VISHAL M.D.

CH.SC.U4CSE24150

OBJECT ORIENTED PROGRAMMING (23CSE111)

LAB RECORD

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.U4CSE24150 – V I S H A L M . D*** 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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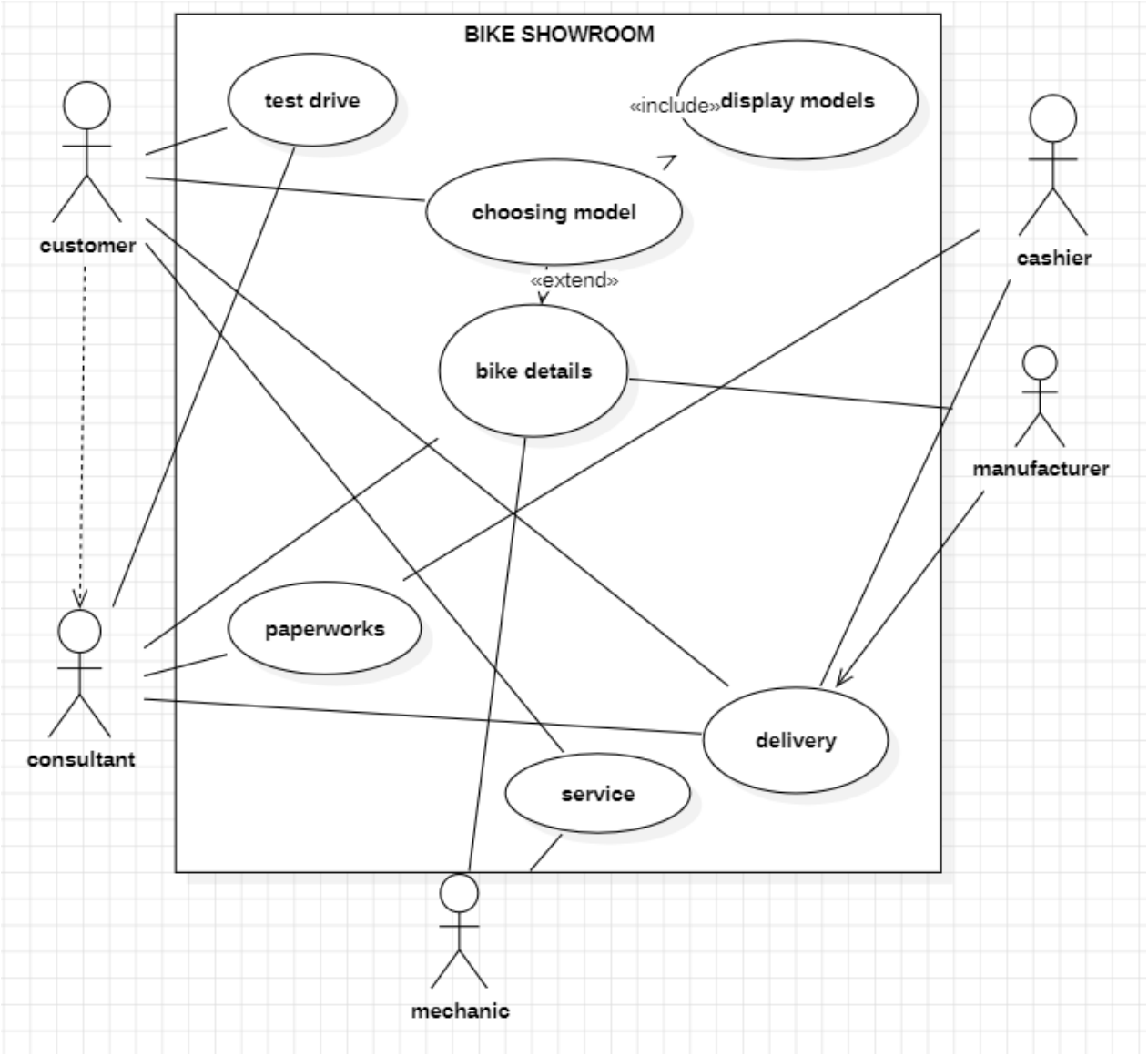
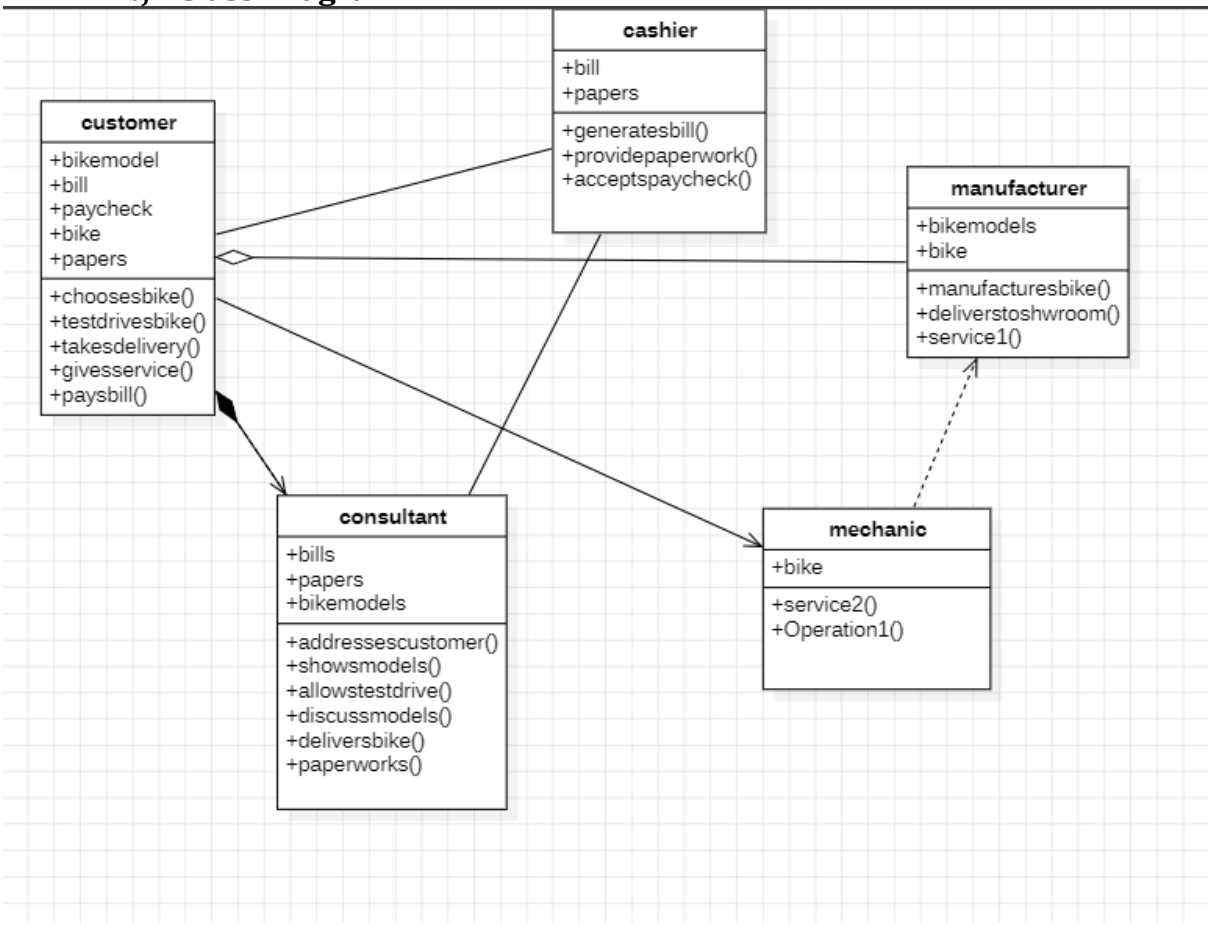
UML DIAGRAMS

