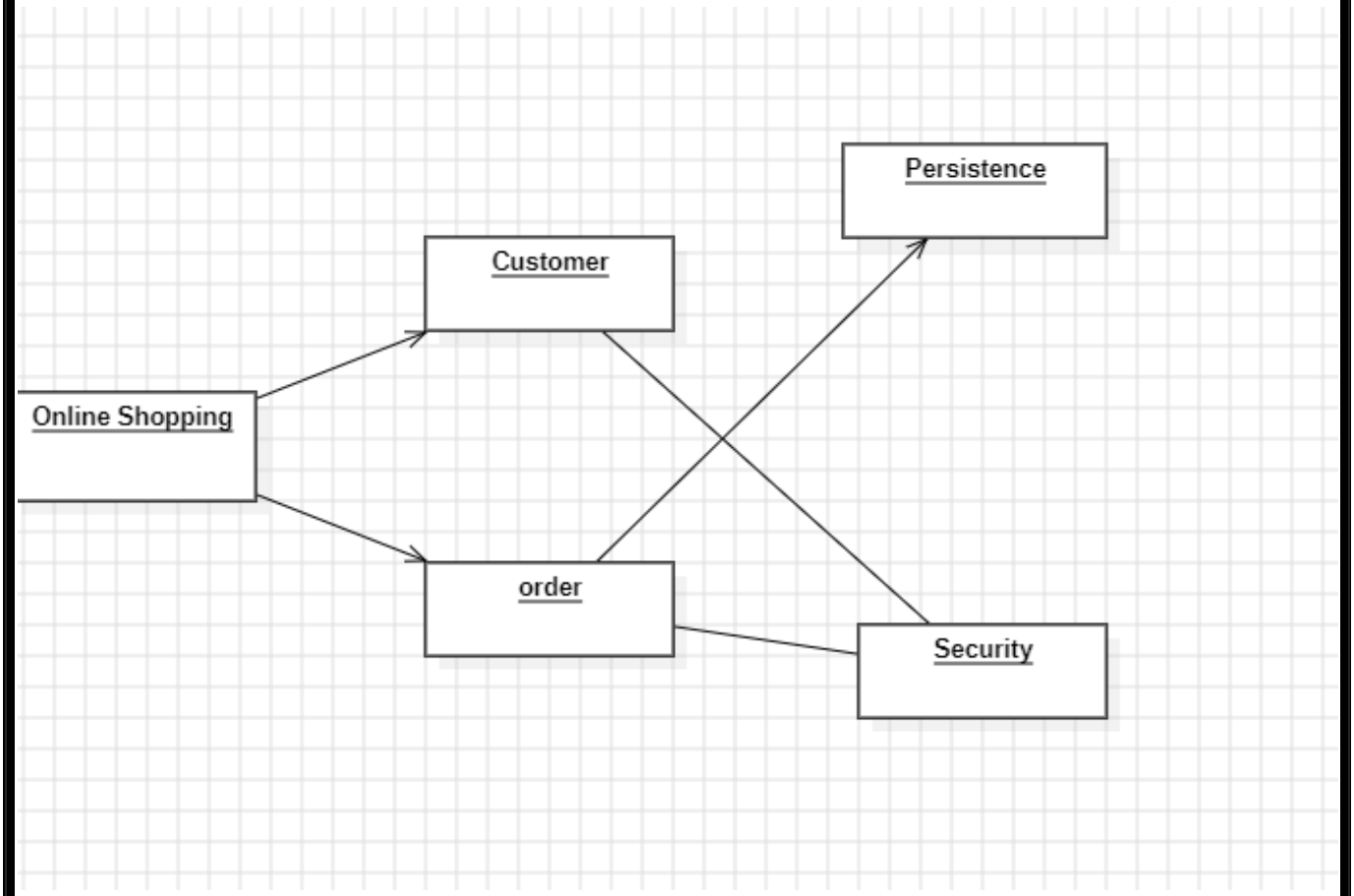
2.b) Class Diagram:



