Program 4

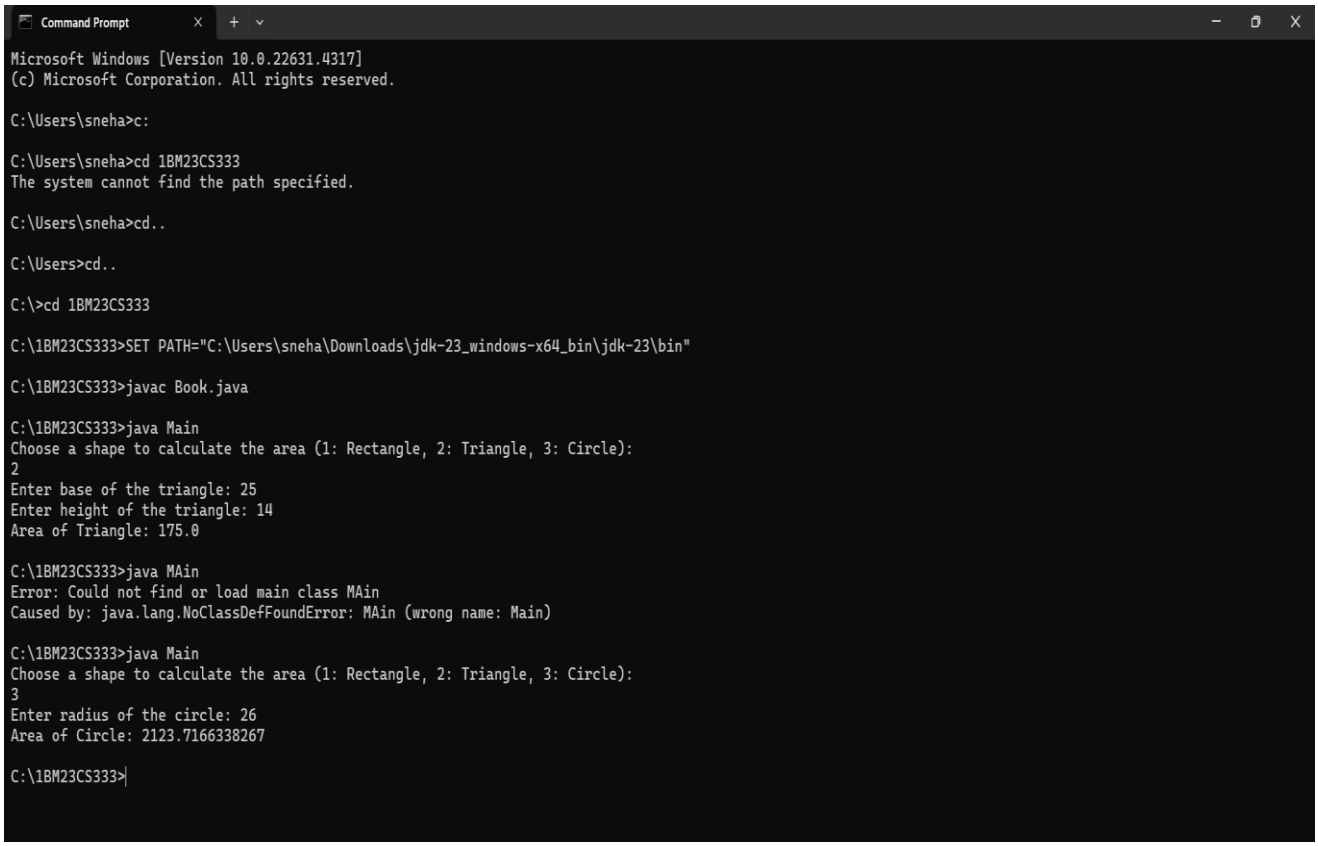
Develop a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea( ). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea( ) that prints the area of the given shape.

```
import java.util.Scanner;
abstract class Shape {
    protected int dimension1;
    protected int dimension2;

    // Constructor to initialize dimensions
    public Shape(int dimension1, int dimension2) {
        this.dimension1 = dimension1;
        this.dimension2 = dimension2;
    }

    // Abstract method to print the area
    public abstract void printArea();
}

class Rectangle extends Shape {
    public Rectangle(int width, int height) {
        super(width, height);
    }

    @Override
    public void printArea() {
        int area = dimension1 * dimension2; // width * height
        System.out.println("Area of Rectangle: " + area);
    }
}

class Triangle extends Shape {
    public Triangle(int base, int height) {
```

```
        super(base, height);
    }

    @Override
    public void printArea() {
        double area = 0.5 * dimension1 * dimension2; // 0.5 * base * height
        System.out.println("Area of Triangle: " + area);
    }
}

class Circle extends Shape {
    public Circle(int radius) {
        super(radius, 0); // dimension2 is not used for Circle
    }

    @Override
    public void printArea() {
        double area = Math.PI * dimension1 * dimension1; // π * radius^2
        System.out.println("Area of Circle: " + area);
    }
}
class Main {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Choose a shape to calculate the area (1: Rectangle, 2: Triangle, 3: Circle): ");
        int choice = scanner.nextInt();

        Shape shape = null;

        switch (choice) {
            case 1:
                System.out.print("Enter width of the rectangle: ");
                int width = scanner.nextInt();
                System.out.print("Enter height of the rectangle: ");
                int height = scanner.nextInt();
                shape = new Rectangle(width, height);
                break;

            case 2:
```

```
            System.out.print("Enter base of the triangle: ");
            int base = scanner.nextInt();
            System.out.print("Enter height of the triangle: ");
            int triangleHeight = scanner.nextInt();
            shape = new Triangle(base, triangleHeight);
            break;

        case 3:
            System.out.print("Enter radius of the circle: ");
            int radius = scanner.nextInt();
            shape = new Circle(radius);
            break;

        default:
            System.out.println("Invalid choice.");
            break;
    }

    if (shape != null) {
        shape.printArea();
    }

    scanner.close();
  }
}
```

