KARTHIKEYAN
22/07/2025

1.

```
package com.training.ooc;
class Student {
  protected String name;
  protected String id;
  protected int age;
  protected double grade;
  protected String address;
  public Student() {
  }
  public Student(String name, String id, int age, double grade, String address) {
    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("Student Details:");
```

```java
    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();
  }
  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;
  }
  @Override
  public void display() {
    System.out.println("UG 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("Degree: " + degree);
    System.out.println("Stream: " + stream);
  }
  @Override
  public boolean isPassed() {
    return grade > 70;
  }
```

```
}
class PGStudent extends Student {
  private String specialization;
  private int noOfPapersPublished;
  public PGStudent() {
     super();
  }
  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;
  }
  @Override
  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);
  }
  @Override
  public boolean isPassed() {
     return grade > 70 && noOfPapersPublished >= 2;
  }
}
public class Main {
  public static void main(String[] args) {

     Student s1 = new Student("Alice", "S101", 20, 55, "123 Main St");
     s1.display();
     System.out.println("Passed: " + s1.isPassed());
     System.out.println();
```

```
        UGStudent ug1 = new UGStudent("Bob", "UG202", 21, 75, "456 Elm St", "B.Tech", "Computer
Science");
        ug1.display();
        System.out.println("Passed: " + ug1.isPassed());
        System.out.println();
        UGStudent ug2 = new UGStudent("Charlie", "UG203", 22, 68, "789 Oak St", "B.Sc", "Physics");
        ug2.display();
        System.out.println("Passed: " + ug2.isPassed());
        System.out.println();
        PGStudent pg1 = new PGStudent("Diana", "PG301", 24, 80, "321 Pine St", "Data Science", 3);
        pg1.display();
        System.out.println("Passed: " + pg1.isPassed());
        System.out.println();
        PGStudent pg2 = new PGStudent("Ethan", "PG302", 26, 85, "654 Maple St", "Artificial Intelligence",
1);
        pg2.display();
        System.out.println("Passed: " + pg2.isPassed());
    }
}
```

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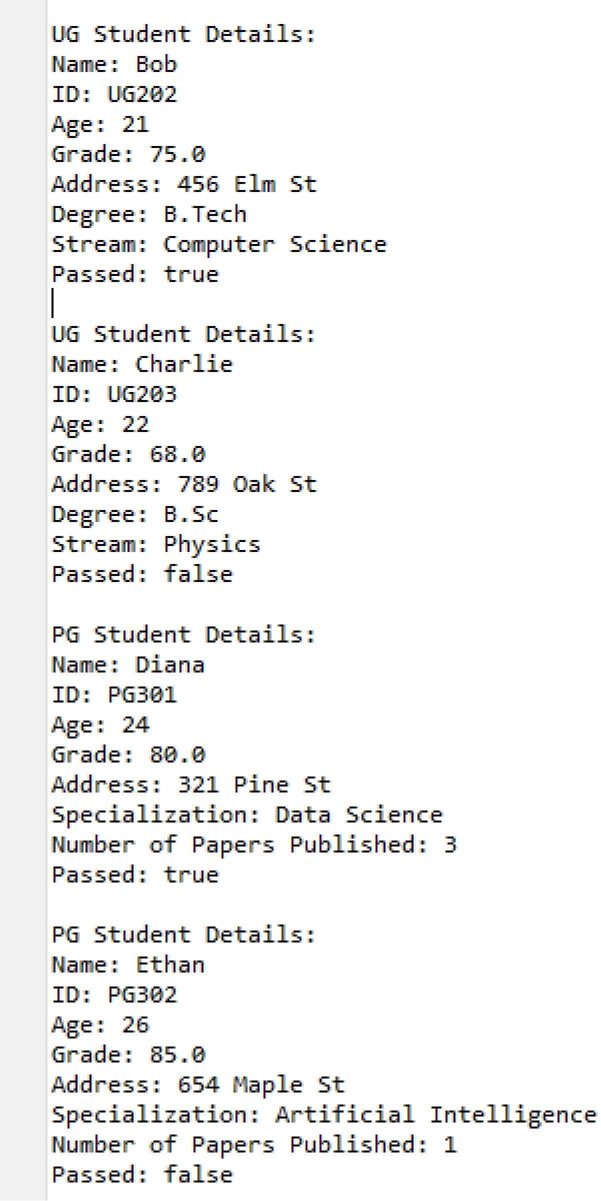
OUTPUT



```
UG Student Details:
Name: Bob
ID: UG202
Age: 21
Grade: 75.0
Address: 456 Elm St
Degree: B.Tech
Stream: Computer Science
Passed: true

UG Student Details:
Name: Charlie
ID: UG203
Age: 22
Grade: 68.0
Address: 789 Oak St
Degree: B.Sc
Stream: Physics
Passed: false

PG Student Details:
Name: Diana
ID: PG301
Age: 24
Grade: 80.0
Address: 321 Pine St
Specialization: Data Science
Number of Papers Published: 3
Passed: true

PG Student Details:
Name: Ethan
ID: PG302
Age: 26
Grade: 85.0
Address: 654 Maple St
Specialization: Artificial Intelligence
Number of Papers Published: 1
Passed: false
```