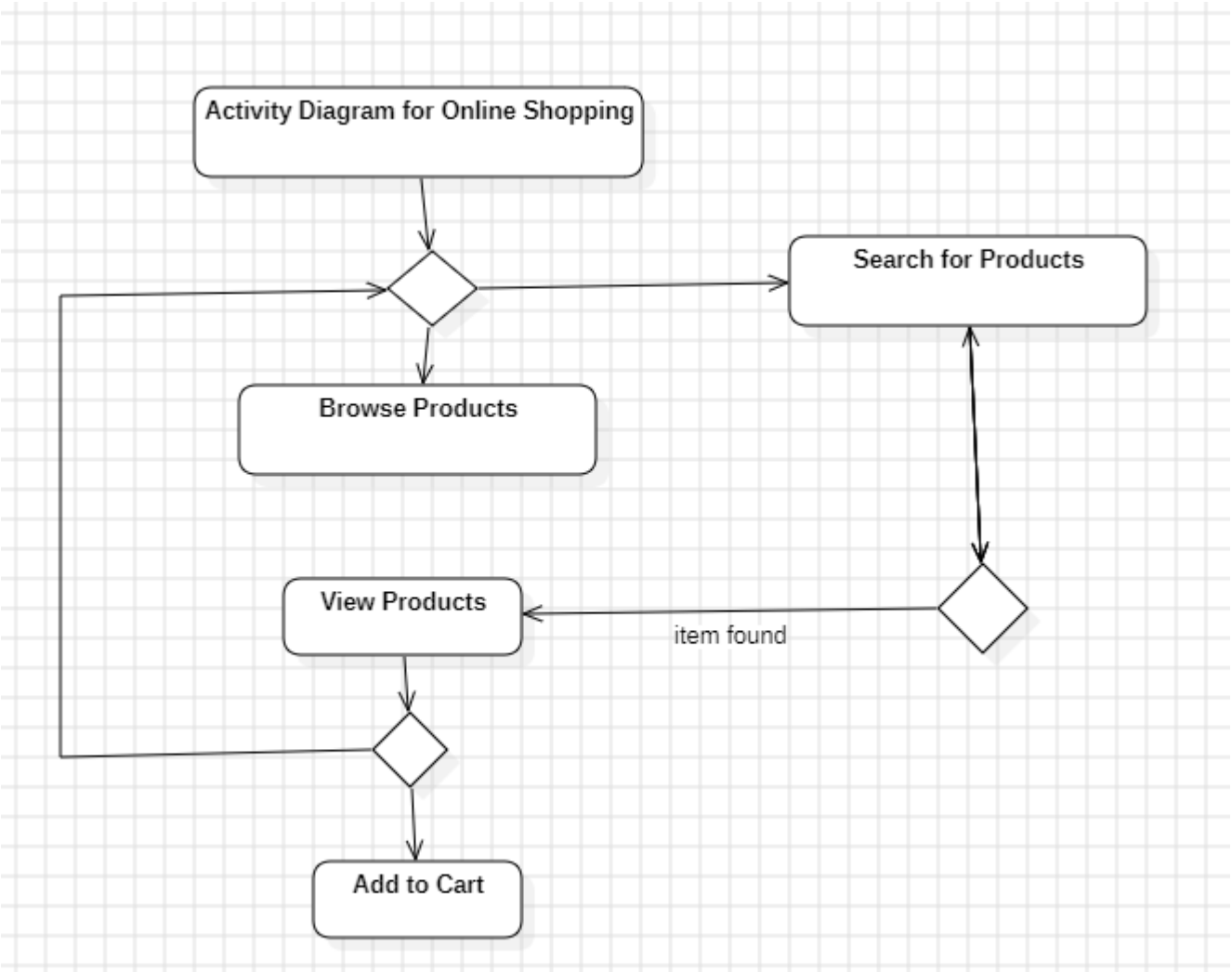
2.c) Sequence Diagram:



2.d) **Object Diagram:**



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


Activity Diagram for Online Shopping
Search for Products
Browse Products
View Products
item found
Add to Cart

3. Basic Java Programs

3.a) Add Numbers

Code:

```
import java.util.Scanner;

public class AddNumbers {
   public static void main(String[] args) {
      Scanner scanner = new Scanner(System.in);
      System.out.print("Enter first number: ");
      int num1 = scanner.nextInt();
      System.out.print("Enter second number: ");
      int num2 = scanner.nextInt();
      int sum = num1 + num2;
      System.out.println("Sum: " + sum);
      scanner.close();
   }
}
```

Output:

```
I:\Users\MYPC\OneDrive\Documents\10 programs java>java AddNumbers
Enter first number: 6
Enter second number: 9
Sum: 15
```