OUTPUT



Java program for finding area of different shapes 24/10/2024

```
abstract class Shape{
    int dim1;
    int dim2;
    Shape(int dim1, int dim2){
      this.dim1 = dim1;
      this.dim2= dim2;
    abstract void printArea();
}
class Rectangle extends Shape{
    Rectangle(int width, int height){
        super(width, height);
    }
    @Override
    void printArea(){
      int area= dim1 * dim2;
      System.out.println("Area of Rectangle: "+area);
    }
}
class Triangle extends Shape{
    Triangle(int base, int height){
        super(base, height);
    }
    @Override
    void printArea(){
      double area= 0.5* dim1* dim2;
      System.out.println("Area of Triangle:"+area);
    }
}
```

```
class Circle extends Shape{
    Circle (int radius){
        super(radius, 0);
    }
    @Override
    void printArea (){
        double area = Math.PI * dim1 * dim1;
        System.out.println("Area of Circle: "+area);
    }
}
class Main {
    public static void main (String[] args) {
        Shape rectangle = new Rectangle (5,10);
        Shape triangle = new Triangle (4,6);
        Shape circle = new Circle (3);
        rectangle.printArea();
        triangle.printArea();
        circle.printArea();
    }
}
```

Question:

Develop a java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

```
class Main {
    public static void main (String[] args){
        Scanner sc = new Scanner(System.in);
        s.o.p("Choose a shape to calculate the area (1: Rectangle,
                    2: Triangle, 3: Circle): ");
        int choice = sc.nextInt();
        Shape shape = null;
        switch (choice){
            case 1:
                s.o.p ("Enter width of the rectangle, ");
                int width = sc.nextInt();
                s.o.p ("Enter height of the rectangle: ");
                int height = sc.nextInt();
                shape = new Rectangle (width, height);
                break;
            Case 2:
                s.o.p("Enter base of the triangle: ");
                int base = sc.nextInt();
                s.o.p("Enter height of the triangle: ");
                int height = sc.nextInt();
                shape = new Triangle (base, height);
                break;
            case 3:
                s.o.p("Enter radius of the circle: ");
                int radius = sc.nextInt();
                shape = new Circle (radius);
                break;
```

```
        default:
            s.o.p("Invalid choice");
            break;
        }
        if (shape != null) {
            shape.printArea();
        }
        scanner.close();
    }
```

Output:

```
choose a shape to calculate the area (1: Rectangle, 2: Triangle,
3: Circle): 1
Enter width of the rectangle: 12
Enter height of the rectangle: 44
Area of Rectangle: 528
```

24/10/24