NAME : SANJEEV N
DATE : 22-07-2025

PROBLEM 1:

```
Name: Sanjeev
ID: N100
Age: 20
Grade: 55.0
Address: Chicago
Passed: true

UG Student Details:
Name: Rocky
ID: UG101
Age: 19
Grade: 75.0
Address: 456 Oak Street
Degree: B.Tech
Stream: Computer Science
Passed: true

PG Student Details:
Name: Quiely
ID: PG102
Age: 24
Grade: 80.0
Address: 1 Chicago
Specialization: Master
Number of Papers Published: 3
Passed: true
```

```java
package com.test.ooc;
class Student {
protected String name;
protected String id;
protected int age;
protected double grade;
protected String address;
public Student() {
  this.name = "";
  this.id = "";
  this.age = 0;
  this.grade = 0.0;
  this.address = "";
}
public Student(String name, String id, int age, double grade, String address) {
```

```java
        this.name = name;
        this.id = id;
        this.age = age;
        this.grade = grade;
        this.address = address;
    }
    public String getName() { return name; }
    public void setName(String name) { this.name = name; }
    public String getId() { return id; }
    public void setId(String id) { this.id = id; }
    public int getAge() { return age; }
    public void setAge(int age) { this.age = age; }
    public double getGrade() { return grade; }
    public void setGrade(double grade) { this.grade = grade; }
    public String getAddress() { return address; }
    public void setAddress(String address) { this.address = address; }
    public void display() {
        System.out.println("Name: " + name);
        System.out.println("ID: " + id);
        System.out.println("Age: " + age);
        System.out.println("Grade: " + grade);
        System.out.println("Address: " + address);
    }
    public boolean isPassed() {
        return grade > 50;
    }
}
class UGStudent extends Student {
    private String degree;
    private String stream;
    public UGStudent() {
        super();
        this.degree = "";
        this.stream = "";
    }
    public UGStudent(String name, String id, int age, double grade, String address, String degree,
    String stream) {
        super(name, id, age, grade, address);
        this.degree = degree;
        this.stream = stream;
    }
    public String getDegree() { return degree; }
    public void setDegree(String degree) { this.degree = degree; }
    public String getStream() { return stream; }
    public void setStream(String stream) { this.stream = stream; }
    public void display() {
        System.out.println("UG Student Details:");
        System.out.println("Name: " + name);
        System.out.println("ID: " + id);
```

```java
        System.out.println("Age: " + age);
        System.out.println("Grade: " + grade);
        System.out.println("Address: " + address);
        System.out.println("Degree: " + degree);
        System.out.println("Stream: " + stream);
    }
    public boolean isPassed() {
        return grade > 70;
    }
}

class PGStudent extends Student {
private String specialization;
private int noOfPapersPublished;
public PGStudent() {
    super();
    this.specialization = "";
    this.noOfPapersPublished = 0;
}
public PGStudent(String name, String id, int age, double grade, String address, String
specialization, int noOfPapersPublished) {
    super(name, id, age, grade, address);
    this.specialization = specialization;
    this.noOfPapersPublished = noOfPapersPublished;
}
public String getSpecialization() { return specialization; }
public void setSpecialization(String specialization) { this.specialization = specialization; }
public int getNoOfPapersPublished() { return noOfPapersPublished; }
public void setNoOfPapersPublished(int noOfPapersPublished) { this.noOfPapersPublished =
noOfPapersPublished; }
public void display() {
    System.out.println("PG Student Details:");
    System.out.println("Name: " + name);
    System.out.println("ID: " + id);
    System.out.println("Age: " + age);
    System.out.println("Grade: " + grade);
    System.out.println("Address: " + address);
    System.out.println("Specialization: " + specialization);
    System.out.println("Number of Papers Published: " + noOfPapersPublished);
}
public boolean isPassed() {
    return grade > 70 && noOfPapersPublished >= 2;
}
}

public class Student1 {
public static void main(String[] args) {

    Student s1 = new Student("Sanjeev", "N100", 20, 55, "Chicago");
    s1.display();
    System.out.println("Passed: " + s1.isPassed());
```

```java
    System.out.println();

    UGStudent ug1 = new UGStudent("Rocky", "UG101", 19, 75, "456 Oak Street", "B.Tech",
"Computer Science");
    ug1.display();
    System.out.println("Passed: " + ug1.isPassed());
    System.out.println();

    PGStudent pg1 = new PGStudent("Quiely", "PG102", 24, 80, "1 Chicago", "Master", 3);
    pg1.display();
    System.out.println("Passed: " + pg1.isPassed());
    System.out.println();

}
}
```