1. BIKE SHOWROOM MANAGEMNT

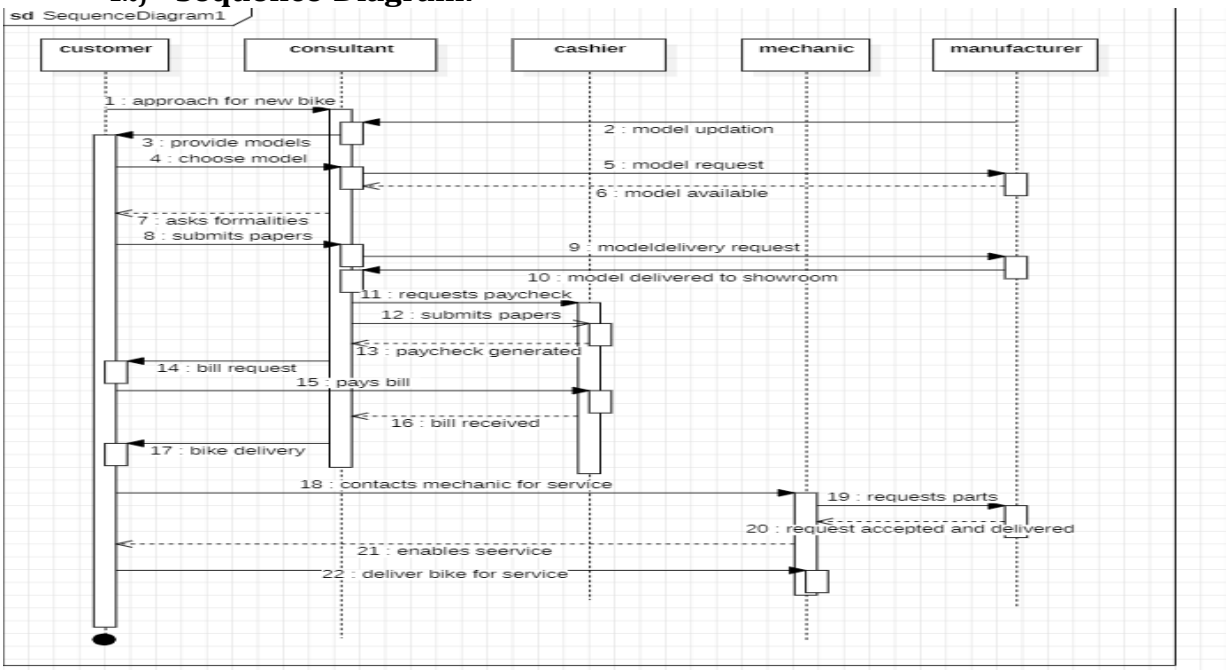
1.a) Use Case Diagram:



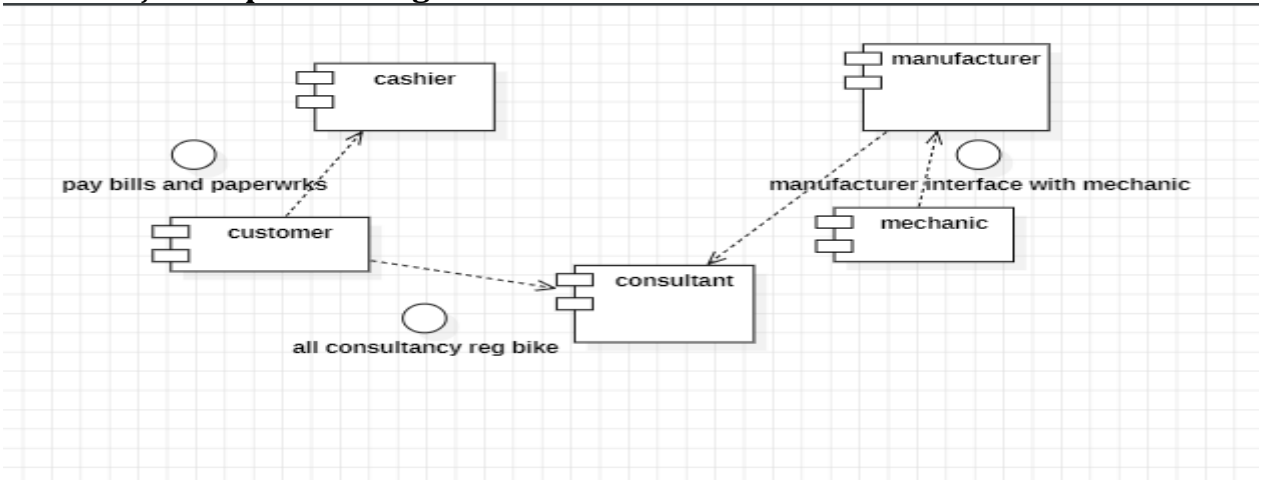
1.b) Class Diagram:



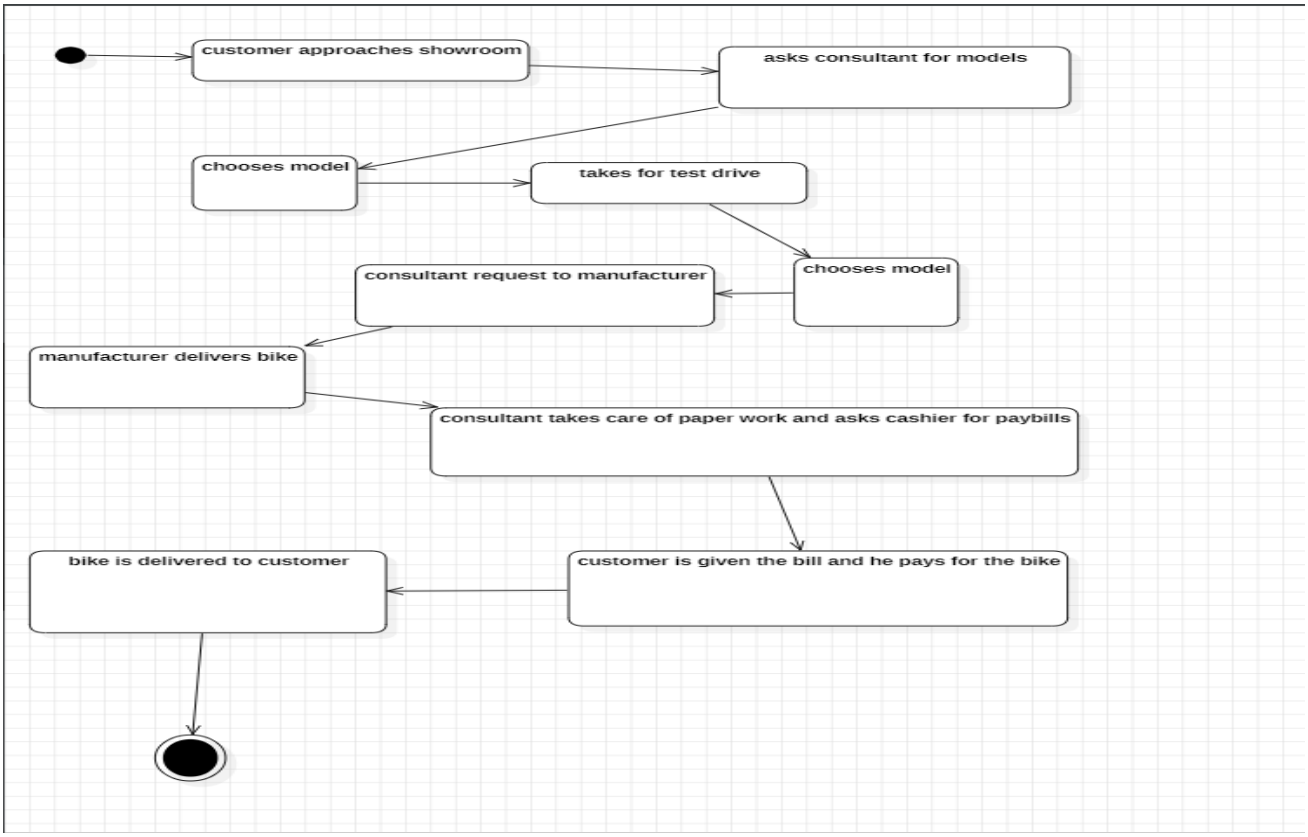
1.c) Sequence Diagram:



1.d) Component Diagram:

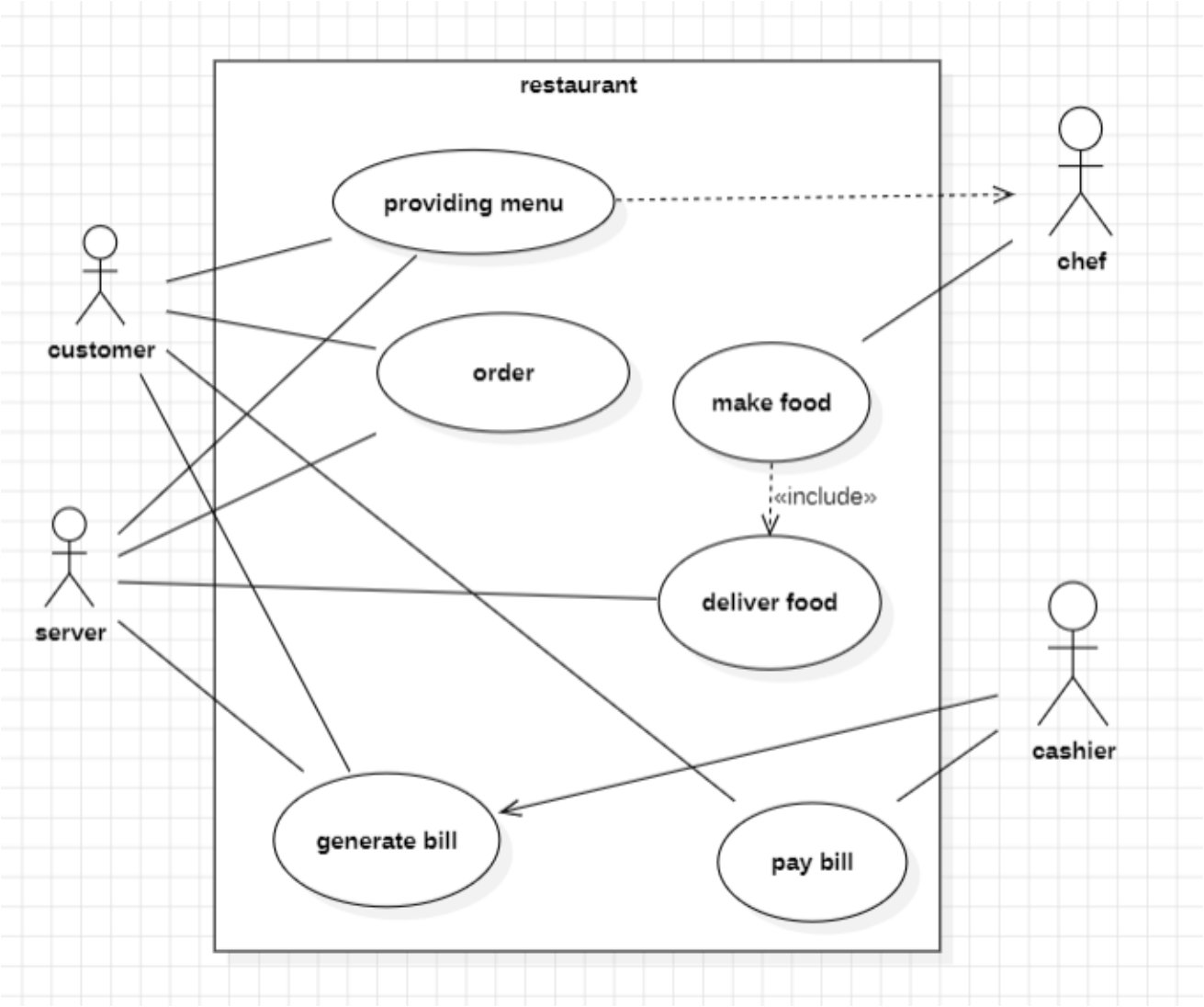


1.e) Activity Diagram:

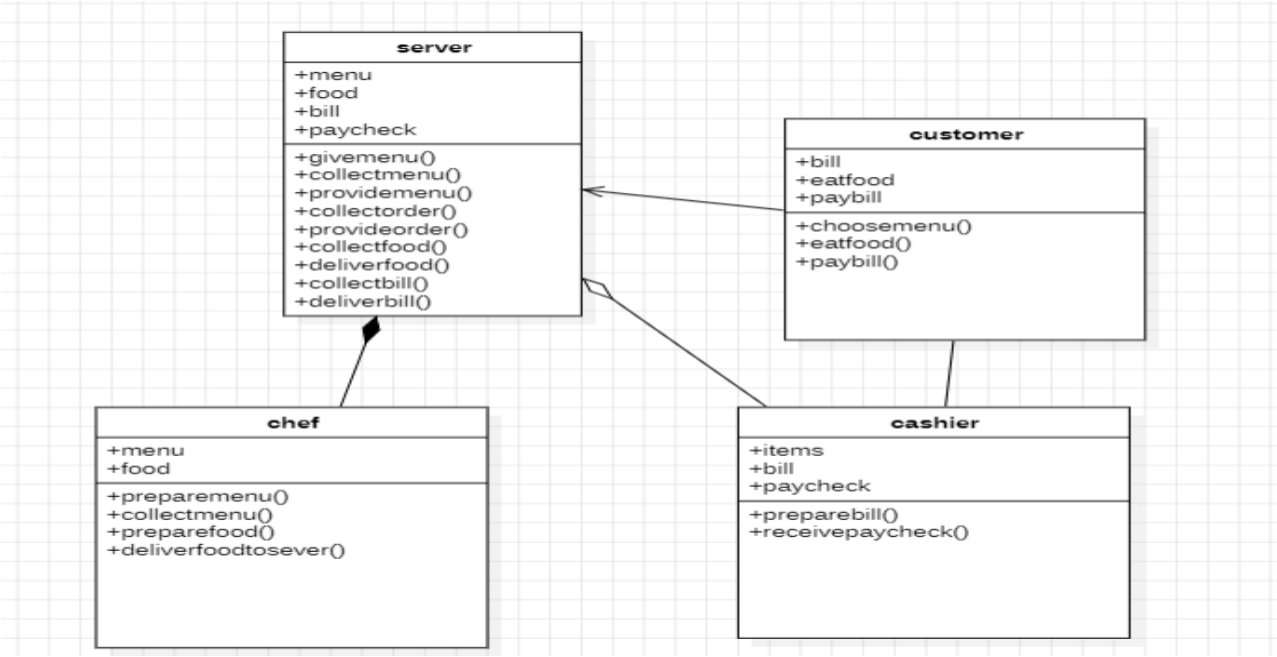


2. RESTAURANT MANAGEMENT

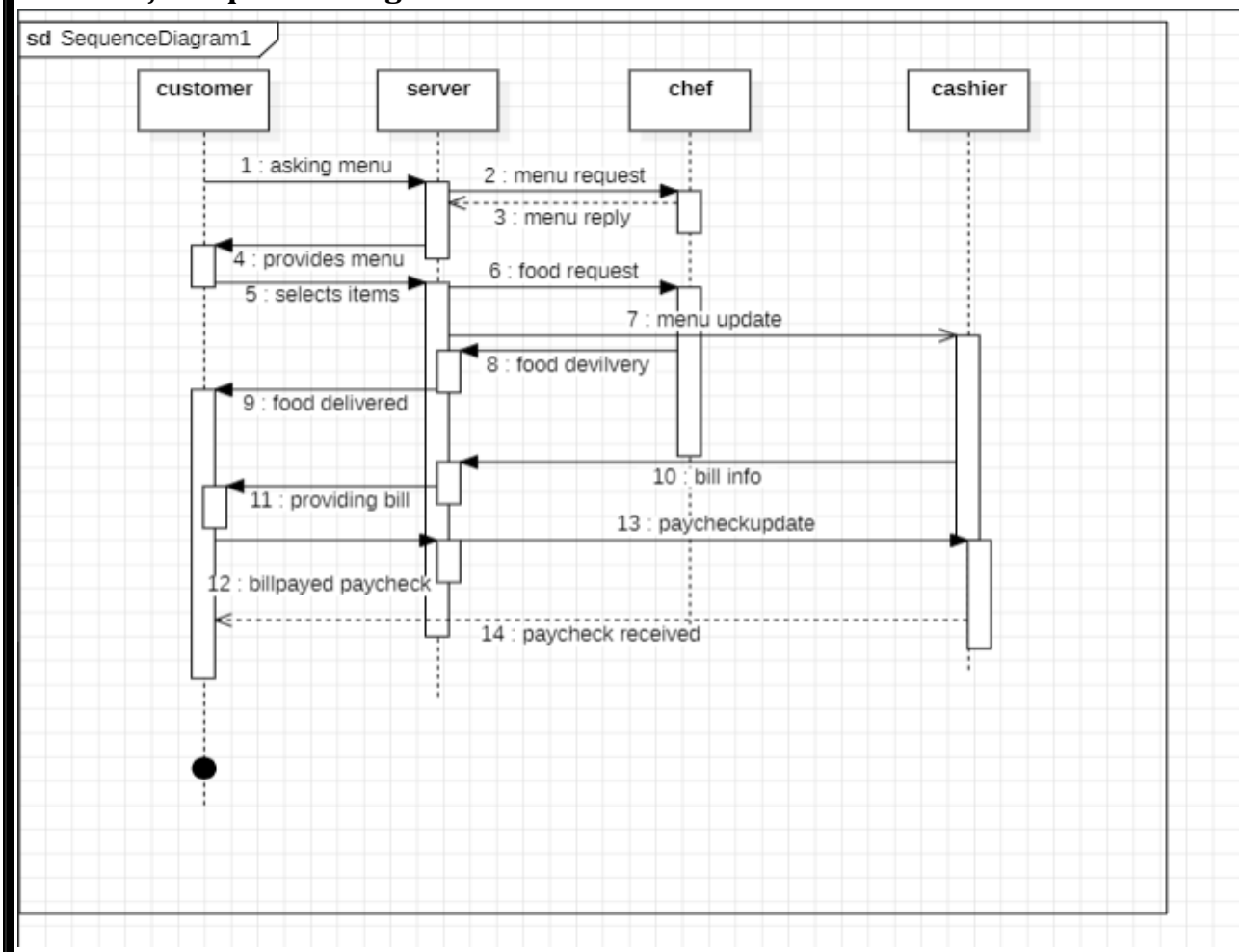
