



**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.U4CSE24060 –PRODDUTURU JASHWANTH** 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.

Internal Examiner 1

Internal Examiner 2

Index

S.NO	Experiment Name	Page Number
1.	UML DIAGRAM	
	Online Shopping <ul style="list-style-type: none"> • Class Diagram • Use Case Diagram • Sequence Diagram • State Activity Diagram • Object Diagram 	
2.	Library Management <ul style="list-style-type: none"> • Class Diagram • Use Case Diagram • Sequence Diagram • State Activity Diagram • Object Diagram 	
3.	Java Basic Programs	
i)	Odd or Even	
ii)	Factorial	
iii)	Reverse a Number	
iv)	Palindrome	
v)	Multiples of 2	
vi)	Quadratic Equation	
vii)	Hypotenuse of a Triangle	
viii)	Square Root of a Number	
xi)	Armstrong of a Number	
x)	Greatest of a Numbers	

	INHERITANCE:	
4.	Single Inheritance	
i)	Students Details	
ii	Bank Details	
5.	MULTILEVEL INHERITANCE PROGRAMS	
i)	General Details	
ii)	Employee Salary	
6.	HIERARCHICAL INHERITANCE PROGRAMS	
i)	Vehicle Model	
ii)	Person Details	
7.	HYBRID INHERITANCE PROGRAMS	
i)	Student Details	
ii)	Vehicle type	
	POLYMORPHISM	
8.	CONSTRUCTOR PROGRAMS	
i)	Book Details	
9.	CONSTRUCTOR OVERLOADING PROGRAMS	
i)	Employee info	
10.	METHOD OVERLOADING PROGRAMS	
i)	Employee details	
ii)	Shape details	
11.	METHOD OVERRIDING PROGRAMS	
i)	Vehicle car bike class	

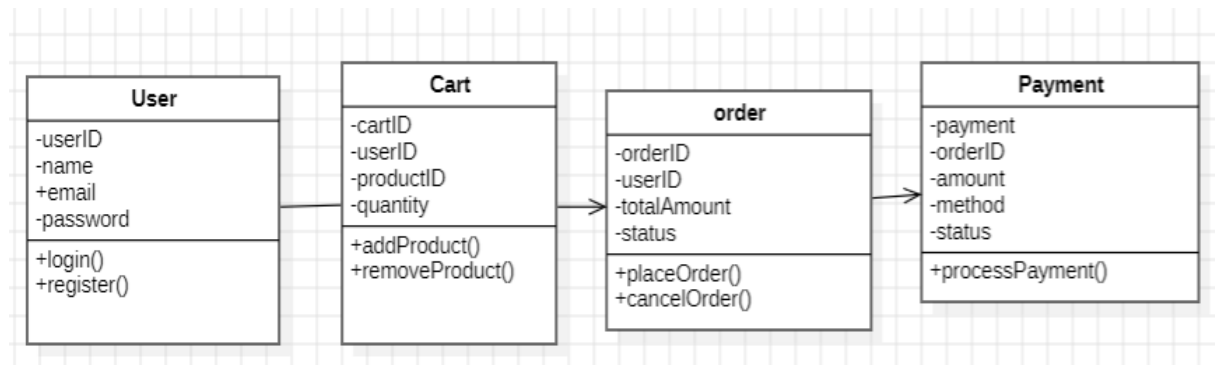
ii)	BankAccount interest Rate	
	ABSTRACTION	
12.	INTERFACE PROGRAMS	
i)	Shape Area	
ii)	Camara and Music Player class	
iii)	Payment Type	
iv)	FuelType	
13.	ABSTRACT CLASS PROGRAMS	
i)	Mileage Calculator	
ii)	Vehicle start and stop	
iii)	Area of shape	
iv)	Shape 2D	
	ENCAPSULATION	
14.	ENCAPSULATION PROGRAMS	
i)	Patients Records	
ii)	Product Details	
iii)	House Details	
iv)	Game Characters	
15.	PACKAGES PROGRAMS	
i)	Button creation	
ii)	Basic Calculation	
iii)	Area calculation	
iv)	Employee Details	
16.	EXCEPTION HANDLING PROGRAMS	
i)	Division by 0	
ii)	Age limit with throws keyword	

iii)	Age limit with throw	
iv)	File missing error	
17.	FILE HANDLING PROGRAMS	
i)	Reading the file	
ii)	Writing the file	
iii)	Reading N writing to a file	
iv)	writing to file multiple try catch	

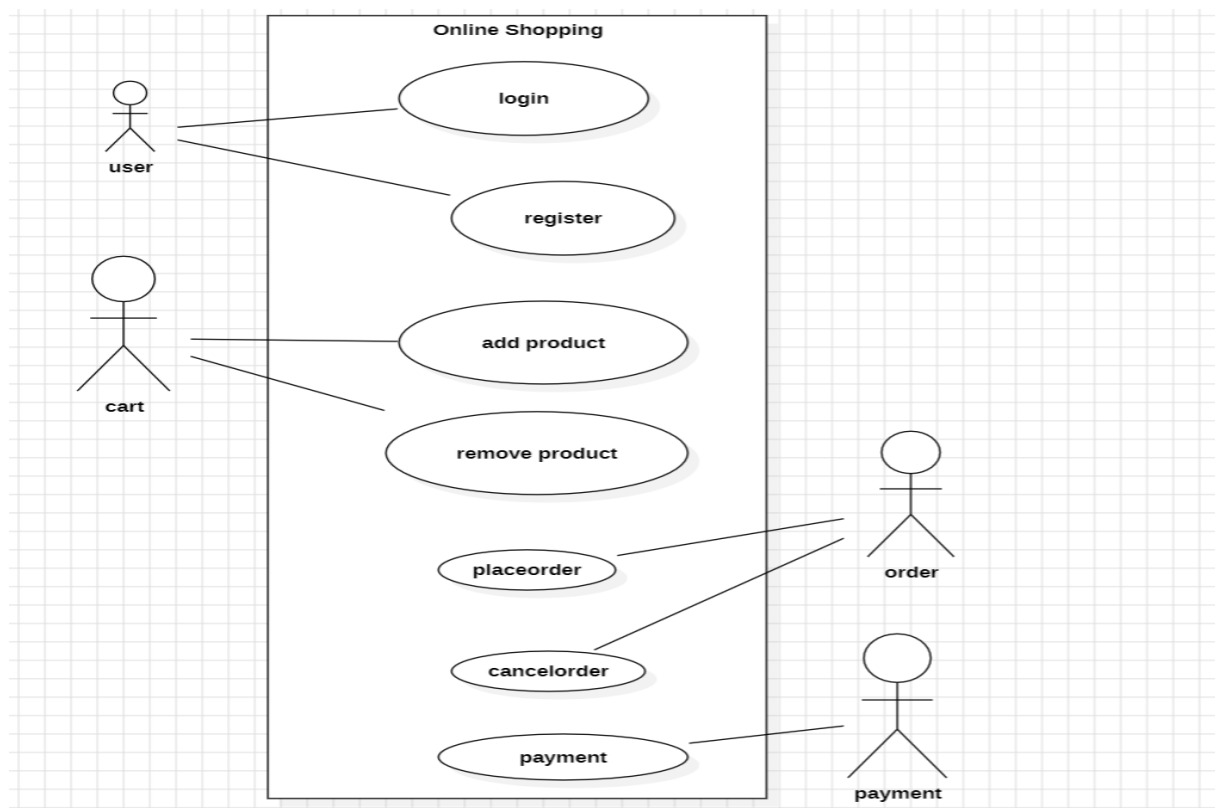
UML DIAGRAM

1. Online Shopping

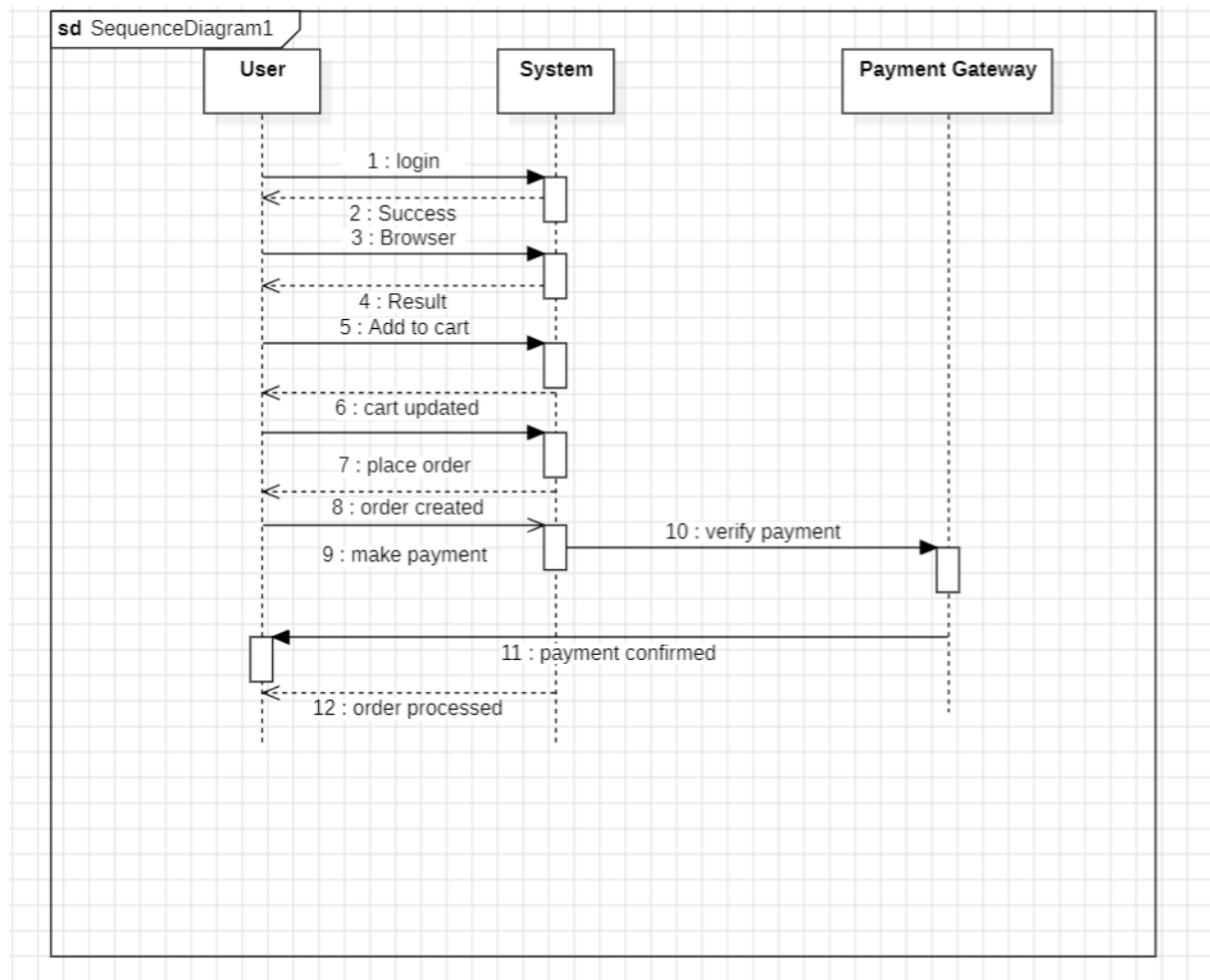
i. Class Diagram:



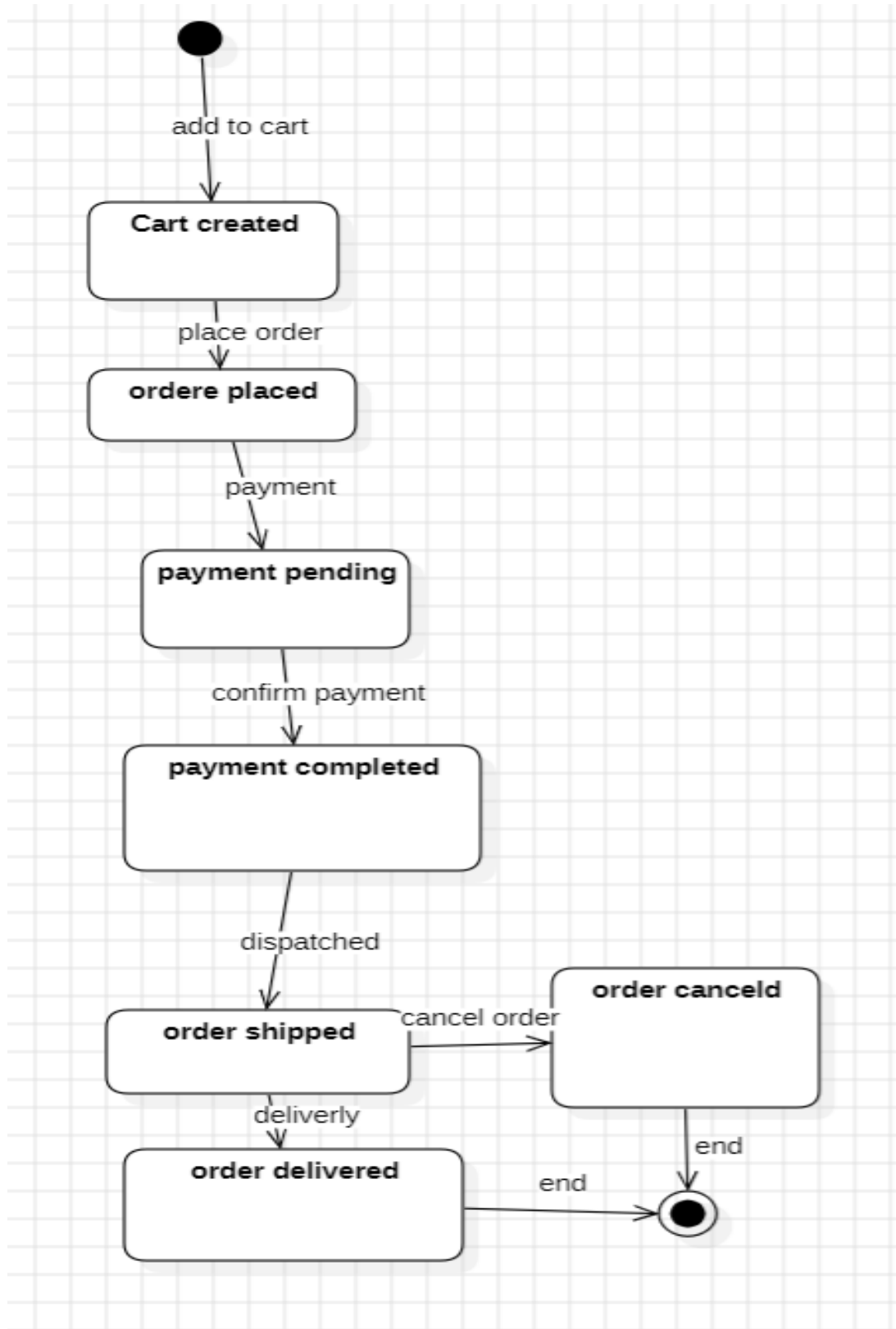
ii. Use Case Diagram:



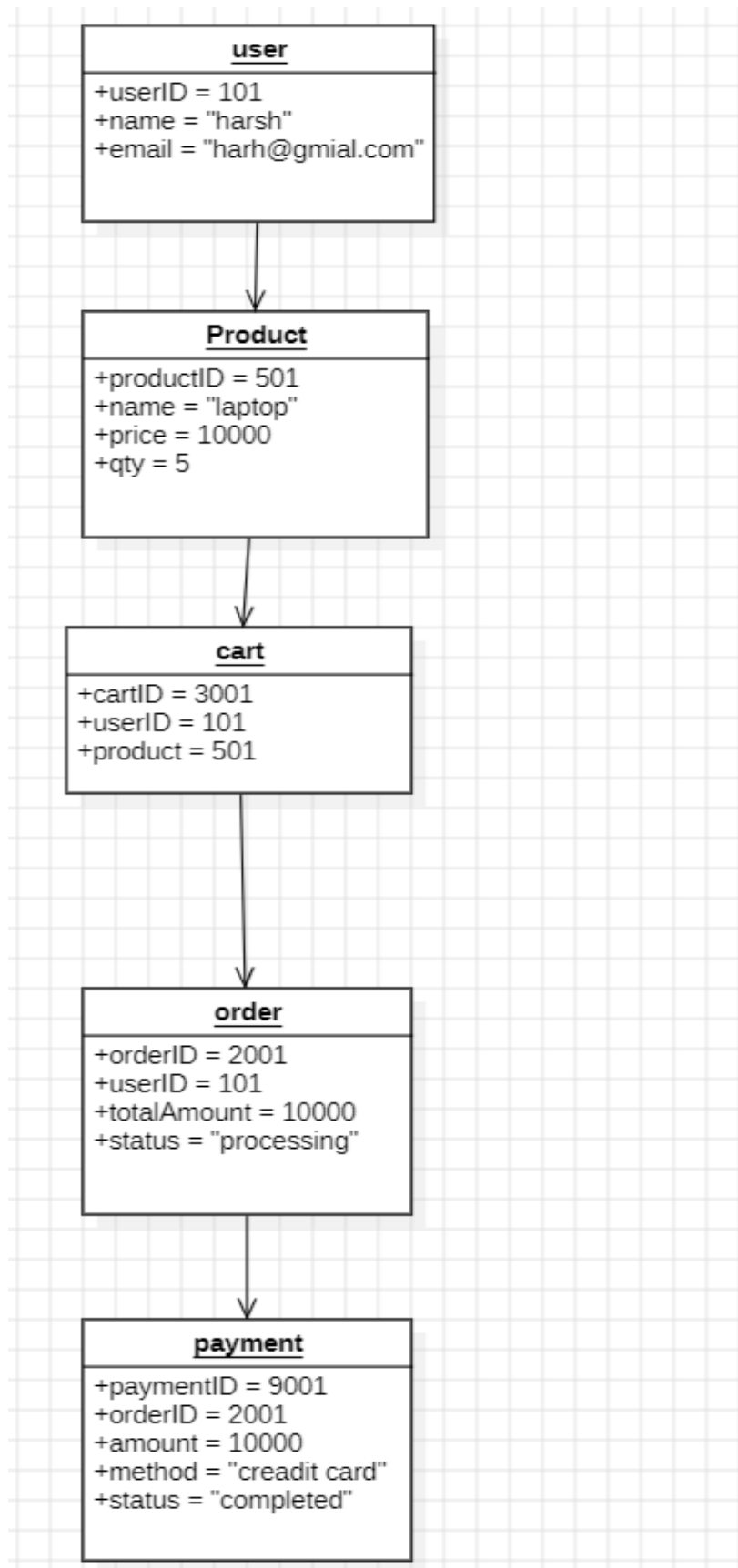
iii. Sequence Diagram:



iv. State Activity Diagram:

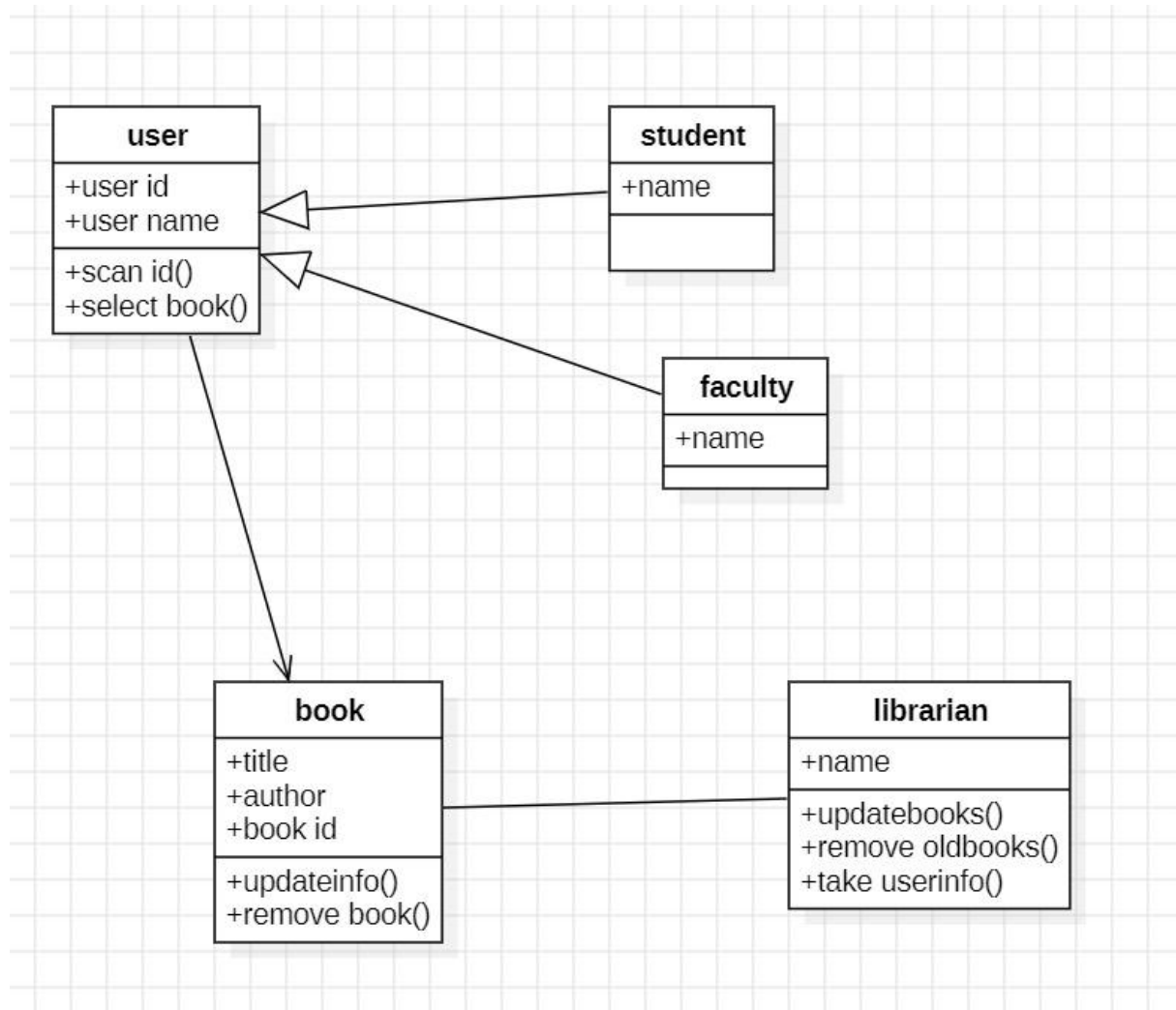


v. Object Diagram:

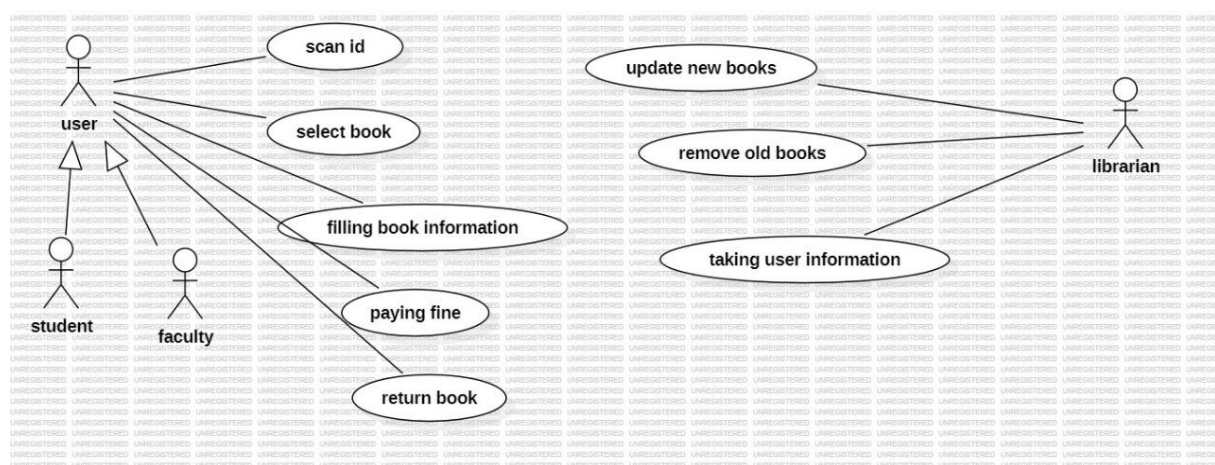


2. Library Management:

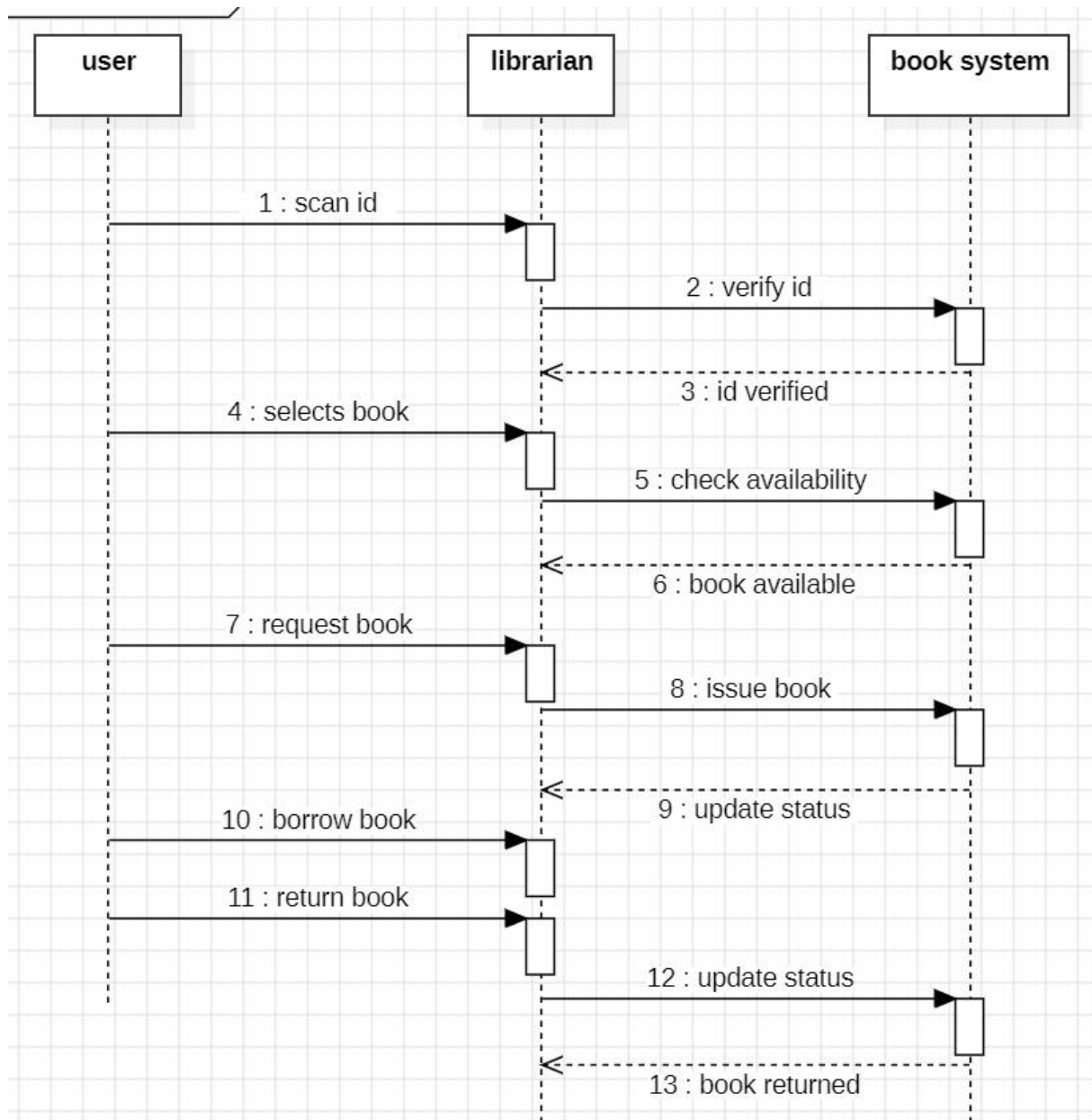
i. Class Diagram:



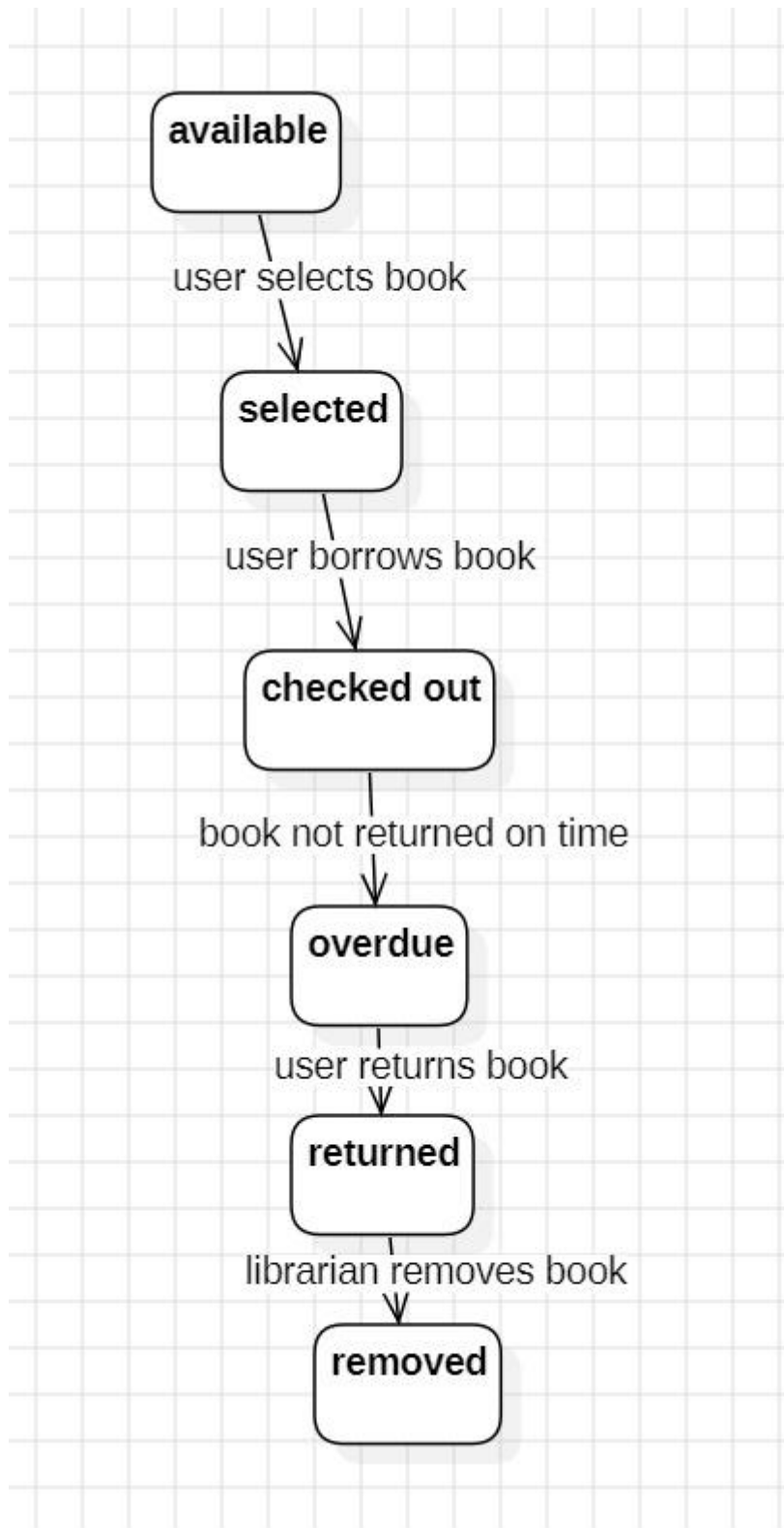
ii. Use Case Diagram:



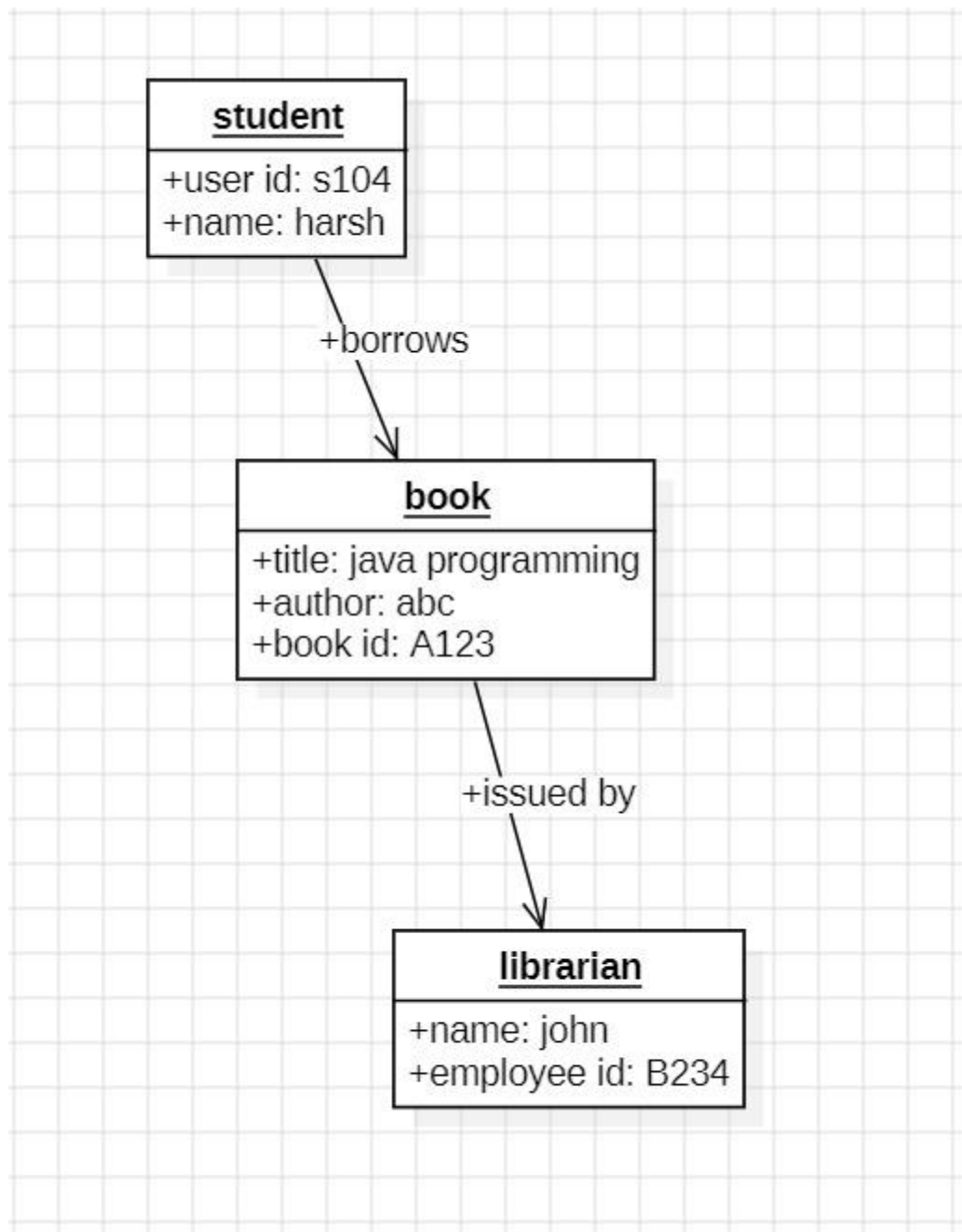
iii. Sequence Diagram:



iv. State Activity Diagram:



v. Object Diagram:



JAVA PROGRAMMES

1.Aim:Checkwhether a give number is odd or even.

Code:

```
import java.util.Scanner;

public class Main1 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

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

        if (number % 2 == 0) {
            System.out.println(number + " is Even.");
        } else {
            System.out.println(number + " is Odd.");
        }

        scanner.close();
    }
}
```

Output:

```
Microsoft Windows [Version 10.0.26100.3323]
(c) Microsoft Corporation. All rights reserved.

C:\Users\prodd\Desktop>javac Main1.java

C:\Users\prodd\Desktop>java Main1
Enter a number: 77
77 is Odd.

C:\Users\prodd\Desktop>|
```

2.Aim:Factorial of a given number.

Code:

```
import java.util.Scanner;
```

```
public class Main2 {
```

```
    public static void main(String[] args) {
```

```
        Scanner scanner = new Scanner(System.in);
```

```
        System.out.print("Enter a number: ");
```

```
        int number = scanner.nextInt();
```

```
        long factorial = 1;
```

```
        for (int i = 1; i <= number; i++) {
```

```
            factorial *= i;
```

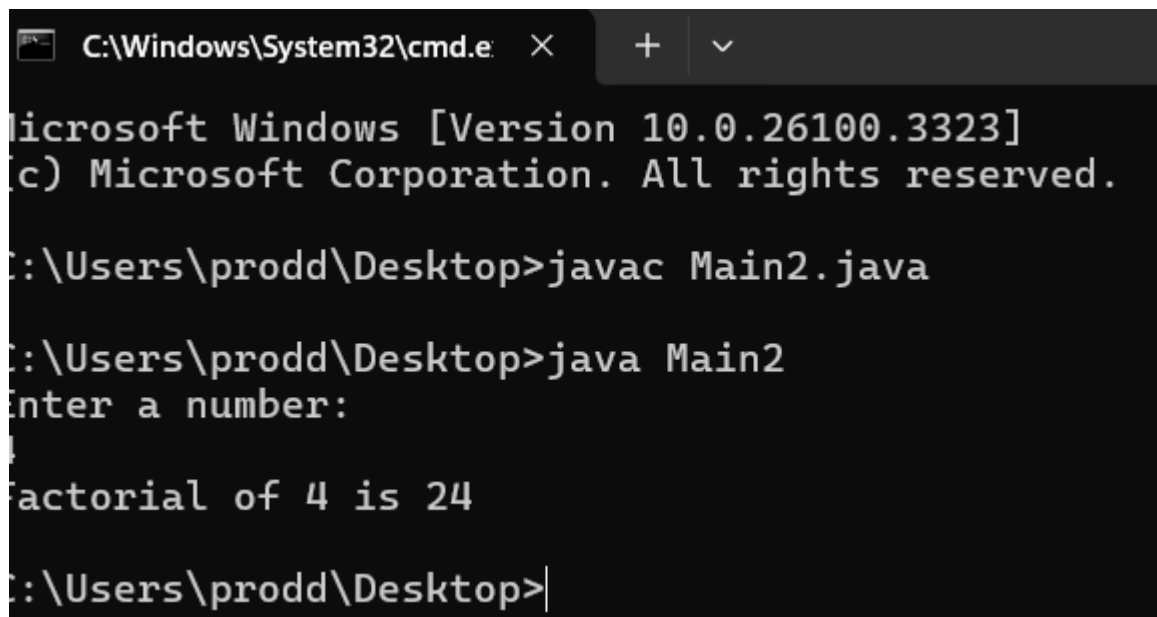
```
        }
```



```
        System.out.println("Factorial of " + number + " is " +  
factorial);
```

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

Output:



```
C:\Windows\System32\cmd.e  X  +  v  
Microsoft Windows [Version 10.0.26100.3323]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\prodd\Desktop>javac Main2.java  
  
C:\Users\prodd\Desktop>java Main2  
Enter a number:  
4  
Factorial of 4 is 24  
  
C:\Users\prodd\Desktop>
```

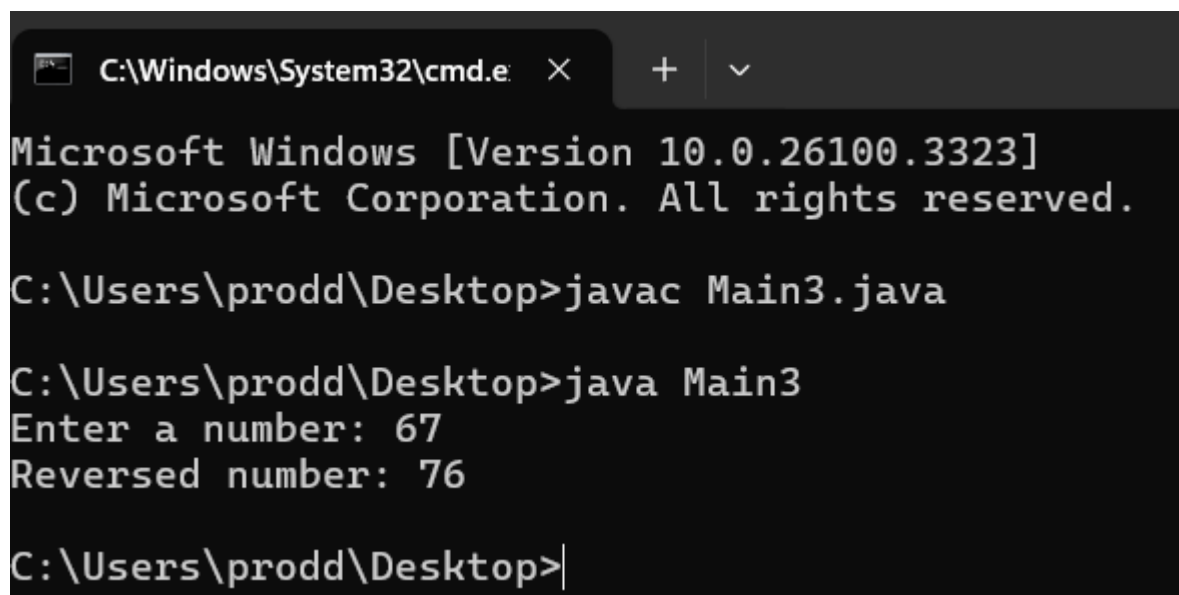
3.AIM:Reverse a number.