3.b) Armstrong Number

Code:

```
import java.util.Scanner;

public class ArmstrongNumber {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = scanner.nextInt();
        int originalNum = num, sum = 0, digit;
        int digits = String.valueOf(num).length();

        while (num != 0) {
            digit = num % 10;
            sum += Math.pow(digit, digits);
            num /= 10;
        }

        System.out.println(originalNum + (sum == originalNum ? "
is an Armstrong Number" : " is not an Armstrong Number"));
        scanner.close();
    }
}
```

Output:

```
C:\Users\MYPC\OneDrive\Documents\10 programs java>java ArmstrongNumber
Enter a number: 5
5 is an Armstrong Number
```

3.c) Even 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("Even Number");
        } else {
            System.out.println("Odd Number");
        }
        scanner.close();
    }
}
```

Output:

```
C:\Users\MYPC\OneDrive\Documents\10 programs java>java EvenOdd
Enter a number: 4
Even Number
```

3.d) Factorial

Code:

```
import java.util.Scanner;

public class Factorial {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = scanner.nextInt();
        long fact = 1;

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

        System.out.println("Factorial: " + fact);
        scanner.close();
    }
}
```

Output;

```
C:\Users\MYPC\OneDrive\Documents\10 programs java>javac Factorial.java

C:\Users\MYPC\OneDrive\Documents\10 programs java>java Factorial
Enter a number: 4
Factorial: 24
```

3.e) 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 number of terms: ");
        int n = scanner.nextInt();
        int a = 0, b = 1, c;

        System.out.print("Fibonacci Series: " + a + " " + b);
        for (int i = 2; i < n; i++) {
            c = a + b;
            System.out.print(" " + c);
            a = b;
            b = c;
        }

        scanner.close();
    }
}
```

Output:

```
C:\Users\MYPC\OneDrive\Documents\10 programs java>javac Fibonacci.java

C:\Users\MYPC\OneDrive\Documents\10 programs java>java Fibonacci
Enter number of terms: 5
Fibonacci Series: 0 1 1 2 3
```

3.f) 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.equalsIgnoreCase(reversed)) {
            System.out.println("Palindrome");
        } else {
            System.out.println("Not a Palindrome");
        }

        scanner.close();
    }
}
```

Output:

```
C:\Users\MYPC\OneDrive\Documents\10 programs java>javac Palindrome.java

C:\Users\MYPC\OneDrive\Documents\10 programs java>java Palindrome
Enter a string: summu
Not a Palindrome
```

3.g) Prime Number

Code:

```
import java.util.Scanner;

public class PrimeNumber {
    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;
            }
        }

        System.out.println(num + (isPrime ? " is a Prime Number" : " is not a Prime
Number"));
        scanner.close();
    }
}
```

Output:

```
C:\Users\MYPC\OneDrive\Documents\10 programs java>javac PrimeNumber.java

C:\Users\MYPC\OneDrive\Documents\10 programs java>java PrimeNumber
Enter a number: 93
93 is not a Prime Number
```

3.h) Reverse string

Code:

```
import java.util.Scanner;

public class ReverseString {
    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();
        System.out.println("Reversed String: " + reversed);
        scanner.close();
    }
}
```

Output:

```
C:\Users\MYPC\OneDrive\Documents\10 programs java>javac ReverseString.java

C:\Users\MYPC\OneDrive\Documents\10 programs java>java ReverseString
Enter a string: summu
Reversed String: ummus
```

3.i) Sum of digits

Code:

```
import java.util.Scanner;

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

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

        System.out.println("Sum of digits: " + sum);
        scanner.close();
    }
}
```

Output:

```
C:\Users\MYPC\OneDrive\Documents\10 programs java>javac SumOfDigits.java

C:\Users\MYPC\OneDrive\Documents\10 programs java>java SumOfDigits
Enter a number: 69
Sum of digits: 15
```

3.j) Swap Numbers

Code:

```
import java.util.Scanner;

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

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

        System.out.print("Enter second number: ");
        int b = scanner.nextInt();

        System.out.println("Before swapping: a = " + a + ", b = " + b);

        // Swapping without a third variable
        a = a + b;
        b = a - b;
        a = a - b;

        System.out.println("After swapping: a = " + a + ", b = " + b);

        scanner.close();
    }
}
```

Output:

```
C:\Users\MYPC\OneDrive\Documents\10 programs java>javac SwapNumbers.java

C:\Users\MYPC\OneDrive\Documents\10 programs java>java SwapNumbers
Enter first number: 65
Enter second number: 45
Before swapping: a = 65, b = 45
After swapping: a = 45, b = 65
```