PROBLEM 2 :

```
Enter Two Wheeler details:
Vehicle Make: Yamaha R15
Vehicle Number: TN66AL3944
Fuel Type: Petrol
Fuel Capacity: 11
CC: 155
Kick Start Available: true

Enter Four Wheeler details:
Vehicle Make: BMW
Vehicle Number: TN39DV1010
Fuel Type: Petrol
Fuel Capacity: 50
CC: 2000
Audio System: DOLBY
Number of Doors: 2
```

```java
package com.test.ooc;
import java.util.Scanner;
class Vehicle {
protected String make;
protected String vehicleNumber;
protected String fuelType;
protected int fuelCapacity;
protected int cc;
public Vehicle(String make, String vehicleNumber, String fuelType, int fuelCapacity, int cc) {
    this.make = make;
    this.vehicleNumber = vehicleNumber;
    this.fuelType = fuelType;
```

```java
        this.fuelCapacity = fuelCapacity;
        this.cc = cc;
    }
    public void displayMake() {
        System.out.println("Vehicle Make: " + make);
    }
    public void displayBasicInfo() {
        System.out.println("Vehicle Number: " + vehicleNumber);
        System.out.println("Fuel Type: " + fuelType);
        System.out.println("Fuel Capacity: " + fuelCapacity);
        System.out.println("CC: " + cc);
    }
    public void displayDetailInfo() {}
}
class TwoWheeler extends Vehicle {
private boolean kickStartAvailable;
public TwoWheeler(String make, String vehicleNumber, String fuelType, int fuelCapacity, int cc,
boolean kickStartAvailable) {
    super(make, vehicleNumber, fuelType, fuelCapacity, cc);
    this.kickStartAvailable = kickStartAvailable;
}
public boolean isKickStartAvailable() { return kickStartAvailable; }
public void setKickStartAvailable(boolean kickStartAvailable) { this.kickStartAvailable =
kickStartAvailable; }
public void displayDetailInfo() {
    System.out.println("Kick Start Available: " + kickStartAvailable);
}
}
class FourWheeler extends Vehicle {
private String audioSystem;
private int numberOfDoors;
public FourWheeler(String make, String vehicleNumber, String fuelType, int fuelCapacity, int cc,
String audioSystem, int numberOfDoors) {
    super(make, vehicleNumber, fuelType, fuelCapacity, cc);
    this.audioSystem = audioSystem;
    this.numberOfDoors = numberOfDoors;
}
public String getAudioSystem() { return audioSystem; }
public void setAudioSystem(String audioSystem) { this.audioSystem = audioSystem; }
public int getNumberOfDoors() { return numberOfDoors; }
public void setNumberOfDoors(int numberOfDoors) { this.numberOfDoors = numberOfDoors; }
@Override
public void displayDetailInfo() {
    System.out.println("Audio System: " + audioSystem);
    System.out.println("Number of Doors: " + numberOfDoors);
}
}
public class VehicleMain {
public static void main(String[] args) {
```

```java
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter Two Wheeler details:");
        TwoWheeler tw = new TwoWheeler("Yamaha R15", "TN66AL3944", "Petrol", 11, 155, true);
        tw.displayMake();
        tw.displayBasicInfo();
        tw.displayDetailInfo();
        System.out.println("\nEnter Four Wheeler details:");
        FourWheeler fw = new FourWheeler("BMW", "TN39DV1010", "Petrol", 50, 2000, "DOLBY", 2);
        fw.displayMake();
        fw.displayBasicInfo();
        fw.displayDetailInfo();
    }
}
```

PROBLEM 3 :

```
Square Area: 100.0
Triangle Area: 24.0
Rectangle Area: 84.0
```

```java
package com.test.ooc;
abstract class Shape {
abstract double calculateArea();
}
class Square extends Shape {
double side;
Square(double side) { this.side = side; }
double calculateArea() {
    return side * side;
}
}
class Triangle extends Shape {
double base, height;
Triangle(double base, double height) {
    this.base = base;
    this.height = height;
}
double calculateArea() {
    return 0.5 * base * height;
}
}
class Rectangle extends Shape {
double length, breadth;
Rectangle(double length, double breadth) {
    this.length = length;
```

```java
        this.breadth = breadth;
    }
    double calculateArea() {
        return length * breadth;
    }
}
}
public class ShapeMain {
public static void main(String[] args) {
    Shape s;
    s = new Square(10);
    System.out.println("Square Area: " + s.calculateArea());
    s = new Triangle(6, 8);
    System.out.println("Triangle Area: " + s.calculateArea());
    s = new Rectangle(6, 14);
    System.out.println("Rectangle Area: " + s.calculateArea());
}
}
```

PROBLEM 4 :

```
Associate ID: 1201
Associate Name: Sanjeev
Work Status: Project phase
```

```java
package com.test.ooc;
class Associate {
private int associateId;
private String associateName;
private String workStatus;
public Associate(int associateId, String associateName) {
    this.associateId = associateId;
    this.associateName = associateName;
}
public int getAssociateId() { return associateId; }
public void setAssociateId(int associateId) { this.associateId = associateId; }
public String getAssociateName() { return associateName; }
public void setAssociateName(String associateName) { this.associateName = associateName; }
public String getWorkStatus() { return workStatus; }
public void setWorkStatus(String workStatus) { this.workStatus = workStatus; }
public void trackAssociateStatus(int days) {
    if(days > 60)
        workStatus = "Deployed in project";
    else if(days <= 20)
        workStatus = "Core skills";
    else if(days <= 40)
```

```java
            workStatus = "Advanced modules";
        else
            workStatus = "Project phase";
    }
}
public class AssociateMain {
public static void main(String[] args) {
    Associate a = new Associate(1201, "Sanjeev");
    a.trackAssociateStatus(45);
    System.out.println("Associate ID: " + a.getAssociateId());
    System.out.println("Associate Name: " + a.getAssociateName());
    System.out.println("Work Status: " + a.getWorkStatus());
}
}
```