2.a) Use Case Diagram:



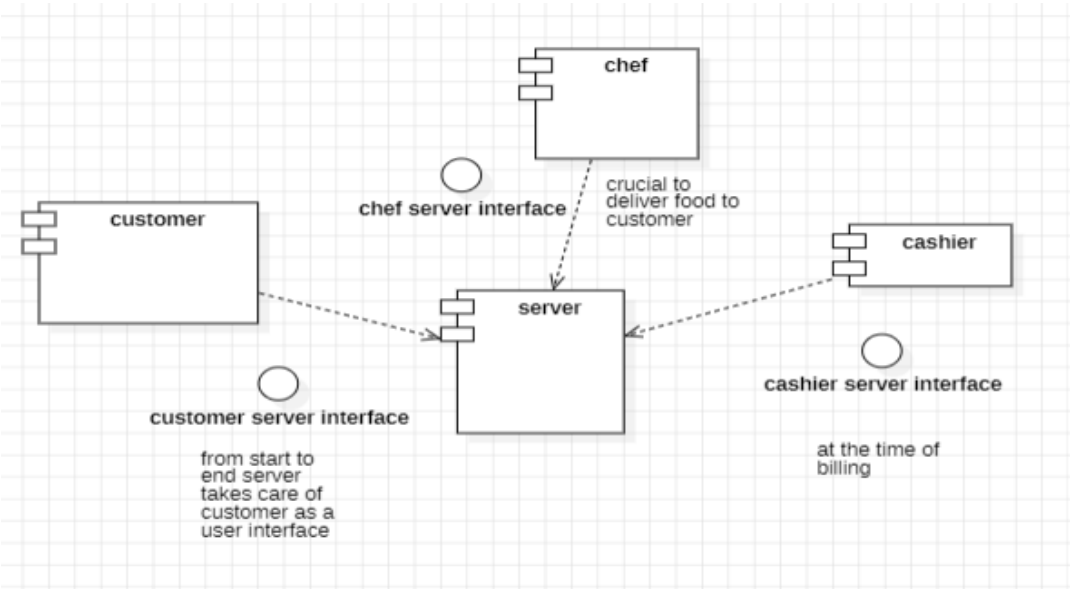
2.b) Class Diagram:



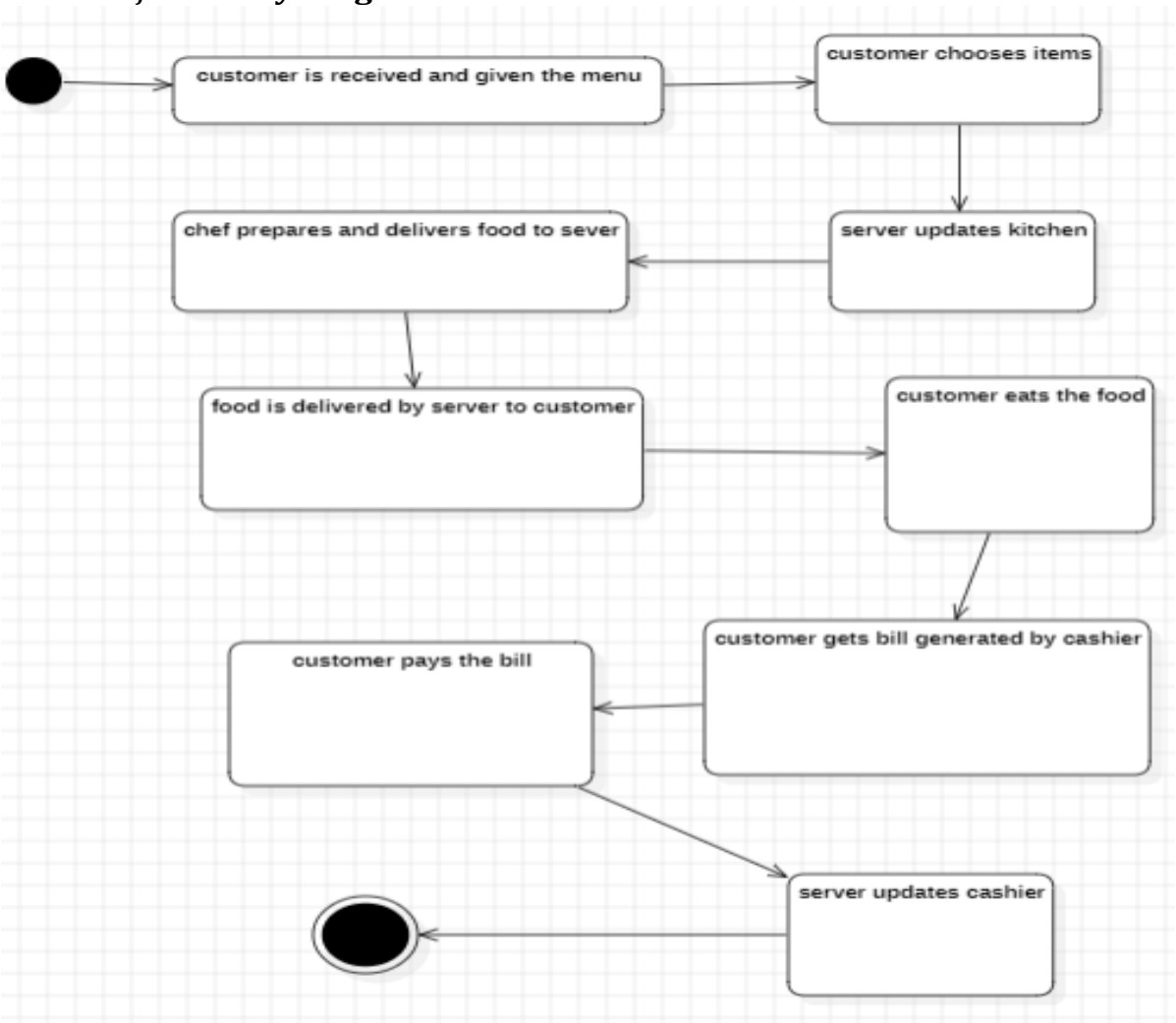
2.c) Sequence Diagram:



2.d) Component Diagram:



2.e) Activity Diagram:



3. Basic Java Programs

3.a) Armstrong Number:

Code:

```
public class ArmstrongNumber {
    public static void main(String[] args) {
        int num = 153; int original = num; int sum = 0;
        while (num != 0) {
            int digit = num % 10;
            sum += digit * digit * digit;
            num /= 10;
        }
        if (sum == original) {
            System.out.println(original + " is an Armstrong
number.");
        } else {
            System.out.println(original + " is not an Armstrong
number.");
        }
    }
```

Output:

```
PS D:\OOP\Exp 3 Basic Java Programs> javac ArmstrongNumber.java
PS D:\OOP\Exp 3 Basic Java Programs> java ArmstrongNumber.java
153 is an Armstrong number.
PS D:\OOP\Exp 3 Basic Java Programs>
```

3.b) Sum of Even, Odd Digits:

Code:

```
public class EvenOddSum {
    public static void main(String[] args) {
        int evenSum = 0; int oddSum = 0; int limit = 10;
        for (int i = 1; i <= limit; i++) {
            if (i % 2 == 0) {
                evenSum += i;
            } else {
                oddSum += i;
            }
        }
        System.out.println("Sum of even numbers from 1 to " + limit
+ ": " + evenSum);
        System.out.println("Sum of odd numbers from 1 to " + limit +
": " + oddSum);
    }
}
```