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2.

```
package com.training.ooc;
import java.util.Scanner;
class Vehicle {
  protected String make;
  protected String vehicleNumber;
  protected String fuelType;
  protected Integer fuelCapacity;
  protected Integer cc;
  public Vehicle(String make, String vehicleNumber, String fuelType, Integer fuelCapacity, Integer cc) {
     this.make = make;
     this.vehicleNumber = vehicleNumber;
     this.fuelType = fuelType;
     this.fuelCapacity = fuelCapacity;
     this.cc = cc;
  }
  public String getMake() {
     return make;
  }
  public void setMake(String make) {
     this.make = make;
  }
  public String getVehicleNumber() {
     return vehicleNumber;
  }
  public void setVehicleNumber(String vehicleNumber) {
     this.vehicleNumber = vehicleNumber;
  }
  public String getFuelType() {
     return fuelType;
  }
  public void setFuelType(String fuelType) {
     this.fuelType = fuelType;
  }
  public Integer getFuelCapacity() {
     return fuelCapacity;
  }
  public void setFuelCapacity(Integer fuelCapacity) {
     this.fuelCapacity = fuelCapacity;
  }
  public Integer getCc() {
     return cc;
  }
  public void setCc(Integer cc) {
     this.cc = cc;
  }
  public void displayMake() {
        System.out.println("Vehicle Make: " + make);
    }
    public void displayBasicInfo() {
        System.out.println("--- Basic Information ---");
        System.out.println("Vehicle Number: " + vehicleNumber);
        System.out.println("Fuel Type: " + fuelType);
        System.out.println("Fuel Capacity: " + fuelCapacity + " litres");
        System.out.println("CC: " + cc);
    }
    public void displayDetailInfo() {

    }
}
class TwoWheeler extends Vehicle {
    private Boolean kickStartAvailable;
    public TwoWheeler(String make, String vehicleNumber, String fuelType, Integer fuelCapacity, Integer
cc, Boolean kickStartAvailable) {
        super(make, vehicleNumber, fuelType, fuelCapacity, cc);
        this.kickStartAvailable = kickStartAvailable;
    }
    public Boolean getKickStartAvailable() {
        return kickStartAvailable;
    }
    public void setKickStartAvailable(Boolean kickStartAvailable) {
        this.kickStartAvailable = kickStartAvailable;
    }
    @Override
    public void displayDetailInfo() {
        System.out.println("--- Detail Information ---");
        System.out.println("Kick Start Available: " + (kickStartAvailable ? "Yes" : "No"));
    }
}
class FourWheeler extends Vehicle {
    private String audioSystem;
    private Integer numberOfDoors;
    public FourWheeler(String make, String vehicleNumber, String fuelType, Integer fuelCapacity, Integer
cc, String audioSystem, Integer 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 Integer getNumberOfDoors() {
        return numberOfDoors;
    }
    public void setNumberOfDoors(Integer numberOfDoors) {
        this.numberOfDoors = numberOfDoors;
    }
    @Override
    public void displayDetailInfo() {
        System.out.println("--- Detail Information ---");
        System.out.println("Audio System: " + audioSystem);
        System.out.println("Number of Doors: " + numberOfDoors);
    }
}
public class VehicleMain {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        Vehicle vehicle = null;
        while (true) {
            System.out.println("Menu");
            System.out.println("1. Two Wheeler");
            System.out.println("2. Four Wheeler");
            System.out.println("3. Exit");
            System.out.print("Enter your option: ");
            int option = sc.nextInt();
            sc.nextLine();
            if (option == 1) {
                System.out.print("Vehicle Make: ");
                String make = sc.nextLine();
                System.out.print("Vehicle Number: ");
                String vehicleNumber = sc.nextLine();
                System.out.print("Fuel Type (Petrol/Diesel): ");
                String fuelType = sc.nextLine();
                System.out.print("Fuel Capacity (litres): ");
                int fuelCapacity = sc.nextInt();
                System.out.print("Engine CC: ");
                int cc = sc.nextInt();
                System.out.print("Kick Start Available (true/false): ");
                boolean kickStartAvailable = sc.nextBoolean();
                sc.nextLine();
                vehicle = new TwoWheeler(make, vehicleNumber, fuelType, fuelCapacity, cc,
kickStartAvailable);

            } else if (option == 2) {
                System.out.print("Vehicle Make: ");
                String make = sc.nextLine();
                System.out.print("Vehicle Number: ");
                String vehicleNumber = sc.nextLine();
                System.out.print("Fuel Type (Petrol/Diesel): ");
                String fuelType = sc.nextLine();
                System.out.print("Fuel Capacity (litres): ");
                int fuelCapacity = sc.nextInt();
                System.out.print("Engine CC: ");
                int cc = sc.nextInt();
                sc.nextLine();
                System.out.print("Audio System: ");
                String audioSystem = sc.nextLine();
                System.out.print("Number of Doors: ");
                int numberOfDoors = sc.nextInt();
                sc.nextLine();
                vehicle = new FourWheeler(make, vehicleNumber, fuelType, fuelCapacity, cc, audioSystem,
numberOfDoors);
            } else if (option == 3) {
                System.out.println("Exiting...");
                break;
            } else {
                System.out.println("Invalid option! Try again.");
                continue;
            }
            if (vehicle != null) {
                System.out.println();
                vehicle.displayMake();
                vehicle.displayBasicInfo();
                vehicle.displayDetailInfo();
                System.out.println();
            }
        }
        sc.close();
    }
}
```

