SCHOOL OF COMPUTING

LAB RECORD

23CSE111- Object Oriented Programming

Submitted by

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BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

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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.U4CSE24142 – Santhosh A*** 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 13/03/2025

Internal Examiner 1 Internal Examiner 2

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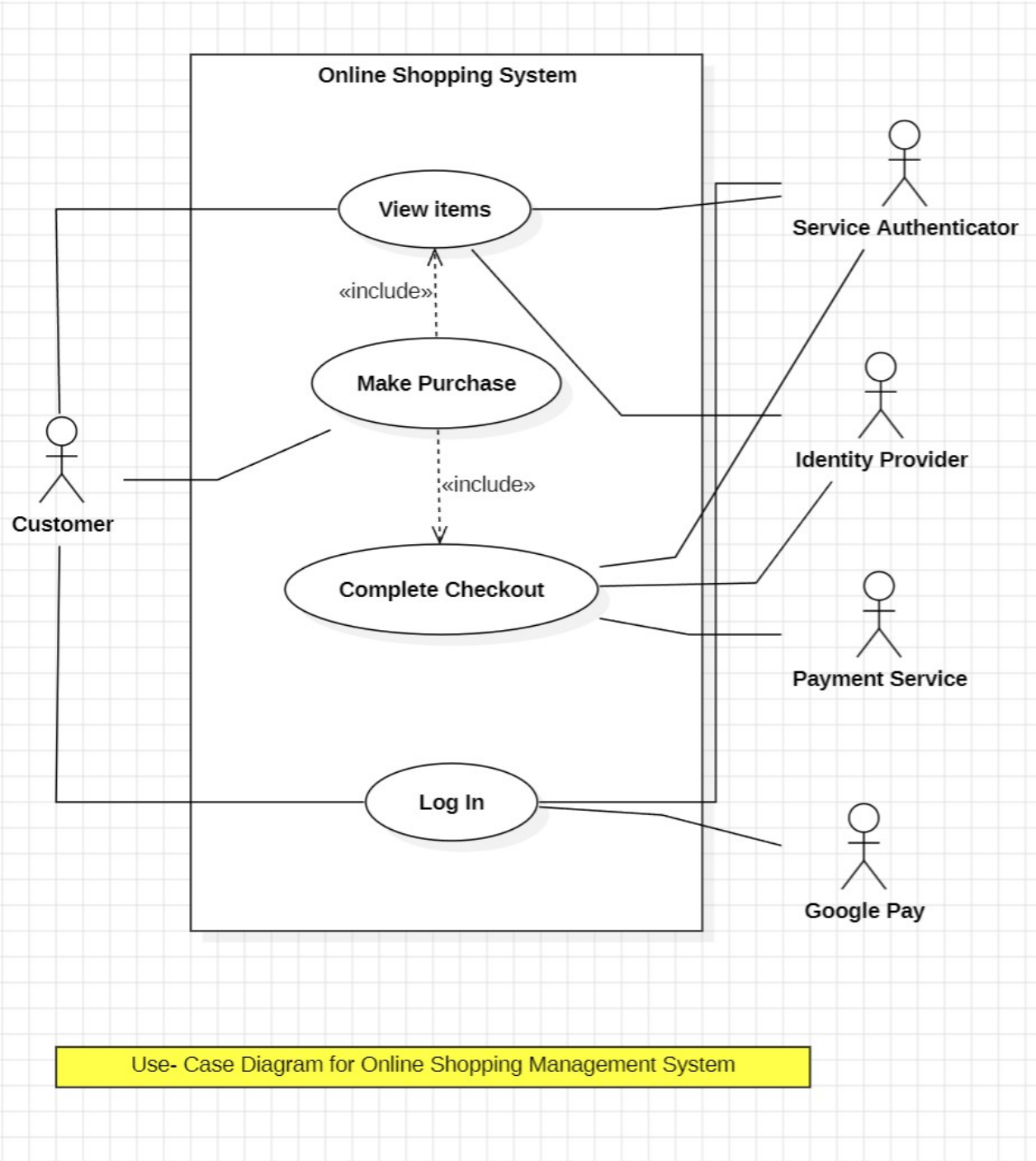
UML DIAGRAMS