Code:

```
import java.util.Scanner;  
  
public class Main3 {  
    public static void main(String[] args) {  
        Scanner scanner = new Scanner(System.in);
```

```
System.out.print("Enter a number: ");  
int number = scanner.nextInt();  
  
int reversed = 0;  
while (number != 0) {  
    int digit = number % 10;  
    reversed = reversed * 10 + digit;  
    number /= 10;  
}  
  
System.out.println("Reversed number: " + reversed);  
  
scanner.close();  
}  
}
```

Output:



```
C:\Windows\System32\cmd.e  X  +  v  
Microsoft Windows [Version 10.0.26100.3323]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\prodd\Desktop>javac Main3.java  
  
C:\Users\prodd\Desktop>java Main3  
Enter a number: 67  
Reversed number: 76  
  
C:\Users\prodd\Desktop>|
```

4.Aim:check whether a number is palindrome or not.

Code:

```
import java.util.Scanner;

public class Main4 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

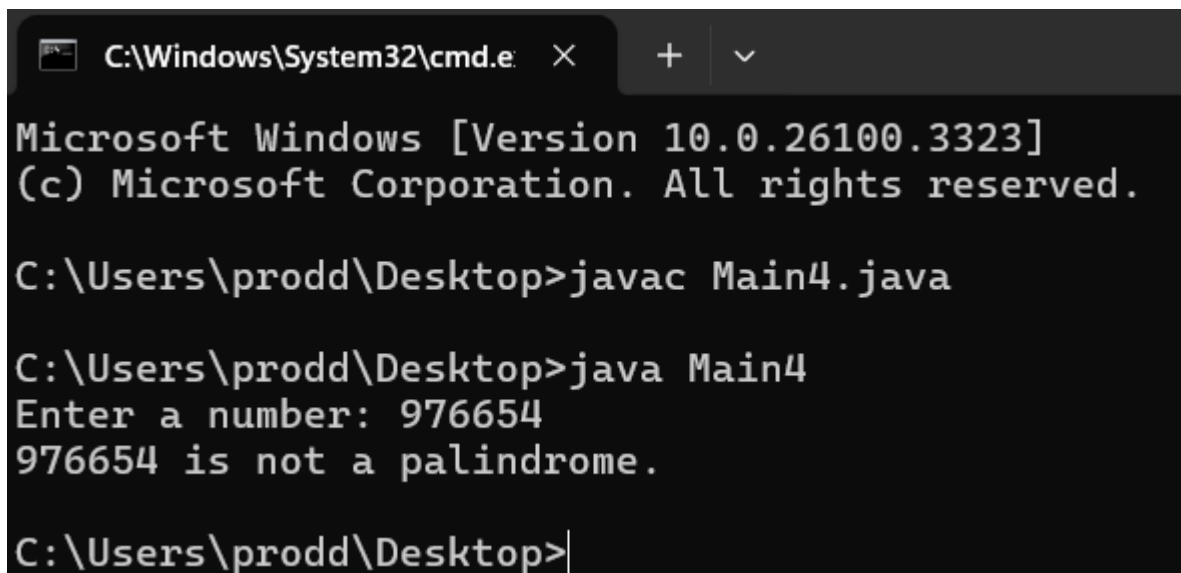
        System.out.print("Enter a number: ");
        int number = scanner.nextInt();
        int originalNumber = number;

        int reversed = 0;
        while (number != 0) {
            int digit = number % 10;
            reversed = reversed * 10 + digit;
            number /= 10;
        }

        if (originalNumber == reversed) {
            System.out.println(originalNumber + " is a
palindrome.");
        }
    }
}
```

```
    } else {  
        System.out.println(originalNumber + " is not a  
palindrome.");  
    }  
  
    scanner.close();  
}  
}
```

Output:



```
C:\Windows\System32\cmd.e  X  +  v  
Microsoft Windows [Version 10.0.26100.3323]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\prodd\Desktop>javac Main4.java  
  
C:\Users\prodd\Desktop>java Main4  
Enter a number: 976654  
976654 is not a palindrome.  
  
C:\Users\prodd\Desktop>|
```

5.Aim:Multiples of 2 upto 12.

Code:

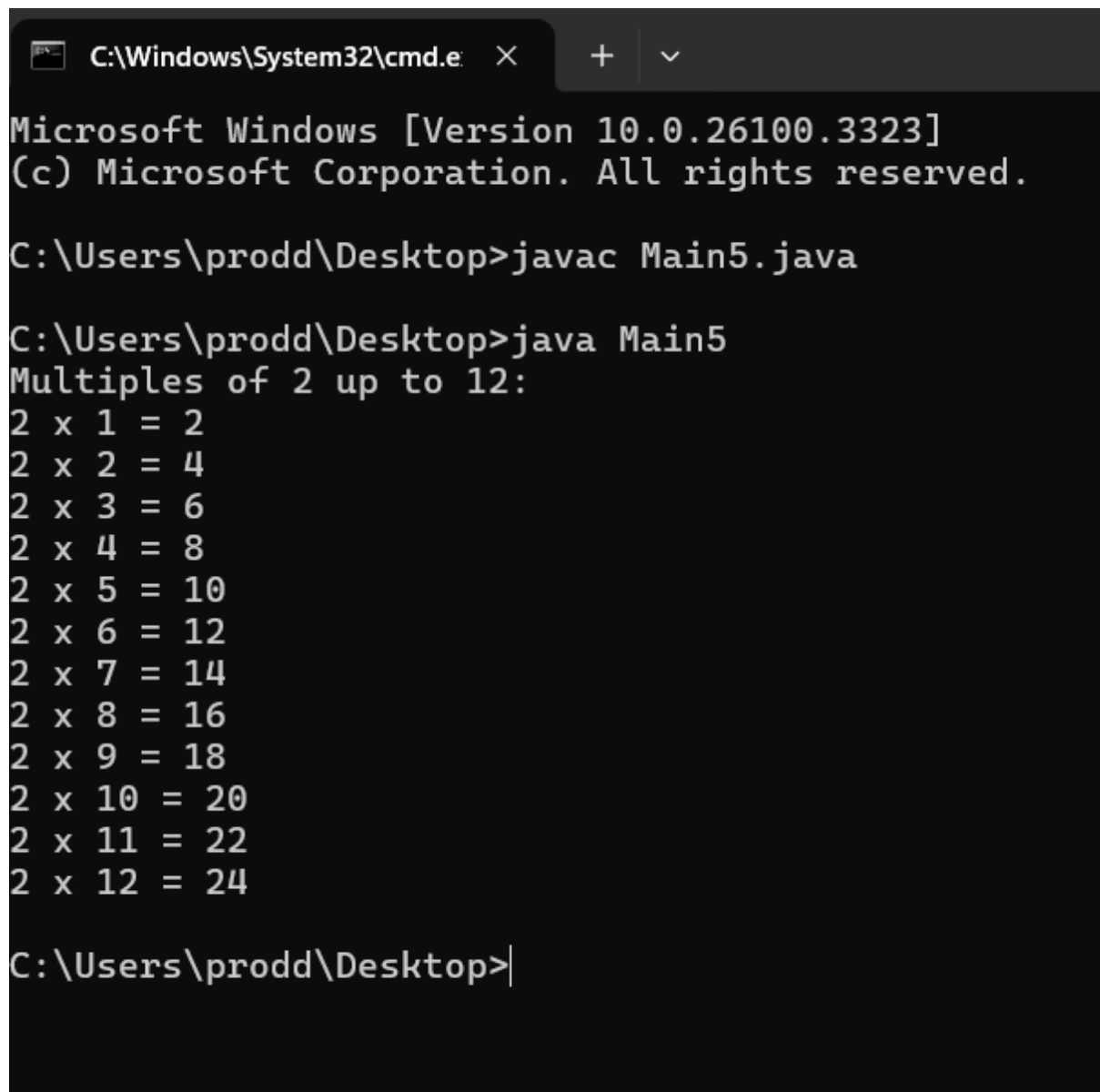
```
import java.util.Scanner;
```

```
public class Main5 {  
    public static void main(String[] args) {
```

```
System.out.println("Multiples of 2 up to 12:");

for (int i = 1; i <= 12; i++) {
    System.out.println("2 x " + i + " = " + (2 * i));
}
}
```

Output:



```
C:\Windows\System32\cmd.e  X + v
Microsoft Windows [Version 10.0.26100.3323]
(c) Microsoft Corporation. All rights reserved.

C:\Users\prodd\Desktop>javac Main5.java

C:\Users\prodd\Desktop>java Main5
Multiples of 2 up to 12:
2 x 1 = 2
2 x 2 = 4
2 x 3 = 6
2 x 4 = 8
2 x 5 = 10
2 x 6 = 12
2 x 7 = 14
2 x 8 = 16
2 x 9 = 18
2 x 10 = 20
2 x 11 = 22
2 x 12 = 24

C:\Users\prodd\Desktop>
```

6.Aim:Qudratic equation roots.

Code:

```
import java.util.Scanner;
```

```
public class Main6 {
```

```
    public static void main(String[] args) {
```

```
        Scanner scanner = new Scanner(System.in);
```

```
        System.out.print("Enter coefficient a: ");
```

```
        double a = scanner.nextDouble();
```

```
        System.out.print("Enter coefficient b: ");
```

```
        double b = scanner.nextDouble();
```

```
        System.out.print("Enter coefficient c: ");
```

```
        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 distinct: " +
root1 + " and " + root2);
    } else if (discriminant == 0) {
        double root = -b / (2 * a);
        System.out.println("Roots are real and equal: " + root);
    } else {
        double realPart = -b / (2 * a);
        double imaginaryPart = Math.sqrt(-discriminant) / (2 *
a);

        System.out.println("Roots are imaginary: " + realPart +
" ± " + imaginaryPart + "i");
    }

    scanner.close();
}
}

```

Output:

```
C:\Windows\System32\cmd.e  X  +  v

Microsoft Windows [Version 10.0.26100.3323]
(c) Microsoft Corporation. All rights reserved.

C:\Users\prodd\Desktop>javac Main6.java

C:\Users\prodd\Desktop>java Main6
Enter coefficient a:
4
Enter coefficient b: 5
Enter coefficient c: 3
Roots are imaginary: -0.625 ± 0.5994789404140899i

C:\Users\prodd\Desktop>
```

7.Aim: To Find Hypotenuse of a Triangle

Code:

```
import java.util.Scanner;
```

```
public class Main7
```

```
{
```

```
    public static void main(String[] args) {
```

```
        double x;
```

```
        double y;
```

```
        double z;
```



```

Scanner scanner = new Scanner(System.in);

System.out.println("Enter side x: ");
x = scanner.nextDouble();

System.out.println("Enter side y: ");
y = scanner.nextDouble();

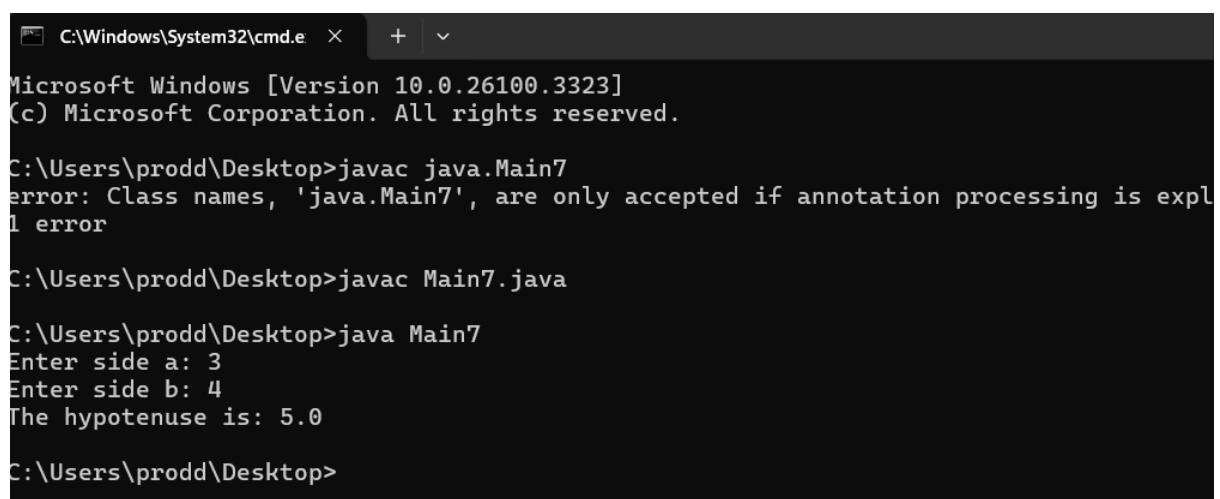
z = Math.sqrt((x*x)+(y*y));

System.out.println("The hypotenuse is: "+z);

scanner.close();
}
}

```

Output:



```

C:\Windows\System32\cmd.e
Microsoft Windows [Version 10.0.26100.3323]
(c) Microsoft Corporation. All rights reserved.

C:\Users\prodd\Desktop>javac java.Main7
error: Class names, 'java.Main7', are only accepted if annotation processing is enabled
1 error

C:\Users\prodd\Desktop>javac Main7.java

C:\Users\prodd\Desktop>java Main7
Enter side a: 3
Enter side b: 4
The hypotenuse is: 5.0

C:\Users\prodd\Desktop>

```

8.AIM:Square root of a number.