Output:

```
PS D:\OOP\Exp 3 Basic Java Programs> javac EvenOddSum.java
PS D:\OOP\Exp 3 Basic Java Programs> java EvenOddSum.java
Sum of even numbers from 1 to 10: 30
Sum of odd numbers from 1 to 10: 25
PS D:\OOP\Exp 3 Basic Java Programs>
```

3.c) Factorial:

Code:

```
public class Factorial {
    public static void main(String[] args) {
        int num = 5;
        int factorial = 1;
        for (int i = 1; i <= num; i++) {
            factorial *= i;
        }
        System.out.println("Factorial of " + num + " is " +
factorial);
    }
}
```

Output:

```
PS D:\OOP\Exp 3 Basic Java Programs> javac Factorial.java
PS D:\OOP\Exp 3 Basic Java Programs> java Factorial.java
Factorial of 5 is 120
PS D:\OOP\Exp 3 Basic Java Programs>
```

3.d) Fibonacci Series:

Code:

```
public class FibonacciSeries {
    public static void main(String[] args) {
        int n = 10, first = 0, second = 1;
        System.out.print("Fibonacci Series: " + first + ", " +
second);
        for (int i = 2; i < n; i++) {
            int next = first + second;
            System.out.print(", " + next);
            first = second;
            second = next;
        }
    }
}
```

Output;

```
PS D:\OOP\Exp 3 Basic Java Programs> javac FibonacciSeries.java
PS D:\OOP\Exp 3 Basic Java Programs> java FibonacciSeries.java
Fibonacci Series: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34
PS D:\OOP\Exp 3 Basic Java Programs>
```

3.e) LCM Calculator:

Code:

```
public class LCMCalculator {
    public static void main(String[] args) {
        int a = 12; int b = 18;int lcm;
        int gcd = a;
        int tempB = b;
        while (tempB != 0) {
            int temp = tempB;
            tempB = gcd % tempB;
            gcd = temp;
        }
        lcm = (a * b) / gcd;
        System.out.println("LCM is " + lcm);
    }
}
```

Output:

```
PS D:\OOP\Exp 3 Basic Java Programs> javac LCMCalculator.java
PS D:\OOP\Exp 3 Basic Java Programs> java LCMCalculator.java
LCM is 36
PS D:\OOP\Exp 3 Basic Java Programs>
```

3.f) Number Pattern:

Code:

```
public class NumberPattern {
    public static void main(String[] args) {
        int n = 5;
        for (int i = 1; i <= n; i++) {
            for (int j = 1; j <= i; j++) {
                System.out.print(j + " ");
            }
            System.out.println();
        }
    }
}
```

Output:

```
PS D:\OOP\Exp 3 Basic Java Programs> javac NumberPattern.java
PS D:\OOP\Exp 3 Basic Java Programs> java NumberPattern.java
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
PS D:\OOP\Exp 3 Basic Java Programs>
```

3.g) Palindrome Check:

Code:

```
public class PalindromeCheck {
    public static void main(String[] args) {
        int num = 121; int original = num; int reversed = 0;
        while (num != 0) {
            int digit = num % 10;
            reversed = reversed * 10 + digit;
            num /= 10;
        }
        if (original == reversed) {
            System.out.println(original + " is a palindrome.");
        } else {
            System.out.println(original + " is not a palindrome.");
        }
    }
}
```

Output:

```
PS D:\OOP\Exp 3 Basic Java Programs> javac PalindromeCheck.java
PS D:\OOP\Exp 3 Basic Java Programs> java PalindromeCheck.java
121 is a palindrome.
PS D:\OOP\Exp 3 Basic Java Programs>
```

3.h) Prime Checker:

Code:

```
public class PrimeChecker {
    public static void main(String[] args) {
        int num = 29;
        boolean isPrime = true;
        if (num <= 1) {
            isPrime = false;
        } else {
            for (int i = 2; i * i <= num; i++) { // Removed
Math.sqrt()
                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 D:\OOP\Exp 3 Basic Java Programs> javac PrimeChecker.java
PS D:\OOP\Exp 3 Basic Java Programs> java PrimeChecker.java
29 is a prime number.
```

3.i) Reverse Number:

Code:

```
public class ReverseNumber {
    public static void main(String[] args) {
        int num = 12345, reversed = 0;
        while (num != 0) {
            int digit = num % 10;
            reversed = reversed * 10 + digit;
            num /= 10;
        }
        System.out.println("Reversed Number: " + reversed);
    }
}
```

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) Sum of Digits:

Code:

```
public class SumOfDigits {
    public static void main(String[] args) {
        int num = 9876; int sum = 0;
        while (num != 0) {
            sum += num % 10;
            num /= 10;
        }
        System.out.println("Sum of digits: " + sum);
    }
}
```

Output:

```
PS D:\OOP\Exp 3 Basic Java Programs> javac SumOfDigits.java
PS D:\OOP\Exp 3 Basic Java Programs> java SumOfDigits.java
Sum of digits: 30
PS D:\OOP\Exp 3 Basic Java Programs>
```