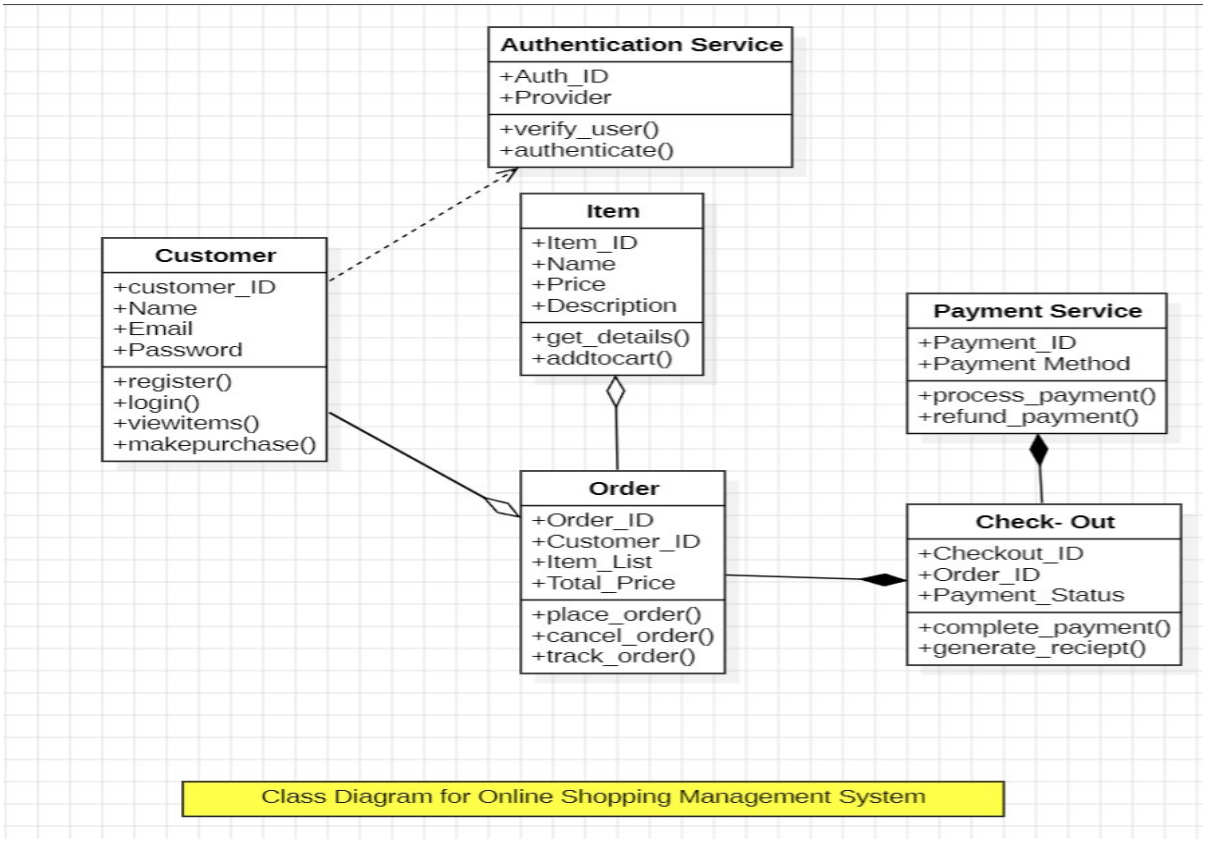
1. ONLINE SHOPPING MANAGEMENT SYSTEM

1.a) Use Case Diagram:



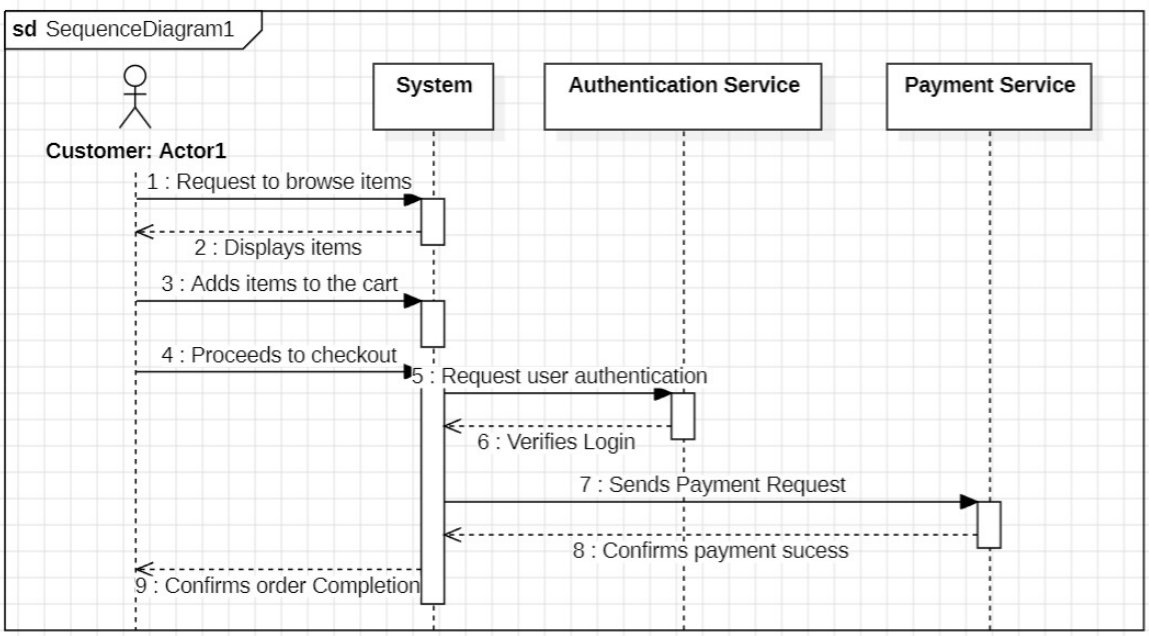
Use- Case Diagram for Online Shopping Management System