Code:

```
import java.util.Scanner;

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

        System.out.print("Enter a number: ");
        double number = scanner.nextDouble();

        if (number < 0) {
            System.out.println("Square root of a negative number
is not real.");
        } else {
            double squareRoot = Math.sqrt(number);
            System.out.println("The square root of " + number + "
is: " + squareRoot);
        }

        scanner.close();
    }
}
```

Output:

```
C:\Windows\System32\cmd.e  X  +  v

Microsoft Windows [Version 10.0.26100.3323]
(c) Microsoft Corporation. All rights reserved.

C:\Users\prodd\Desktop>javac Main8.java

C:\Users\prodd\Desktop>java Main8
Enter a number: 4
The square root of 4.0 is: 2.0

C:\Users\prodd\Desktop>|
```

9.Aim:Armstrong of a number.

Code:

```
import java.util.Scanner;
```

```
public class Main9 {
```

```
    public static boolean isArmstrong(int num) {
```

```
        int originalNum = num, sum = 0, digits = 0;
```

```
        int temp = num;
```

```
        while (temp > 0) {
```

```
            temp /= 10;
```

```
            digits++;
```

```
        }
```

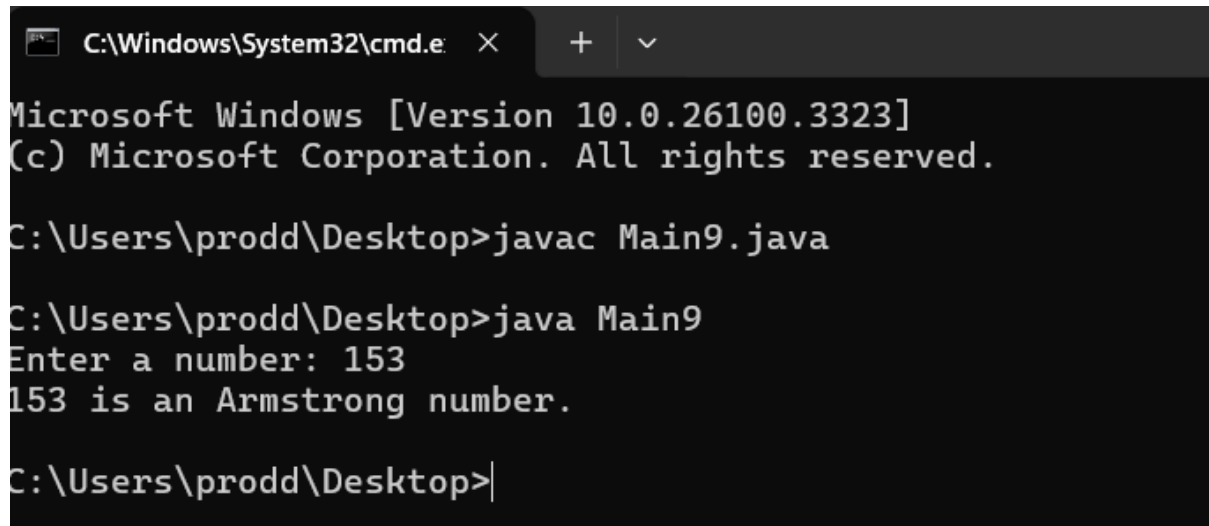
```
temp = num;
while (temp > 0) {
    int digit = temp % 10;
    sum += Math.pow(digit, digits);
    temp /= 10;
}
return sum == originalNum;
}
```

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

    if (isArmstrong(number)) {
        System.out.println(number + " is an Armstrong
number.");
    } else {
        System.out.println(number + " is not an Armstrong
number.");
    }
}
```

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

Output:



```
C:\Windows\System32\cmd.e  X  +  v  
Microsoft Windows [Version 10.0.26100.3323]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\prodd\Desktop>javac Main9.java  
  
C:\Users\prodd\Desktop>java Main9  
Enter a number: 153  
153 is an Armstrong number.  
  
C:\Users\prodd\Desktop>|
```

10.Aim:.. greastest of three numbers

Code:

```
import java.util.Scanner;
```

```
public class Main10 {
```

```
    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.print("Enter third number: ");
```

```
int c = scanner.nextInt();
```

```
int greatest;
```

```
if (a >= b && a >= c) {
```

```
    greatest = a;
```

```
} else if (b >= a && b >= c) {
```

```
    greatest = b;
```

```
} else {
```

```
    greatest = c;
```

```
}
```

```
System.out.println("The greatest number is: " + greatest);
```

```
scanner.close();
```

```
}
```

```
}
```

Output:

```
C:\Windows\System32\cmd.e  X  +  v

Microsoft Windows [Version 10.0.26100.3323]
(c) Microsoft Corporation. All rights reserved.

C:\Users\prodd\Desktop>javac Main10.java

C:\Users\prodd\Desktop>java Main10
Enter first number: 4
Enter second number: 7
Enter third number: 9
The greatest number is: 9

C:\Users\prodd\Desktop>|
```

INHERITANCE

4)

i) Students Details:

CODE:

```
class College {  
    String collegeName = "AMRITA";  
    String address = "CHENNAI, India";  
  
    void showCollegeDetails() {  
        System.out.println("College Name: " + collegeName);  
        System.out.println("Address: " + address);  
    }  
}  
  
class Student extends College {  
    String studentName;  
    int rollNumber;  
  
    Student(String studentName, int rollNumber) {  
        this.studentName = studentName;  
        this.rollNumber = rollNumber;  
    }  
  
    void showStudentDetails() {
```



```

        System.out.println("Student Name: " + studentName);
        System.out.println("Roll Number: " + rollNumber);
    }
}

public class SingleInheritanceExample1 {
    public static void main(String[] args) {
        Student s1 = new Student("Rahul", 101);
        s1.showCollegeDetails();
        s1.showStudentDetails();
    }
}

```

OUTPUT:

```

College Name: AMRITA
Address: CHENNAI, India
Student Name: Rahul
Roll Number: 101

```

ii)Bank Details

CODE:

```

class BankAccount {
    String accountHolder;
    double balance;

    BankAccount(String accountHolder, double balance) {
        this.accountHolder = accountHolder;
    }
}

```

```
        this.balance = balance;
    }

    void showBalance() {
        System.out.println("Account Holder: " + accountHolder);
        System.out.println("Balance: $" + balance);
    }
}

class SavingsAccount extends BankAccount {
    double interestRate = 5.0;

    SavingsAccount(String accountHolder, double balance) {
        super(accountHolder, balance);
    }

    void calculateInterest() {
        double interest = (balance * interestRate) / 100;
        System.out.println("Annual Interest: $" + interest);
    }
}

public class SingleInheritanceExample2 {
    public static void main(String[] args) {
```

```
SavingsAccount acc1 = new SavingsAccount("John Doe",  
5000);  
    acc1.showBalance();  
    acc1.calculateInterest();  
}  
}
```

MULTILEVEL INHERITANCE

5.

i)General Details

CODE:

```
class LivingBeing {  
    void breathe() {  
        System.out.println("Living beings breathe.");  
    }  
}  
  
class Human extends LivingBeing {  
    void speak() {  
        System.out.println("Humans can speak.");  
    }  
}  
  
class Student extends Human {
```

```
String name;
int studentID;

Student(String name, int studentID) {
    this.name = name;
    this.studentID = studentID;
}

void study() {
    System.out.println(name + " is studying.");
}

void showDetails() {
    System.out.println("Student Name: " + name);
    System.out.println("Student ID: " + studentID);
}
}

public class MultilevelExample1 {
    public static void main(String[] args) {
        Student s1 = new Student("Rahul", 101);
        s1.breathe();
        s1.speak();
        s1.study();
    }
}
```

```
s1.showDetails();  
}  
}
```

OUTPUT:

```
Living beings breathe.  
Humans can speak.  
Rahul is studying.  
Student Name: Rahul  
Student ID: 101
```

ii)Employee

CODE:

```
class Person {  
    String name;  
    Person(String name) {  
        this.name = name;  
    }  
    void showPerson() {  
        System.out.println("Person Name: " + name);  
    }  
}  
  
class Employee extends Person {  
    int employeeID;
```

```
double salary;
Employee(String name, int employeeID, double salary) {
    super(name);
    this.employeeID = employeeID;
    this.salary = salary;
}
void showEmployee() {
    System.out.println("Employee ID: " + employeeID);
    System.out.println("Salary: $" + salary);
}
}
class Manager extends Employee {
    String department;
    Manager(String name, int employeeID, double salary, String
department) {
        super(name, employeeID, salary);
        this.department = department;
    }
    void showManager() {
        System.out.println("Department: " + department);
        System.out.println("Role: Manager");
    }
}
```

```

public class MultilevelExample2 {
    public static void main(String[] args) {
        Manager m1 = new Manager("Alice", 2001, 75000, "HR");
        m1.showPerson();
        m1.showEmployee();
        m1.showManager();
    }
}

```

OUTPUT:

```

Person Name: Alice
Employee ID: 2001
Salary: $75000.0
Department: HR
Role: Manager

```

HIERARCHICAL INHERITANCE PROGRAMS

6.

i)Code:

```

class Vehicle {
    private String brand;
    private String model;
    public Vehicle(String brand, String model) {
        this.brand = brand;
        this.model = model;
    }
    public void start() {
        System.out.println("Vehicle is starting.");
    }
}

```

```

    }
    public void stop() {
        System.out.println("Vehicle is stopping.");
    }
    public String getBrand() {
        return brand;
    }
    public String getModel() {
        return model;
    }
}
class Car extends Vehicle {
    private int numberOfDoors ;
    public Car(String brand, String model, int
numberOfDoors) {
        super(brand, model);
        this.numberOfDoors = numberOfDoors;
    }
    public void drive() {
        System.out.println("Car is driving.");
    }
    public int getNumberOfDoors() {
        return numberOfDoors;
    }
}
class ElectricCar extends Car {
    private int batteryCapacity;
    public ElectricCar(String brand, String model, int
numberOfDoors, int batteryCapacity) {
        super(brand, model, numberOfDoors);
        this.batteryCapacity = batteryCapacity;
    }
    public void charge() {

```



```

        System.out.println("Electric car is charging.");
    }
    public int getBatteryCapacity() {
        return batteryCapacity;
    }
}
class Truck extends Vehicle {
    private double cargoCapacity;
    public Truck(String brand, String model, double
cargoCapacity) {
        super(brand, model);
        this.cargoCapacity = cargoCapacity;
    }
    public void loadCargo() {
        System.out.println("Truck is loading cargo.");
    }
    public double getCargoCapacity() {
        return cargoCapacity;
    }
}
public class Main {
    public static void main(String[] args) {
        Car car = new Car("Toyota", "Corolla", 4);
        car.start();
        car.drive();
        car.stop();
        System.out.println("Car doors: " +
car.getNumberOfDoors());
        ElectricCar electricCar = new ElectricCar("Tesla",
"Model S", 4, 100);
        electricCar.start();
        electricCar.drive();
        electricCar.charge();
    }
}

```

```
        System.out.println("Battery capacity: " +  
electricCar.getBatteryCapacity());  
        Truck truck = new Truck("Ford", "F-150", 2000.5);  
        truck.start();  
        truck.loadCargo();  
        truck.stop();  
        System.out.println("Cargo capacity: " +  
truck.getCargoCapacity());  
    }  
}
```

OUTPUT:

```
Vehicle is starting.  
Car is driving.  
Vehicle is stopping.  
Car doors: 4  
Vehicle is starting.  
Car is driving.  
Electric car is charging.  
Battery capacity: 100  
Vehicle is starting.  
Truck is loading cargo.  
Vehicle is stopping.  
Cargo capacity: 2000.5
```

ii)

Code:

```
class Person {  
    private String name;  
    private int age;  
  
    public Person(String name, int age) {  
        this.name = name;  
        this.age = age;  
    }  
  
    public void displayDetails() {  
        System.out.println("Name: " + name + ", Age: " + age);  
    }  
}  
  
class Student extends Person {  
    private int studentId;  
    private String major;  
    public Student(String name, int age, int studentId, String  
major) {  
        super(name, age);  
        this.studentId = studentId;
```

```
        this.major = major;
    }

    public void study() {
        System.out.println("Student is studying " + major);
    }

    public void displayDetails() {
        super.displayDetails();

        System.out.println("Student ID: " + studentId + ", Major: " + major);
    }
}

class Professor extends Person {
    private String department;
    private String researchArea;

    public Professor(String name, int age, String department, String researchArea) {
        super(name, age);
        this.department = department;
        this.researchArea = researchArea;
    }

    public void teach() {
        System.out.println("Professor is teaching in " + department);
    }
}
```

```
public void displayDetails() {  
    super.displayDetails();  
    System.out.println("Department: " + department + ",  
Research Area: " + researchArea);  
}  
}  
  
class TeachingAssistant extends Student {  
    private String course;  
  
    public TeachingAssistant(String name, int age, int studentId,  
String major, String course) {  
        super(name, age, studentId, major);  
        this.course = course;  
    }  
  
    public void assist() {  
        System.out.println("Teaching assistant is assisting in " +  
course);  
    }  
  
    public void displayDetails() {  
        super.displayDetails();  
        System.out.println("Course: " + course);  
    }  
}  
  
public class Main2 {
```

```
public static void main(String[] args) {  
    Student student = new Student("Alice", 20, 101,  
    "Computer Science");  
    student.displayDetails();  
    student.study();  
    Professor professor = new Professor("Dr. Smith", 45,  
    "Computer Science", "AI");  
    professor.displayDetails();  
    professor.teach();  
    TeachingAssistant ta = new TeachingAssistant("Bob", 25,  
    102, "Mathematics", "Calculus");  
    ta.displayDetails();  
    ta.study();  
    ta.assist();  
}  
}
```

OUTPUT:

```
Name: Alice, Age: 20  
Student ID: 101, Major: Computer Science  
Student is studying Computer Science  
Name: Dr. Smith, Age: 45  
Department: Computer Science, Research Area: AI  
Professor is teaching in Computer Science  
Name: Bob, Age: 25  
Student ID: 102, Major: Mathematics  
Course: Calculus  
Student is studying Mathematics  
Teaching assistant is assisting in Calculus
```

HYBRID INHERITANCE PROGRAMS

7.

i)

CODE:

```
class Person {  
    String name;  
  
    Person(String name) {  
        this.name = name;  
    }  
}
```

```
void showDetails() {  
    System.out.println("Name: " + name);  
}  
}  
class Student extends Person {  
    int studentID;  
  
    Student(String name, int studentID) {  
        super(name);  
        this.studentID = studentID;  
    }  
  
    void study() {  
        System.out.println(name + " is studying.");  
    }  
}  
class Teacher extends Person {  
    String subject;  
  
    Teacher(String name, String subject) {  
        super(name);  
        this.subject = subject;  
    }  
}
```



```

    }

    void teach() {
        System.out.println(name + " is teaching " + subject + ".");
    }
}

interface Assistant {
    void assist();
}

class TeachingAssistant extends Student implements Assistant
{
    TeachingAssistant(String name, int studentID) {
        super(name, studentID);
    }

    public void assist() {
        System.out.println(name + " is assisting in a lab
session.");
    }
}

public class HybridInheritanceExample1 {
    public static void main(String[] args) {
        TeachingAssistant ta = new TeachingAssistant("Alex",
101);

```

```
        ta.showDetails();  
        ta.study();  
        ta.assist();  
    }  
}
```

OUTPUT:

```
Name: Alex  
Alex is studying.  
Alex is assisting in a lab session.
```

ii)

CODE:

```
class Vehicle {  
    void startEngine() {  
        System.out.println("Vehicle engine started.");  
    }  
}  
  
class Car extends Vehicle {
```

```
void drive() {  
    System.out.println("Car is driving.");  
}  
  
class Boat extends Vehicle {  
    void sail() {  
        System.out.println("Boat is sailing.");  
    }  
}  
  
interface Amphibious {  
    void switchMode();  
}  
  
class AmphibiousCar extends Car implements Amphibious {  
    public void switchMode() {  
        System.out.println("Switching between land and water  
mode.");  
    }  
  
    void sail() {  
        System.out.println("Amphibious car is sailing on water.");  
    }  
}  
  
public class HybridInheritanceExample2 {
```

```
public static void main(String[] args) {  
    AmphibiousCar ac = new AmphibiousCar();  
    ac.startEngine();  
    ac.drive();  
    ac.switchMode();  
    ac.sail();  
}  
}
```

OUTPUT:

```
Vehicle engine started.  
Car is driving.  
Switching between land and water mode.  
Amphibious car is sailing on water.
```

POLYMORPHISM

CONSTRUCTOR PROGRAMS

8

i)

CODE:

```
class Book {
    String title;
    int pages;
    Book(String t, int p) {
        title = t;
        pages = p;
    }
    Book(Book b) {
        title = b.title;
        pages = b.pages;
    }
    void display() {
        System.out.println("Book: " + title + ", Pages: " + pages);
    }
}

public class ConstructorExample {
    public static void main(String[] args) {
        Book b1 = new Book("Java Programming", 500);
        Book b2 = new Book(b1);
        b1.display();
    }
}
```

```
        b2.display();  
    }  
}
```

OUTPUT:

```
Book: Java Programming, Pages: 500  
Book: Java Programming, Pages: 500
```

CONSTRUCTOR OVERLOADING PROGRAMS

9.

i)

CODE:

```
class Employee {  
    String name;  
    int age;  
    double salary;  
  
    Employee() {  
        name = "Unknown";  
        age = 18;  
        salary = 30000;  
    }  
  
    Employee(String n, int a) {  
        name = n;  
        age = a;  
        salary = 40000;  
    }  
  
    Employee(String n, int a, double s) {  
        name = n;  
        age = a;  
        salary = s;  
    }  
}
```

```
void display() {  
    System.out.println("Name: " + name + ", Age: " + age + ",  
Salary: $" + salary);  
}  
}
```

```
public class ConstructorOverloadingExample {  
    public static void main(String[] args) {  
        Employee e1 = new Employee();  
        Employee e2 = new Employee("John", 25);  
        Employee e3 = new Employee("Alice", 30, 60000);  
  
        e1.display();  
        e2.display();  
        e3.display();  
    }  
}
```

OUTPUT:

```
Name: Unknown, Age: 18, Salary: $30000.0  
Name: John, Age: 25, Salary: $40000.0  
Name: Alice, Age: 30, Salary: $60000.0
```

METHOD OVERLOADING PROGRAMS

10.

i)

CODE:

```
class Employee {  
    private String name;  
    private int id;  
    private double salary;  
    void setDetails(String name, int id) {  
        this.name = name;  
        this.id = id;  
    }  
    void setDetails(String name, int id, double salary) {  
        this.name = name;  
        this.id = id;  
        this.salary = salary;  
    }  
    void setDetails(String name) {  
        this.name = name;  
    }  
    void displayDetails() {  
        System.out.println("Name: " + name + ", ID: " + id + ",  
Salary: " + salary);  
    }  
}
```

```
public class Main {  
    public static void main(String[] args) {  
        Employee emp1 = new Employee();  
        emp1.setDetails("Alice", 101); // Calls first method  
        emp1.displayDetails();  
        Employee emp2 = new Employee();  
        emp2.setDetails("Bob", 102, 50000.0); // Calls second  
method  
        emp2.displayDetails();  
        Employee emp3 = new Employee();  
        emp3.setDetails("Charlie"); // Calls third method  
        emp3.displayDetails();  
    }  
}
```

OUTPUT:

```
Name: Alice, ID: 101, Salary: 0.0  
Name: Bob, ID: 102, Salary: 50000.0  
Name: Charlie, ID: 0, Salary: 0.0
```

ii)

CODE:

```
class Shape {
```

```
void draw(double radius) {  
    System.out.println("Drawing a circle with radius: " +  
radius);  
}  
  
void draw(double length, double width) {  
    System.out.println("Drawing a rectangle with length: " +  
length + " and width: " + width);  
}  
  
void draw(double side1, double side2, double side3) {  
    System.out.println("Drawing a triangle with sides: " +  
side1 + ", " + side2 + ", " + side3);  
}  
}  
  
public class Main2{  
    public static void main(String[] args) {  
        Shape shape = new Shape();  
        shape.draw(5.0);  
        shape.draw(4.0, 6.0);  
        shape.draw(3.0, 4.0, 5.0);    }  
}
```

OUTPUT:

```
Drawing a circle with radius: 5.0  
Drawing a rectangle with length: 4.0 and width: 6.0  
Drawing a triangle with sides: 3.0, 4.0, 5.0
```

METHOD OVERRIDING PROGRAMS

11

i)

CODE:

```
class Vehicle {  
    void speed() {  
        System.out.println("Vehicle is moving");  
    }  
}  
  
class Car extends Vehicle {  
    void speed() {  
        System.out.println("Car moves at 80 km/h");  
    }  
}  
  
class Bike extends Vehicle {  
    void speed() {  
        System.out.println("Bike moves at 60 km/h");  
    }  
}  
  
public class Main {  
    public static void main(String[] args) {  
        Vehicle v;  
        v = new Car();  
        v.speed();  
        v = new Bike();
```

```
        v.speed();  
    }  
}
```

OUTPUT:

```
Car moves at 80 km/h  
Bike moves at 60 km/h
```

ii)

CODE:

```
class Bank {  
    double getInterestRate() {  
        return 0;  
    }  
}
```

```
class SBI extends Bank {  
    double getInterestRate() {  
        return 5.5;  
    }  
}
```

```
class ICICI extends Bank {  
    double getInterestRate() {  
        return 6.7;  
    }  
}
```

```
class HDFC extends Bank {  
    double getInterestRate() {  
        return 7.2;  
    }  
}
```

```
public class Main2 {  
    public static void main(String[] args) {  
        Bank b;  
  
        b = new SBI();  
        System.out.println("SBI Interest Rate: " +  
b.getInterestRate() + "%");  
  
        b = new ICICI();  
        System.out.println("ICICI Interest Rate: " +  
b.getInterestRate() + "%");  
  
        b = new HDFC();  
        System.out.println("HDFC Interest Rate: " +  
b.getInterestRate() + "%");  
    }  
}
```

OUTPUT:

```
SBI Interest Rate: 5.5%  
ICICI Interest Rate: 6.7%  
HDFC Interest Rate: 7.2%
```

INTERFACE PROGRAMS

12

i)

CODE:

```
interface Shape{
void getArea();
}

class Rectangle implements Shape{
    double lenght,breadth;

    Rectangle(double lenght, double breadth) {
        this.lenght = lenght;
        this.breadth = breadth;
    }

    public void getArea(){
        System.out.println("The area of rectangle
"+(lenght*breadth));
    }
}

class Circle implements Shape{
    double radius;

    Circle(double radius){
        this.radius=radius;
```

```

    }

    public void getArea(){

        System.out.println("The are of circle is
        "+(3.14*(radius*radius)));

    }
}

public class Infferface1 {

    public static void main(String[] args) {

        Rectangle r1=new Rectangle(12, 12);

        r1.getArea();

        Circle c1=new Circle(4);

        c1.getArea();

    }

}

```

OUTPUT:

```

The area of rectangle 144.0
The are of circle is 50.24

```


ii)

CODE:

```
interface Camara{
    void takePhoto();
}

interface MusicPlayer{
    void canPlayMusic();
}

class SmartPhone implements Camara,MusicPlayer{
    public void takePhoto(){
        System.out.println("SmartPhone can take photo");
    }
    public void canPlayMusic(){
        System.out.println("SmartPhone can play music");
    }
}

public class Infferface2 {
    public static void main(String[] args) {
        SmartPhone s1=new SmartPhone();
        s1.canPlayMusic();
        s1.takePhoto();
    }
}
```

OUTPUT:

```
SmartPhone can play music  
SmartPhone can take photo
```

iii)

CODE:

```
interface Payment {
```

```
    void initiatePayment(double amount);
```

```
    void getPaymentStatus();
```

```
}
```

```
class CreditCard implements Payment {
```

```
    public void initiatePayment(double amount) {
```

```
        System.out.println("Processing Credit Card payment of $"  
+ amount);
```

```
    }
```

```
    public void getPaymentStatus() {
```

```
        System.out.println("Credit Card payment successful!");
```

```
    }
```

```
}
```

```
class PayPal implements Payment {  
    public void initiatePayment(double amount) {  
        System.out.println("Processing PayPal payment of $" +  
amount);  
    }  
  
    public void getPaymentStatus() {  
        System.out.println("PayPal payment successful!");  
    }  
}  
  
public class Infferface3 {  
    public static void main(String[] args) {  
        Payment creditCardPayment = new CreditCard();  
        Payment paypalPayment = new PayPal();  
  
        creditCardPayment.initiatePayment(50.0);  
        creditCardPayment.getPaymentStatus();  
  
        paypalPayment.initiatePayment(30.0);  
        paypalPayment.getPaymentStatus();  
    }  
}
```

```
}
```

OUTPUT:

```
Processing Credit Card payment of $50.0  
Credit Card payment successful!  
Processing PayPal payment of $30.0  
PayPal payment successful!
```

iv)

CODE:

```
interface Vehicle{  
    void start();  
    void stop();  
}  
  
interface ElectricVehicle{  
    void chargeBattery();  
}  
  
interface FuelVehicle{  
    void refuel();  
}  
  
class HybridCar implements  
Vehicle,ElectricVehicle,FuelVehicle{  
    public void start(){  
        System.out.println("Vehicle Started ");  
    }  
}
```

```
public void stop(){
    System.out.println("Vehicle Stopped ");
}

public void chargeBattery(){
    System.out.println("Vehicle charging battery ");
}

public void refuel(){
    System.out.println("Vehicle refilling the fuel tank ");
}

}

public class Infferface4 {
    public static void main(String[] args) {
        HybridCar v1=new HybridCar();
        v1.chargeBattery();
        v1.start();
        v1.stop();
        v1.refuel();
    }
}
```

OUTPUT:

```
Vehicle charging battery  
Vehicle Started  
Vehicle Stopped  
Vehicle refilling the fuel tank
```

ABSTRACT CLASS PROGRAMS

13

i)

Code:

```
public class Main{  
    public static void main(String[] args){  
        Car c1=new Lam();  
        c1.carName("lambogini");  
        c1.carSpeed(122,"lambogini");  
    }  
}
```

```
abstract class Car{  
    abstract void carName(String name);  
  
    abstract void carSpeed(int speed,String name);  
  
    abstract void Mileage(int fuel,double mileage);  
  
}
```

```
class Lam extends Car{
```

```

void carName(String name){
    System.out.println("Your Car name is "+name);
}

void carSpeed(int speed,String name){
    System.out.println(name+" can travel at the speed of "+speed+" km/h");
}

void Mileage(int fuel,double mileage){
    System.out.println("lam "+"can travel range of "+(fuel*mileage));
}

}

```

Output:

```

Your Car name is lambogini
lambogini can travel at the speed of 122 km/h

```

ii)

Code:

```

abstract class Vehicle{
    abstract void start(String name);

    abstract void stop(String name);

}

```

```
class Car extends Vehicle{
void start(String name){
System.out.println( name+" is Starting");
}
void stop(String name){
System.out.println(name+" is stopping");
}
}

class Bike extends Vehicle{
void start(String name){
System.out.println( name+" is Starting");
}
void stop(String name){
System.out.println(name+" is stopping");
}
}

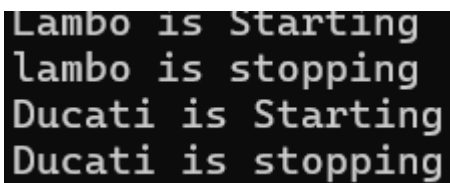
public class Main2{
public static void main(String[] args){
Car v1=new Car();

v1.start("Lambo");
v1.stop("lambo");
```



```
Bike v2=new Bike();  
v2.start("Ducati");  
v2.stop("Ducati");  
}  
}
```

Output:



```
Lambo is Starting  
lambo is stopping  
Ducati is Starting  
Ducati is stopping
```

iii)

Code:

```
abstract class Shape {  
    // Abstract method to calculate the area  
    abstract double calculateArea();  
}  
  
class Square extends Shape {  
    private double side;  
  
    public Square(double side) {  
        this.side = side;
```

```

    }

    @Override
    double calculateArea() {
        return side * side; // Area of square: side2
    }
}

public class Main3 {
    public static void main(String[] args) {
        Shape square = new Square(4.0);
        System.out.println("Area of the square: " +
            square.calculateArea());
    }
}

```

Output:

```
Area of the square: 16.0
```

iv)

Code:

```

abstract class Shape2D{
    abstract void draw();
    abstract void resize();
}

```

```
class Rectangle extends Shape2D{
void draw(){
System.out.println("you are Drawing Rectangle");
}
void resize(){
System.out.println("you can resize the lenght and breadth of
rectangle");
}
}

class Circle extends Shape2D{
void draw(){
System.out.println("you are Drawing Circle");
}
void resize(){
System.out.println("you can resize the Radius of circle ");
}
}

public class Main4{
public static void main(String[] args){
Shape2D s1=new Rectangle();
s1.draw();
s1.resize();
}
```

```
Shape2D s2=new Circle();  
s2.draw();  
s2.resize();  
  
}  
}
```

Output:

```
you are Drawing Rectangle  
you can resize the lenght and breadth of rectangle  
you are Drawing Circle  
you can resize the Radius of circle
```

ENCAPSULATION PROGRAMS

14

i)

Code:

```
class Patient {  
    private String name;  
    private double weight; // in kg  
    private double height; // in meters  
  
    public void setName(String name) {  
        this.name = name;  
    }  
}
```

```
}
```

```
public void setWeight(double weight) {  
    this.weight = weight;  
}
```

```
public void setHeight(double height) {  
    this.height = height;  
}
```

```
public String getName() {  
    return name;  
}
```

```
public double calculateBMI() {  
    return weight / (height * height);  
}
```

```
public String getHealthStatus() {  
    double bmi = calculateBMI();  
    if (bmi < 18.5) return "Underweight";  
    else if (bmi < 24.9) return "Normal weight";  
    else if (bmi < 29.9) return "Overweight";
```

```
        else return "Obese";
    }
}

public class PatientTest {
    public static void main(String[] args) {
        Patient p = new Patient();
        p.setName("John Doe");
        p.setWeight(70);
        p.setHeight(1.75);
        System.out.println("Patient: " + p.getName());
        System.out.println("BMI: " + p.calculateBMI());
        System.out.println("Health Status: " +
p.getHealthStatus());
    }
}
```

OUTPUT:

```
PS D:\Dhaksin\OOP\java oops\Encapsulation> javac PatientTest.java
PS D:\Dhaksin\OOP\java oops\Encapsulation> java PatientTest
Patient: John Doe
BMI: 22.857142857142858
Health Status: Normal weight
PS D:\Dhaksin\OOP\java oops\Encapsulation> |
```

ii)

Code:

```
class Product {  
    private String productName;  
    private double price;  
    private int stock;  
  
    public void setProductName(String productName) {  
        this.productName = productName;  
    }  
  
    public void setPrice(double price) {  
        this.price = price > 0 ? price : 0;  
    }  
  
    public void setStock(int stock) {  
        this.stock = stock >= 0 ? stock : 0;  
    }  
}
```

```
public String getProductName() {  
    return productName;  
}
```

```
public double getPrice() {  
    return price;  
}
```

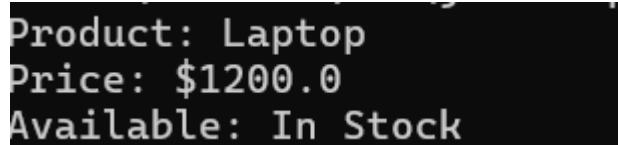
```
public boolean isAvailable() {  
    return stock > 0;  
}  
}
```

```
public class ProductTest {  
    public static void main(String[] args) {  
        Product product = new Product();  
        product.setProductName("Laptop");  
        product.setPrice(1200);  
        product.setStock(5);  
  
        System.out.println("Product: " +  
product.getProductName());  
        System.out.println("Price: $" + product.getPrice());  
    }  
}
```



```
        System.out.println("Available: " + (product.isAvailable() ?  
"In Stock" : "Out of Stock"));  
    }  
}
```

OUTPUT:



```
Product: Laptop  
Price: $1200.0  
Available: In Stock
```

iii)

Code:

```
class House {  
    private String location;  
    private double area; // in square meters  
    private double pricePerSquareMeter;  
  
    public void setLocation(String location) {  
        this.location = location;  
    }  
  
    public void setArea(double area) {  
        this.area = area > 0 ? area : 0;  
    }  
}
```

```
public void setPricePerSquareMeter(double price) {  
    this.pricePerSquareMeter = price > 0 ? price : 0;  
}  
  
public String getLocation() {  
    return location;  
}  
  
public double getTotalPrice() {  
    return area * pricePerSquareMeter;  
}  
}  
  
public class HouseTest {  
    public static void main(String[] args) {  
        House house = new House();  
        house.setLocation("Downtown");  
        house.setArea(200);  
        house.setPricePerSquareMeter(1500);  
        System.out.println("House Location: " +  
house.getLocation());  
        System.out.println("Total Price: $" +  
house.getTotalPrice());  
    }  
}
```

```
}
```

OUTPUT:

```
House Location: Downtown  
Total Price: $300000.0
```

iv)

Code:

```
class GameCharacter {  
    private String name;  
    private int level;  
    private int strength;  
    private int intelligence;  
    public void setName(String name) {  
        this.name = name;  
    }  
    public void setLevel(int level) {  
        this.level = Math.max(level, 1);  
    }  
    public void setStrength(int strength) {  
        this.strength = Math.max(strength, 1);  
    }  
}
```

```
public void setIntelligence(int intelligence) {
    this.intelligence = Math.max(intelligence, 1);
}

public String getName() {
    return name;
}

public int getPowerLevel() {
    return (strength * 2 + intelligence * 3) * level;
}
}

public class GameTest {
    public static void main(String[] args) {
        GameCharacter hero = new GameCharacter();
        hero.setName("Ketta Paiyyan");
        hero.setLevel(10);
        hero.setStrength(20);
        hero.setIntelligence(15);
        System.out.println("Hero: " + hero.getName());
        System.out.println("Power Level: " +
hero.getPowerLevel());
    }
}
```

OUTPUT:

```
Hero: Ketta Paiyyan  
Power Level: 850
```

PACKAGES PROGRAMS

15

i)

code:

```
import java.awt.*;
```

```
import java.awt.event.*;
```

```
public class SimpleAWTApp {
```

```
    SimpleAWTApp() {
```

```
        Frame frame = new Frame("AWT Example");
```

```
        Button button = new Button("Click Me!");
```

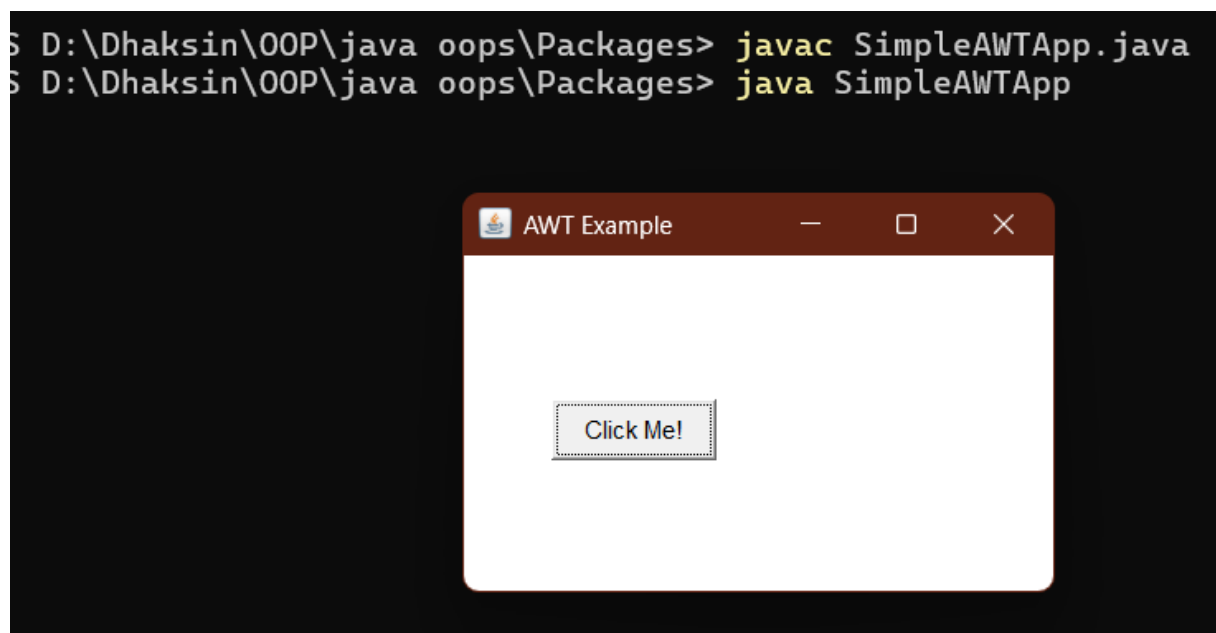
```
        button.setBounds(50, 100, 80, 30);
```

```
        frame.add(button);
```

```
        frame.setSize(300, 200);
```

```
frame.setLayout(null);  
frame.setVisible(true);  
  
frame.addWindowListener(new WindowAdapter() {  
    public void windowClosing(WindowEvent e) {  
        frame.dispose();  
    }  
});  
}  
  
public static void main(String[] args) {  
    new SimpleAWTApp();  
}  
}
```

output:



ii)

code:

```
#package  
package mypackage;  
  
public class basiccalc {  
    public int add(int a, int b) {  
        return a + b;  
    }  
    public int sub(int a, int b) {  
        return a - b;  
    }  
    public int mul(int a, int b) {  
        return a * b;  
    }  
    public int div(int a, int b) {
```

```

        if (b == 0) {
            System.out.println("Denominator with 0 is not defined
or infinite");
            return 0;
        }
        else {
            return a / b;
        }
    }
}

import mypackage.basicalc;

public class calc {
    public static void main(String[] args) {
        basicalc c1=new basicalc();

        System.out.println("the sum is"+c1.add(2,3));
    }
}

```

output:

```

PS D:\Dhaksin\00P\java oops\Packages> javac -d . mypackage/basicalc.java
PS D:\Dhaksin\00P\java oops\Packages> javac calc.java
PS D:\Dhaksin\00P\java oops\Packages> java calc
the sum is5

```


iii)

code:

```
#package  
package mypackage;  
public class geometry {  
  
    public double areaRectangle(double lenght,double breath){  
        return lenght*breath;  
    }  
    public double areaCircle(double radius){  
        return 3.14*(radius*radius);  
    }  
    public double areaTriangle(double lenght,double height){  
        return 0.5*(lenght+height);  
    }  
}
```

```
import java.lang.*;  
import java.util.Scanner;  
import mypackage.geometry;  
public class geometrycal {  
    public static void main(String[] args) {  
        Scanner input=new Scanner(System.in);
```

```
    geometry a1=new geometry();  
    System.out.println("Enter the lenght of Rectangle");  
    double lenght=input.nextDouble();  
    System.out.println("Enter the Breath of Rectangle");  
    double breath=input.nextDouble();  
    System.out.println("Area of Rectangle");  
    System.out.println(a1.areaRectangle(lenght, breath));  
    System.out.println("Enter the radius of Circle");  
    double radius=input.nextDouble();  
    System.out.println("Area of Circle");  
    System.out.println(a1.areaCircle(radius));  
    System.out.println("Enter lenght of triangle");  
    double tlenght=input.nextDouble();  
    System.out.println("Enter height of triangle");  
    double height=input.nextDouble();  
    System.out.println("Area of Triangle");  
    System.out.println(a1.areaTriangle(tlenght, height));  
}  
}
```

output:

```
Enter the lenght of Rectangle
5
Enter the Breath of Rectangle
3
Area of Rectangle
15.0
Enter the radius of Circle
3
Area of Circle
28.26
Enter lenght of triangle
3
Enter height of triangle
3
Area of Triangle
3.0
```

iv)

code:

```
import java.util.*;
```

```
import java.time.*;
```

```
import java.io.*;
```

```
public class EmployeePayroll {
```

```
    public static void main(String[] args) {
```

```
        Scanner scanner = new Scanner(System.in);
```

```
        try {
```

```
            System.out.print("Enter number of employees: ");
```

```
            int numEmployees = scanner.nextInt();
```

```
            scanner.nextLine();
```

```
ArrayList<Employee> employees = new ArrayList<>();

for (int i = 0; i < numEmployees; i++) {
    System.out.println("\nEmployee " + (i + 1) + ":");

    System.out.print("Enter name: ");
    String name = scanner.nextLine();

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

    System.out.print("Enter joining year: ");
    int joiningYear = scanner.nextInt();
    scanner.nextLine();

    employees.add(new Employee(name, salary,
    joiningYear));
}

FileWriter writer = new
FileWriter("EmployeePayroll.txt");
```

```
System.out.println("\n--- Employee Payroll ---");
writer.write("--- Employee Payroll ---\n");

for (Employee emp : employees) {
    emp.calculateBonus();
    emp.displayDetails();
    writer.write(emp.getDetailsForFile());
}

writer.close();

System.out.println("\nPayroll saved to
'EmployeePayroll.txt'");

} catch (IOException e) {
    System.out.println("An error occurred while writing to
the file.");
} catch (InputMismatchException e) {
    System.out.println("Invalid input. Please enter
numbers correctly.");
}

scanner.close();
}
}
```

```
class Employee {  
    private String name;  
    private double salary;  
    private int joiningYear;  
    private double bonus;  
  
    public Employee(String name, double salary, int  
joiningYear) {  
        this.name = name;  
        this.salary = salary;  
        this.joiningYear = joiningYear;  
    }  
  
    public void calculateBonus() {  
        int currentYear = LocalDate.now().getYear();  
        int yearsWorked = currentYear - joiningYear;  
  
        if (yearsWorked >= 5) {  
            bonus = salary * 0.1;  
        } else {  
            bonus = salary * 0.05;  
        }  
    }  
}
```

```
}
```

```
public void displayDetails() {  
    System.out.println("Employee: " + name);  
    System.out.println("Salary: ₹" + salary);  
    System.out.println("Joining Year: " + joiningYear);  
    System.out.println("Bonus: ₹" + bonus);  
    System.out.println("Total Salary: ₹" + (salary + bonus));  
    System.out.println();  
}
```

```
public String getDetailsForFile() {  
    return "Employee: " + name + "\n" +  
        "Salary: ₹" + salary + "\n" +  
        "Joining Year: " + joiningYear + "\n" +  
        "Bonus: ₹" + bonus + "\n" +  
        "Total Salary: ₹" + (salary + bonus) + "\n\n";  
}  
}
```

output:

```
Employee 1:
Enter name: dhaksin
Enter salary: 1200000
Enter joining year: 2023

Employee 2:
Enter name: jyoo
Enter salary: 1200400
Enter joining year: 2024

--- Employee Payroll ---
Employee: dhaksin
Salary: ?1200000.0
Joining Year: 2023
Bonus: ?60000.0
Total Salary: ?1260000.0

Employee: jyoo
Salary: ?1200400.0
Joining Year: 2024
Bonus: ?60020.0
Total Salary: ?1260420.0
```

EXCEPTION HANDLING PROGRAMS

16.

i)Division by 0

Code:

```
public class main{
    public static void main(String[] args){
        try{
            int result=10/0;
```



```

}
catch(ArithmeticException e){
System.out.println("Caught exception "+e);
}
finally {
    System.out.println("This is the finally block. It runs always.");
}
}
}
}

```

Output:

```

PS D:\Dhaksin\OOP\java oops\Exception Handeling> javac main.java
PS D:\Dhaksin\OOP\java oops\Exception Handeling> java main
Caught exception java.lang.ArithmeticException: / by zero
This is the finally block. It runs always.
PS D:\Dhaksin\OOP\java oops\Exception Handeling> |

```

ii)Age Exception with throws

Code:

```

class ageLimitException extends Exception{
ageLimitException(String message){
super(message);
}}

```

```

public class main2{
    public static void main(String[] args){
        try{
            ageLimit(17);
        }
        catch(ageLimitException e){
            System.out.println("Caught error "+e);
        }
    }

    public static void ageLimit(int age) throws ageLimitException{
        if (age<18){
            throw new ageLimitException("Age must me above 18 ");
        }
    }
}

```

Output:

```

PS D:\Dhaksin\OOP\java oops\Exception Handeling> javac main2.java
PS D:\Dhaksin\OOP\java oops\Exception Handeling> java main2
Caught error ageLimitException: Age must me above 18
PS D:\Dhaksin\OOP\java oops\Exception Handeling> |

```

iii)Age Exception

Code:

```

public class main3{
    public static void main(String[] args){
        try{

```

```

ageLimit(11);
}
catch(IllegalArgumentException e){
System.out.println("Caught Error "+e);
}
}
public static void ageLimit(int age){
if (age<18){
throw new IllegalArgumentException("Not elligible to vote");
}
System.out.println("Successfully accessed");
}
}

```

Output:

```

PS D:\Dhaksin\OOP\java oops\Exception Handeling> javac main3.java
PS D:\Dhaksin\OOP\java oops\Exception Handeling> java main3
Caught Error java.lang.IllegalArgumentException: Not elligible to vote
PS D:\Dhaksin\OOP\java oops\Exception Handeling> |

```

iv)Filemissing error

Code

```

import java.io.*;
class Filemissing extends Exception{
Filemissing(String message){
super(message);

```

```
}  
  
}  
  
public class main4{  
    public static void main(String[] args) throws Filemissing,  
        IOException {  
        String filename="example.txt";  
        try{  
  
            readfile("example.txt");  
        }  
        catch(FileNotFoundException e){  
            throw new Filemissing("File not found: " + filename);  
        }  
    }  
  
    public static void readfile(String filename) throws  
        Filemissing,IOException {  
        FileReader file = new FileReader(filename);  
        BufferedReader reader= new BufferedReader(file);  
        String line=reader.readLine();  
        while(line!=null){  
            System.out.println(line);  
            line=reader.readLine();  
        }  
    }  
}
```

```
reader.close();  
  
}  
  
}
```

Output:

```
Exception in thread "main" Filemissing: File not found: example.txt  
    at main4.main(main4.java:15)  
PS D:\Dhaksin\OOP\java oops\Exception Handeling> |
```

FILE HANDLING PROGRAMS

17.

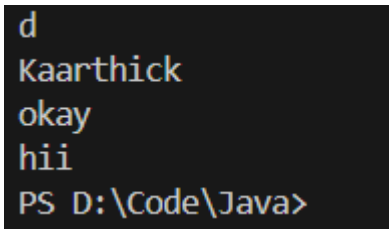
i)Reading a File

code:

```
import java.io.BufferedReader;
import java.io.FileReader;
public class readfile {
    public static void main(String[] args) {
        try {
            FileReader r=new FileReader("output.txt");
            BufferedReader v=new BufferedReader(r);
            String e=v.readLine();
            while(e!=null){
                System.out.println(e);
                e=v.readLine();
            }
            v.close();
        } catch (Exception e) {
            System.out.println("error");
        }
    }
}
```

```
}
```

Screen Shot:



```
d
Karthick
okay
hii
PS D:\Code\Java>
```

ii)Writing to a file:

code:

```
import java.io.BufferedWriter;
```

```
import java.io.FileWriter;
```

```
public class filehandeling {
```

```
    public static void main(String[] args) {
```

```
        try{
```

```
            FileWriter file=new FileWriter("output.txt",true);
```

```
            BufferedWriter b=new BufferedWriter(file);
```

```
            b.write("dhaksin");
```

```
            b.newLine();
```

```
            b.write("hello");
```

```
            b.close();
```

```
        }
```

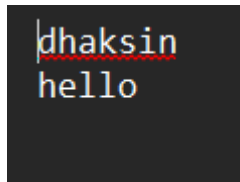
```
        catch(Exception e){
```

```
            System.out.println("error");
```

```
    }
```

```
}  
  
}
```

Screen Shot:



iii)Reading and Writing to a file with word count:

code:

```
import java.io.BufferedReader;  
import java.io.BufferedWriter;  
import java.io.FileReader;  
import java.io.FileWriter;  
import java.io.IOException;  
public class writeNread {  
    public static void main(String[] args) {  
        try (FileReader file = new  
FileReader("D:/Code/Java/input.txt");  
            BufferedReader v = new BufferedReader(file);  
            FileWriter A = new  
FileWriter("D://Code//Java//output.txt/");
```



```
        BufferedWriter f = new BufferedWriter(A)) {  
    String line=v.readLine();  
    int count=0;  
    while (line!= null) {  
        System.out.println(line);  
        count+=line.length();  
        f.write(line);  
        f.newLine();  
        line=v.readLine();  
    }  
    System.out.println(count);  
  
    } catch (IOException e) {  
        System.out.println("Some error: " + e.getMessage());  
    }  
}  
}
```

Screen Shot:

#Reading

```
d
Karthick
okay
hii
18
PS D:\Code\Java>
```

#writing

```
d
Karthick
okay
hii
```

iv)writing to file multiple try catch:

code:

```
import java.io.*;

public class FileHandlingExample {
    public static void main(String[] args) {
        String fileName = "example.txt";
        try (FileWriter writer = new FileWriter(fileName)) {
            writer.write("Hello, this is a test file!\n");
            writer.write("This is line 2.");
            System.out.println("Successfully wrote to the file.");
        } catch (IOException e) {
            System.out.println("Error writing to file: " +
e.getMessage());
        }
    }
}
```

```

try (BufferedReader reader = new BufferedReader(new
FileReader(fileName))) {
    System.out.println("\nFile contents:");
    String line;
    while ((line = reader.readLine()) != null) {
        System.out.println(line);
    }
} catch (IOException e) {
    System.out.println("Error reading file: " +
e.getMessage());
}

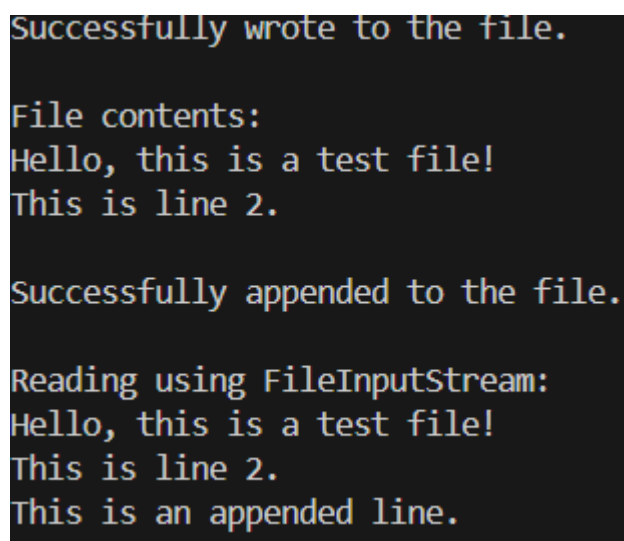
try (FileWriter writer = new FileWriter(fileName, true)) {
    writer.write("\nThis is an appended line.");
    System.out.println("\nSuccessfully appended to the
file.");
} catch (IOException e) {
    System.out.println("Error appending to file: " +
e.getMessage());
}

try (FileInputStream fis = new FileInputStream(fileName))
{
    System.out.println("\nReading using
FileInputStream:");
    int content;

```

```
        while ((content = fis.read()) != -1) {  
            System.out.print((char) content);  
        }  
    } catch (IOException e) {  
        System.out.println("Error reading file: " +  
e.getMessage());  
    }  
}  
}
```

Screen Shot:



```
Successfully wrote to the file.  
  
File contents:  
Hello, this is a test file!  
This is line 2.  
  
Successfully appended to the file.  
  
Reading using FileInputStream:  
Hello, this is a test file!  
This is line 2.  
This is an appended line.
```