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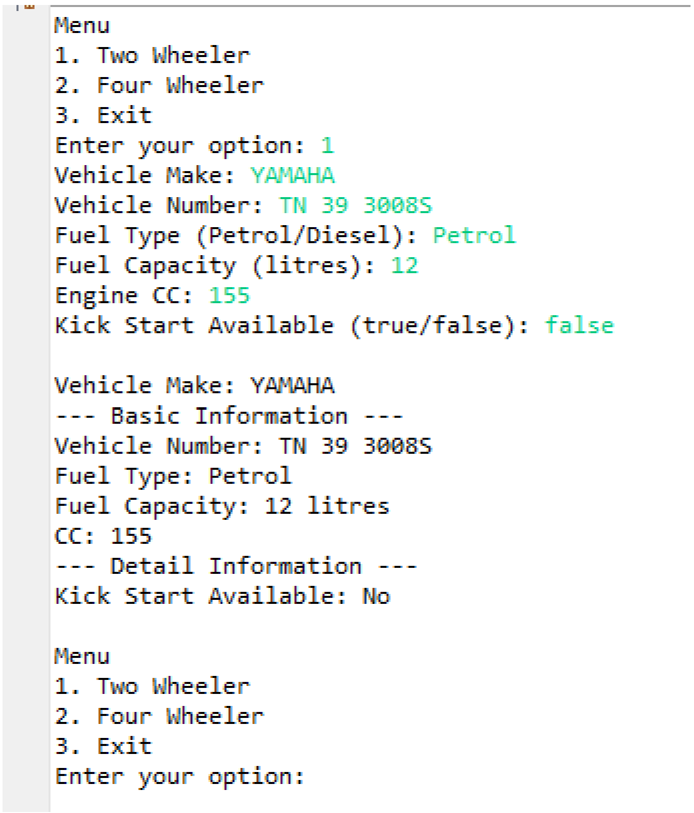
OUTPUT



```
Menu
1. Two Wheeler
2. Four Wheeler
3. Exit
Enter your option: 1
Vehicle Make: YAMAHA
Vehicle Number: TN 39 3008S
Fuel Type (Petrol/Diesel): Petrol
Fuel Capacity (litres): 12
Engine CC: 155
Kick Start Available (true/false): false

Vehicle Make: YAMAHA
--- Basic Information ---
Vehicle Number: TN 39 3008S
Fuel Type: Petrol
Fuel Capacity: 12 litres
CC: 155
--- Detail Information ---
Kick Start Available: No

Menu
1. Two Wheeler
2. Four Wheeler
3. Exit
Enter your option:
```