1. b) Class Diagram:



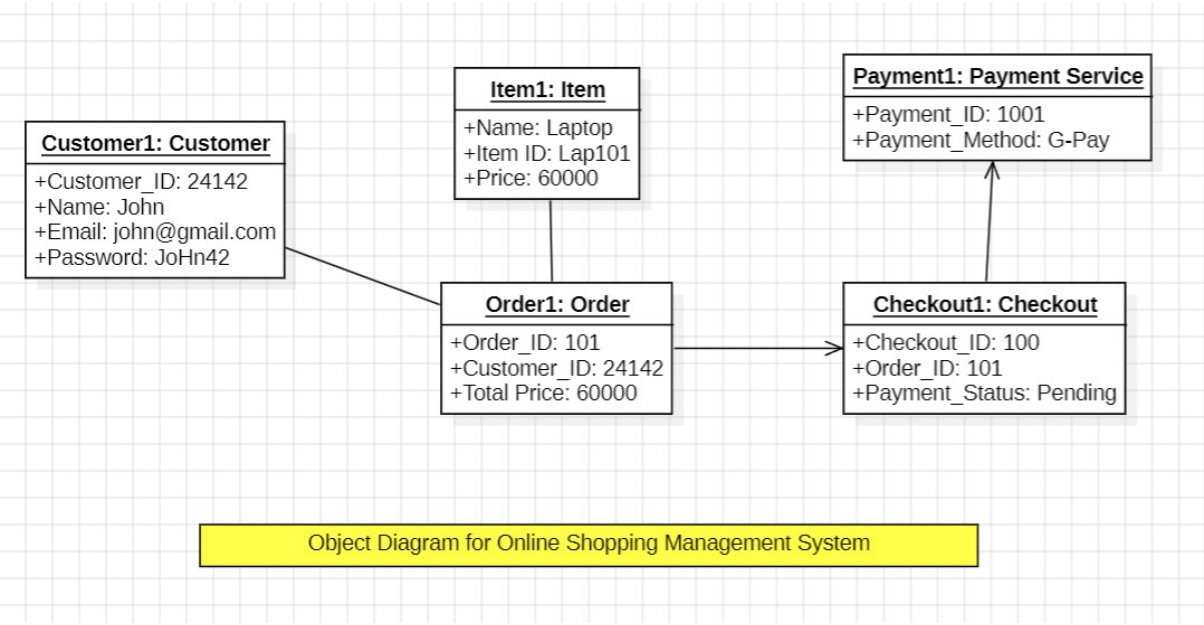
Class Diagram for Online Shopping Management System

1.c) Sequence Diagram:

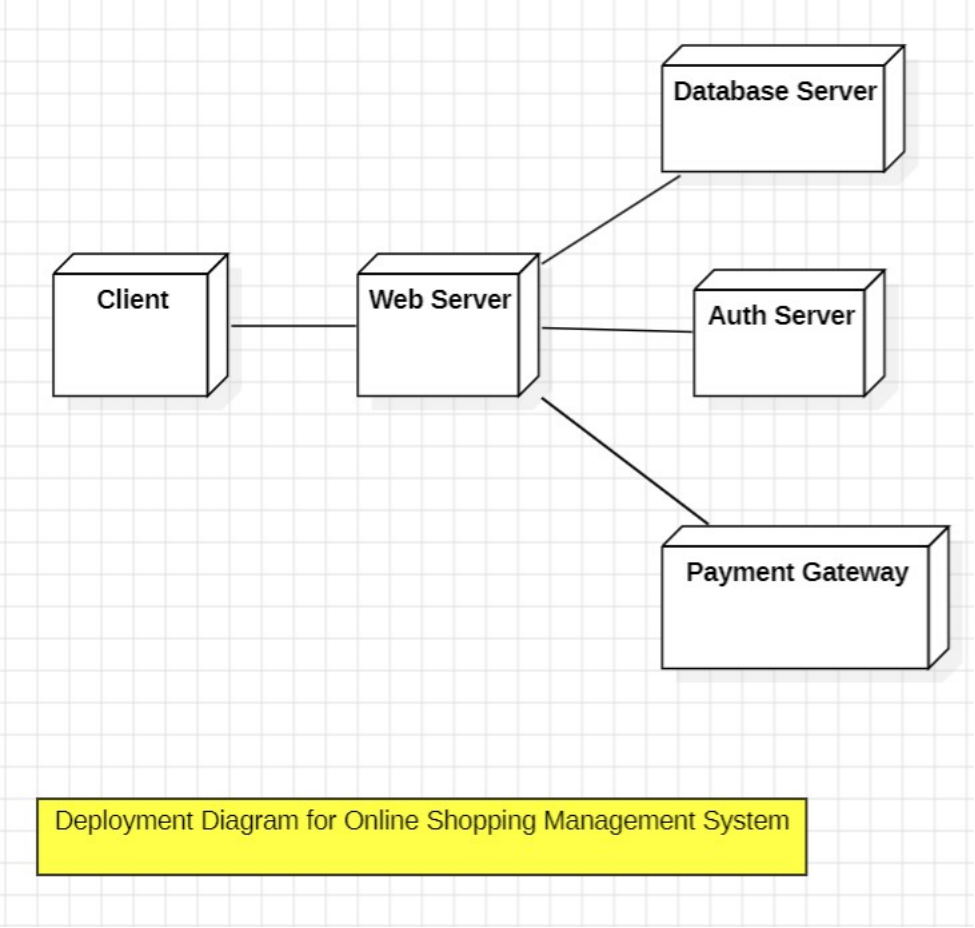


Sequence Diagram for Online Shopping Management System

1.d) Object Diagram:

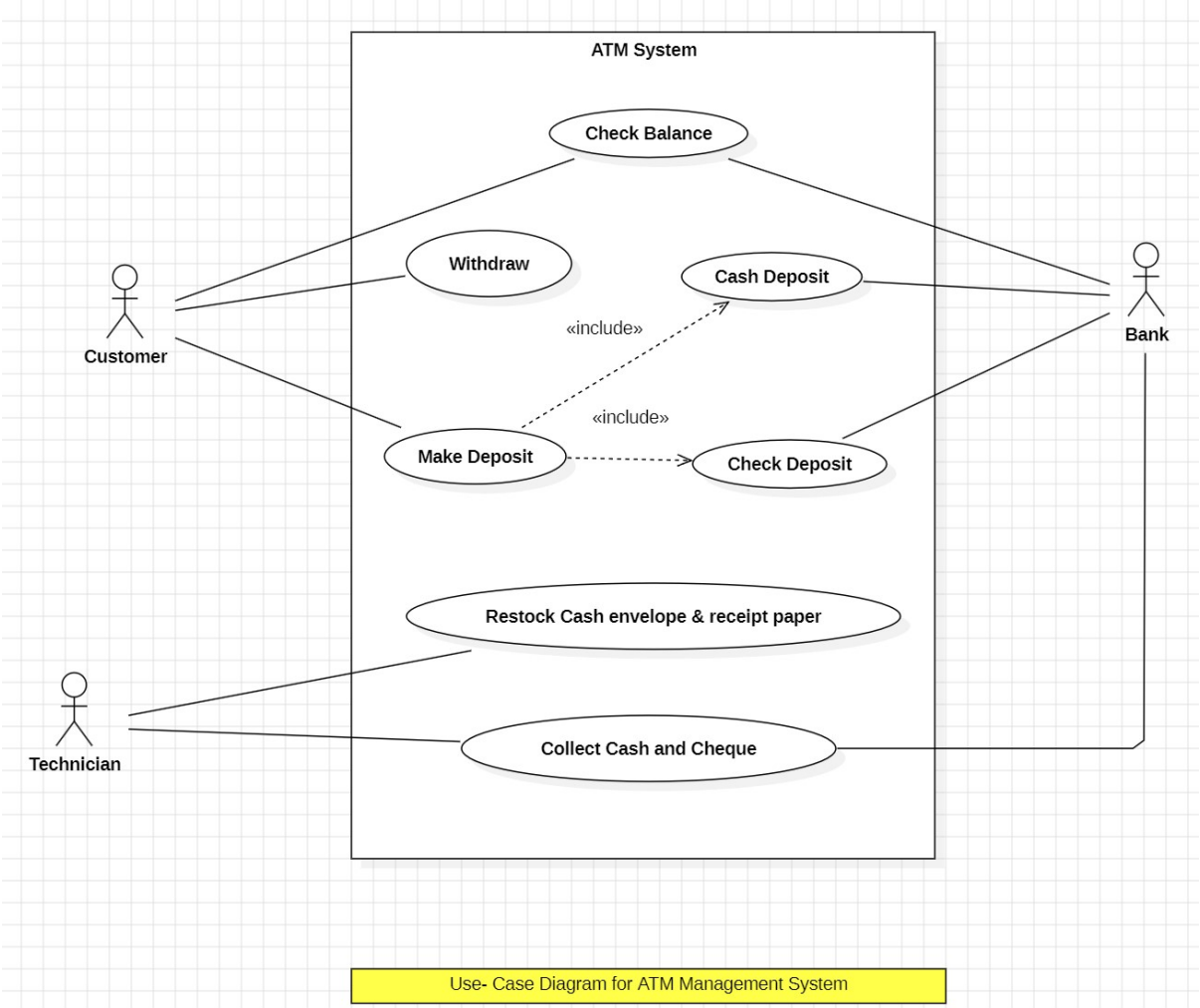


1.e) Deployment Diagram:



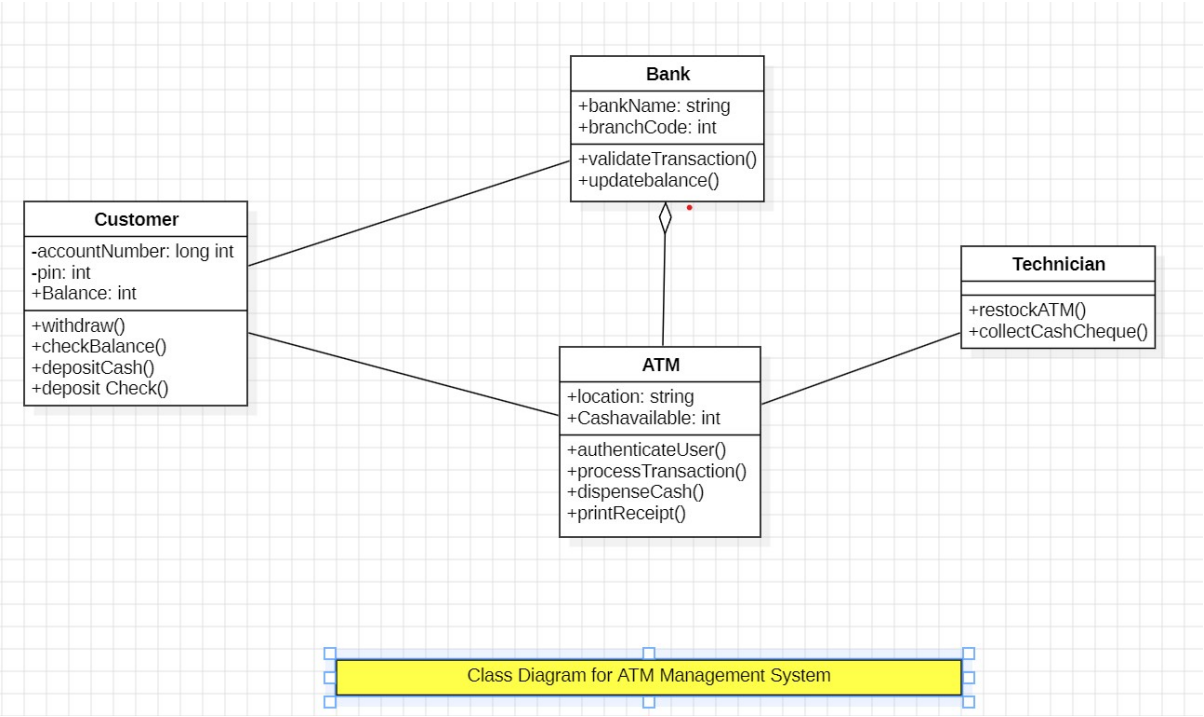
2. ATM MANAGEMENT SYSTEM

2. a) Use Case Diagram:

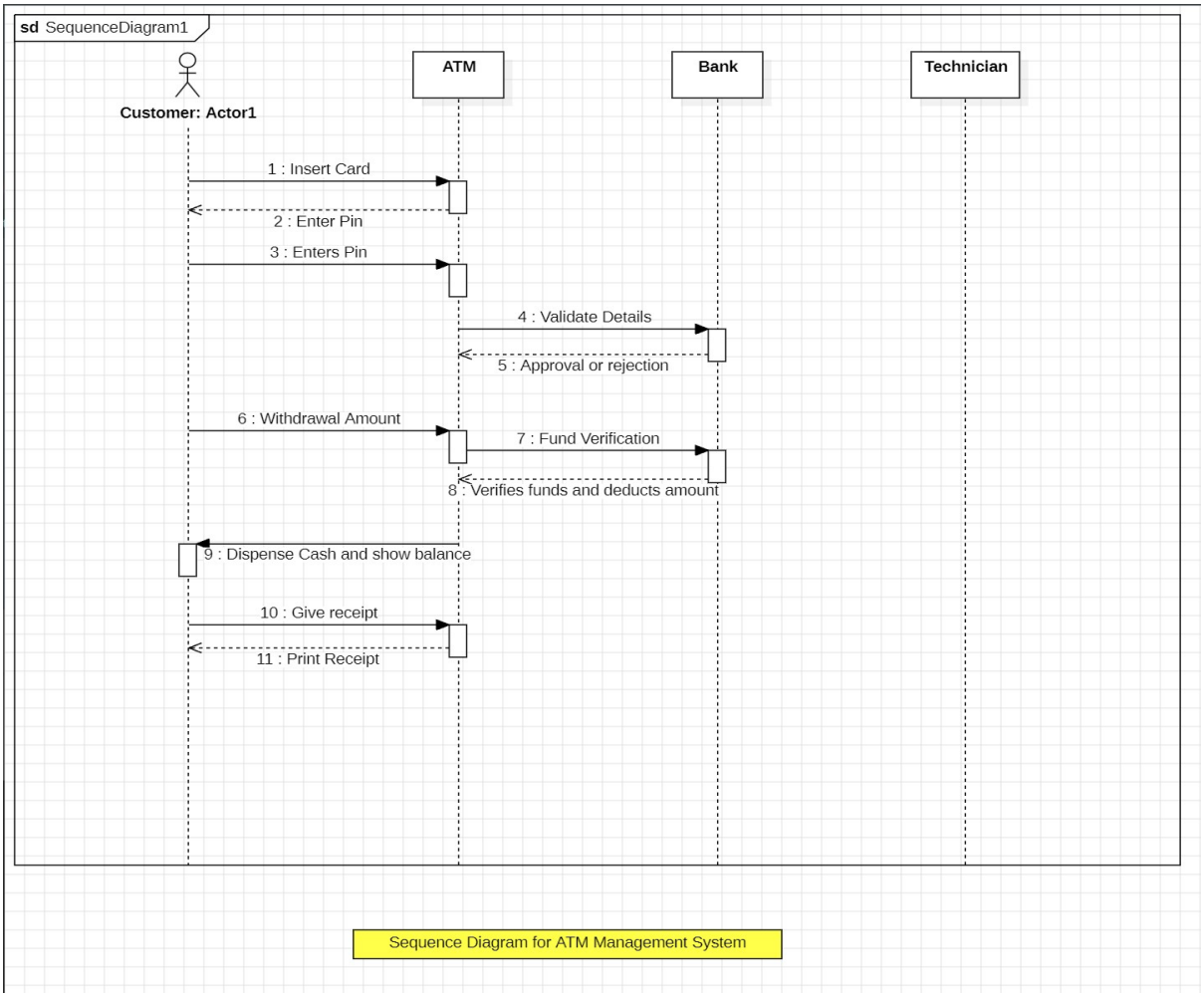


Use- Case Diagram for ATM Management System

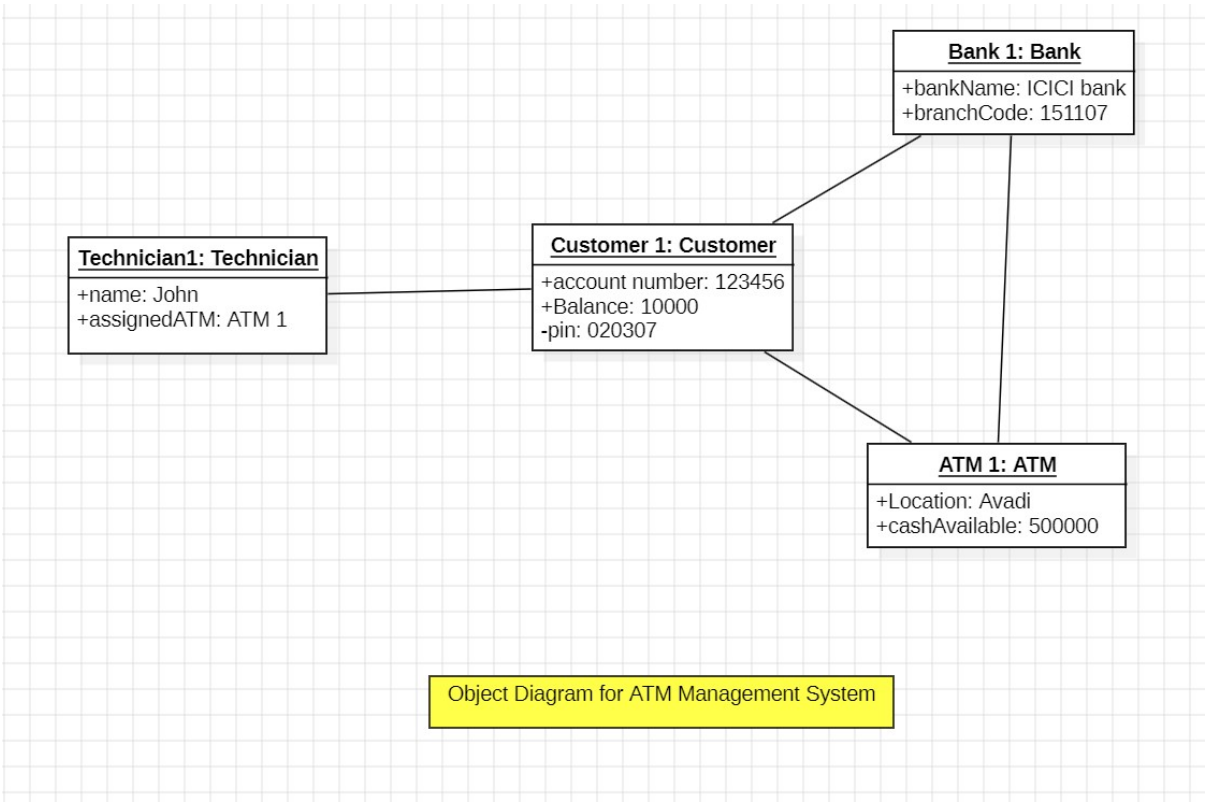
3. b) Class Diagram:



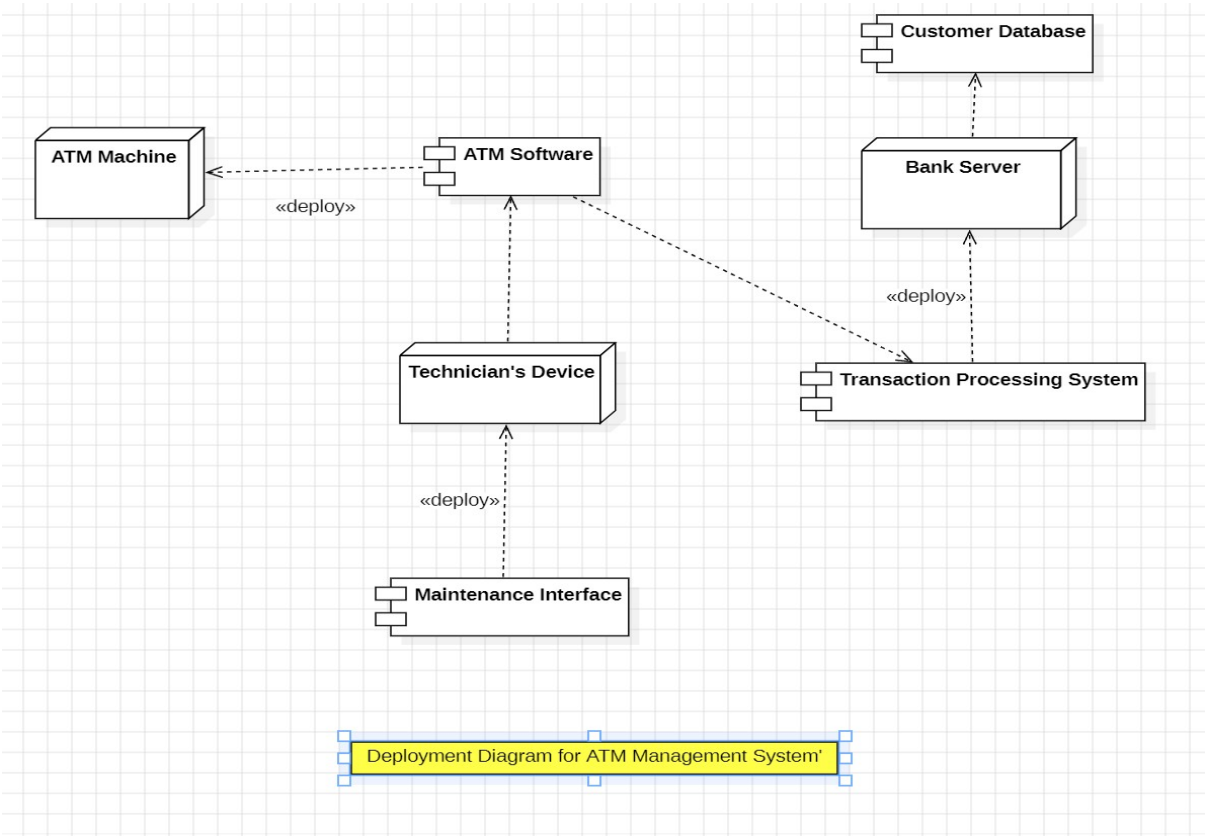
2. c) Sequence Diagram:



2.d) Object Diagram:



2.e) Deployment Diagram:



3.Basic Java Programs

3.a) Cash- Withdrawal System:

Code:

```java
import java.util.Scanner;

public class ATMWithdrawal {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter balance: ");
        double balance = scanner.nextDouble();

        System.out.print("Enter withdrawal amount: ");
        double amount = scanner.nextDouble();

        if (amount > balance) {
            System.out.println("Insufficient balance!");
        } else if (amount <= 0) {
            System.out.println("Invalid amount entered!");
        } else {
            balance -= amount;
            System.out.println("Withdrawal successful! Remaining balance: " + balance);
        }
        scanner.close();
    }
}
```

Output:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>javac ATMWithdrawal.java

D:\AVV CHENNAI\Object Oriented Programming\JAVA>java ATMWithdrawal
Enter balance: 10000
Enter withdrawal amount: 1000
Withdrawal successful! Remaining balance: 9000.0
```

3.b) Odd or Even:

Code:

```java
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:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>java EvenOdd
Enter a number: 32
32 is Even.
```

3.c) Largest Number:

Code:

```java
import java.util.Scanner;

public class LargestNumber {
    Run | Debug
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print(s:"Enter three numbers: ");
        int a = scanner.nextInt();
        int b = scanner.nextInt();
        int c = scanner.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.");
        }
        scanner.close();
    }
}
```

Output:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>java LargestNumber
Enter three numbers: 32
45
18
45 is the largest.
```

3.d) Leap Year Checker:

Code:

```java
import java.util.Scanner;

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

        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.");
        }
        scanner.close();
    }
}
```

Output:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>java LeapYearCheck
Enter a year: 2024
2024 is a Leap Year.
```

3.e) Number Checker:

Code:

```java
import java.util.Scanner;

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

        if (num > 0) {
            System.out.println("The number is Positive.");
        } else if (num < 0) {
            System.out.println("The number is Negative.");
        } else {
            System.out.println("The number is Zero.");
        }
        scanner.close();
    }
}
```

Output:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>java NumberCheck
Enter a number: -45
The number is Negative.
```

3.f) Quadratic Equation:

Code:

```java
import java.util.Scanner;

public class QuadraticEquation {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter coefficients a, b, and c: ");
        double a = scanner.nextDouble();
        double b = scanner.nextDouble();
        double c = scanner.nextDouble();

        double discriminant = b * b - 4 * a * c;

        if (discriminant > 0) {
            double root1 = (-b + Math.sqrt(discriminant)) / (2 * a);
            double root2 = (-b - Math.sqrt(discriminant)) / (2 * a);
            System.out.println("Roots are real and different: " + root1 + ", " + root2);
        } else if (discriminant == 0) {
            double root = -b / (2 * a);
            System.out.println("Roots are real and equal: " + root);
        } else {
            System.out.println("Roots are imaginary.");
        }
        scanner.close();
    }
}
```

Output:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>javac QuadraticEquation.java

D:\AVV CHENNAI\Object Oriented Programming\JAVA>java QuadraticEquation
Enter coefficients a, b, and c: 1
5
6
Roots are real and different: -2.0, -3.0
```

3.g) Student Grades:

Code:

```java
import java.util.Scanner;

public class StudentGrade {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter marks: ");
        int marks = scanner.nextInt();

        if (marks >= 90) {
            System.out.println("Grade: A");
        } else if (marks >= 80) {
            System.out.println("Grade: B");
        } else if (marks >= 70) {
            System.out.println("Grade: C");
        } else if (marks >= 60) {
            System.out.println("Grade: D");
        } else {
            System.out.println("Grade: F (Fail)");
        }
        scanner.close();
    }
}
```

Output:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>javac StudentGrade.java

D:\AVV CHENNAI\Object Oriented Programming\JAVA>java StudentGrade
Enter marks: 97
Grade: A
```

3.h) Triangle Type:

Code:

```java
import java.util.Scanner;

public class TriangleType {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter three sides of the triangle: ");
        int a = scanner.nextInt();
        int b = scanner.nextInt();
        int c = scanner.nextInt();

        if (a == b && b == c) {
            System.out.println("It is an Equilateral Triangle.");
        } else if (a == b || b == c || a == c) {
            System.out.println("It is an Isosceles Triangle.");
        } else {
            System.out.println("It is a Scalene Triangle.");
        }
        scanner.close();
    }
}
```

Output:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>javac TriangleType.java

D:\AVV CHENNAI\Object Oriented Programming\JAVA>java TriangleType
Enter three sides of the triangle: 5
5
5
It is an Equilateral Triangle.
```

3.i) Voting Eligibility:

Code:

```java
import java.util.Scanner;

public class VotingEligibility {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter your age: ");
        int age = scanner.nextInt();

        if (age >= 18) {
            System.out.println("You are eligible to vote.");
        } else {
            System.out.println("You are not eligible to vote.");
        }
        scanner.close();
    }
}
```

Output:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>javac VotingEligibility.java

D:\AVV CHENNAI\Object Oriented Programming\JAVA>java VotingEligibility
Enter your age: 21
You are eligible to vote.
```

3.j) Vowels and Consonants Classifier:

Code:

```java
import java.util.Scanner;

public class VowelConsonant {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a character: ");
        char ch = scanner.next().toLowerCase().charAt(0);

        if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u') {
            System.out.println(ch + " is a Vowel.");
        } else if ((ch >= 'a' && ch <= 'z')) {
            System.out.println(ch + " is a Consonant.");
        } else {
            System.out.println("Invalid input! Please enter a letter.");
        }
        scanner.close();
    }
}
```

Output:

```
D:\AVV CHENNAI\Object Oriented Programming\JAVA>javac VowelConsonant.java

D:\AVV CHENNAI\Object Oriented Programming\JAVA>java VowelConsonant
Enter a character: u
u is a Vowel.
```