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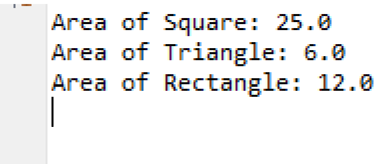
3.

```
package com.training.ooc;
class Shape {
  public double calculateArea() {
     return 0.0;
  }
}
class Square extends Shape {
  private double side;
  public Square(double side) {
     this.side = side;
  }
  public double getSide() {
     return side;
  }
  public void setSide(double side) {
     this.side = side;
  }
  @Override
  public double calculateArea() {
     return side * side;
  }
}
class Triangle extends Shape {
  private double base;
  private double height;
  public Triangle(double base, double height) {
     this.base = base;
     this.height = height;
  }
  public double getBase() {
     return base;
  }
  public void setBase(double base) {
     this.base = base;
  }
  public double getHeight() {
     return height;
  }
  public void setHeight(double height) {
     this.height = height;
  }
  @Override
  public double calculateArea() {
     return 0.5 * base * height;
  }
}
class Rectangle extends Shape {
  private double length;
```

```
    private double width;
    public Rectangle(double length, double width) {
        this.length = length;
        this.width = width;
    }
    public double getLength() {
        return length;
    }
    public void setLength(double length) {
        this.length = length;
    }
    public double getWidth() {
        return width;
    }
    public void setWidth(double width) {
        this.width = width;
    }
    @Override
    public double calculateArea() {
        return length * width;
    }
}
public class AreaMain {
    public static void main(String[] args) {
        Shape s1 = new Square(5);
        Shape s2 = new Triangle(4, 3);
        Shape s3 = new Rectangle(6, 2);
        System.out.println("Area of Square: " + s1.calculateArea());
        System.out.println("Area of Triangle: " + s2.calculateArea());
        System.out.println("Area of Rectangle: " + s3.calculateArea());
    }
}
```

OUTPUT



```
Area of Square: 25.0
Area of Triangle: 6.0
Area of Rectangle: 12.0
```

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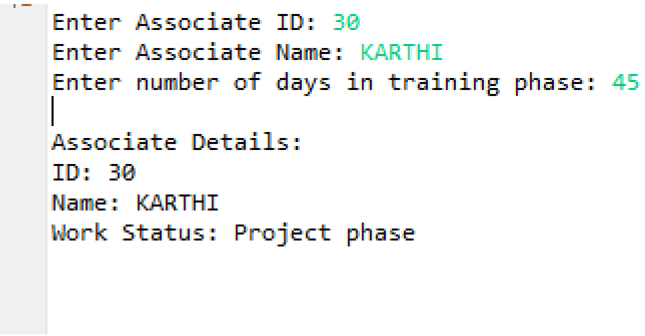
4.

```
package com.training.ooc;
import java.util.Scanner;
class Associate {
  private int associateId;
  private String associateName;
  private String workStatus;
  public Associate() {
  }
  public Associate(int associateId, String associateName, String workStatus) {
    this.associateId = associateId;
    this.associateName = associateName;
    this.workStatus = workStatus;
  }
  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 > 0 && days <= 20) {
      workStatus = "Core skills";
    } else if (days > 20 && days <= 40) {
      workStatus = "Advanced modules";
    } else if (days > 40 && days <= 60) {
      workStatus = "Project phase";
    } else if (days > 60) {
      workStatus = "Deployed in project";
    } else {
      workStatus = "Invalid number of days";
    }
  }
}
public class DetailsMain {
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    Associate associate = new Associate();
    System.out.print("Enter Associate ID: ");
    while (!sc.hasNextInt()) {
      System.out.println("Invalid input. Please enter numeric Associate ID:");
      sc.next();
    }
    associate.setAssociateId(sc.nextInt());
    sc.nextLine();
    System.out.print("Enter Associate Name: ");
    String name = sc.nextLine();
    associate.setAssociateName(name);
    System.out.print("Enter number of days in training phase: ");
    while (!sc.hasNextInt()) {
      System.out.println("Invalid input. Please enter numeric days:");
      sc.next();
    }
    int days = sc.nextInt();
    associate.trackAssociateStatus(days);
    System.out.println("\nAssociate Details:");
    System.out.println("ID: " + associate.getAssociateId());
    System.out.println("Name: " + associate.getAssociateName());
    System.out.println("Work Status: " + associate.getWorkStatus());
    sc.close();
  }
}
```

OUTPUT



```
Enter Associate ID: 30
Enter Associate Name: KARTHI
Enter number of days in training phase: 45

Associate Details:
ID: 30
Name: KARTHI
Work Status: Project phase
```