Folder Q3

10 printable files

(file list disabled)

Q3\Circle.java

```java
package Q3;

public class Circle extends TwoDimensionalShape {
    private double radius;
    private final String DESCRIPTION = "Round shape with no straight sides.";

    public Circle(String name, double radius){
        super(name);
        this.radius = radius;
    }

    @Override
    public double getArea() {
        return (Math.PI * Math.pow(radius, 2));
    }

    public double getRadius() {
        return radius;
    }

    public void setRadius(double radius) {
        this.radius = radius;
    }

    public String getDESCRIPTION() {
        return DESCRIPTION;
    }

}

```

Q3\Cube.java

```java
package Q3;

public class Cube extends ThreeDimensionalShape {
    private double side;
    private final String DESCRIPTION = "Six-sided solid with equal sides.";

    public Cube(String name, double side){
        super(name);
        this.side = side;
    }

    @Override
    public double getVolume() {
        return (Math.pow(side, 3));
    }
```

```
16
17      @Override
18      public double getArea() {
19          return (6 * side * side);
20      }
21
22      public double getSide() {
23          return side;
24      }
25
26      public void setSide(double side) {
27          this.side = side;
28      }
29
30      public String getDESCRIPTION() {
31          return DESCRIPTION;
32      }
33
34  }
35
```

Q3\Shape.java

```
1   package Q3;
2
3   abstract class Shape {
4       private String name;
5       public String DESCRIPTION;
6
7       public String getDESCRIPTION() {
8           return DESCRIPTION;
9       }
10
11      public abstract double getArea();
12
13      public Shape(String name) {
14          this.name = name;
15      }
16
17      public String getName() {
18          return name;
19      }
20
21      public void setName(String name) {
22          this.name = name;
23      }
24
25  }
26
```

Q3\ShapeTest.java

```
1   package Q3;
2
3   public class ShapeTest {
4       public static void main(String[] args) {
5
```

```
        Shape[] formas = new Shape[6];
        formas[0] = new Circle("Círculo", 5);
        formas[1] = new Square("Quadrado", 5);
        formas[2] = new Triangle("Triângulo", 5, 3);
        formas[3] = new Sphere("Esfera", 5);
        formas[4] = new Cube("Cubo", 5);
        formas[5] = new Tetrahedron("Tetraedro", 5);

        for(int i = 0; i < formas.length; i++) {
          if(formas[i] instanceof TwoDimensionalShape) {
            TwoDimensionalShape figura2D = (TwoDimensionalShape) formas[i];
            System.out.println("Nome: " + figura2D.getName());
            System.out.println("Descrição: " + figura2D.getDESCRIPTION());
            System.out.println("Área: " + figura2D.getArea() + "cm²");
            System.out.println("-------------------------------------");
          }
          else if(formas[i] instanceof ThreeDimensionalShape) {
            ThreeDimensionalShape objeto3D = (ThreeDimensionalShape) formas[i];
            System.out.println("Nome: " + objeto3D.getName());
            System.out.println("Descrição: " + objeto3D.getDESCRIPTION());
            System.out.println("Área: " + objeto3D.getArea() + "cm²");
            System.out.println("Volume: " + objeto3D.getVolume() + "cm³");
            System.out.println("-------------------------------------");

          }
        }
    }
}

```

Q3\Sphere.java

```
package Q3;

public class Sphere extends ThreeDimensionalShape {
    private double radius;
    private final String DESCRIPTION = "Round three-dimensional object.";

    public String getDESCRIPTION() {
        return DESCRIPTION;
    }

    public Sphere(String name, double radius){
        super(name);
        this.radius = radius;
    }

    @Override
    public double getVolume() {
        return ((4/3) * Math.PI * Math.pow(radius, 3));
    }

    @Override
    public double getArea() {
        return (4 * Math.PI * Math.pow(radius, 2));
    }

    public double getRadius() {
        return radius;
```

```
    }

    public void setRadius(double radius) {
        this.radius = radius;
    }

}

```

Q3\Square.java

```
package Q3;

public class Square extends TwoDimensionalShape {
    private double side;
    public String getDESCRIPTION() {
        return DESCRIPTION;
    }

    private final String DESCRIPTION = "Four-sided figure with equal sides.";

    public Square(String name, double side){
        super(name);
        this.side = side;
    }

    @Override
    public double getArea() {
        return (side * side);
    }

    public double getSide() {
        return side;
    }

    public void setSide(double side) {
        this.side = side;
    }

}

```

Q3\Tetrahedron.java

```
package Q3;

public class Tetrahedron extends ThreeDimensionalShape {
    private double edge;
    public String getDESCRIPTION() {
        return DESCRIPTION;
    }

    private final String DESCRIPTION = "Four-sided solid with triangular faces.";

    public Tetrahedron(String name, double edge){
        super(name);
        this.edge = edge;
```

```
    }

    @Override
    public double getVolume() {
        return ((Math.pow(edge, 3) * Math.sqrt(2)) / 12);
    }

    @Override
    public double getArea() {
        return (Math.sqrt(3) * edge * edge);
    }

    public double getEdge() {
        return edge;
    }

    public void setEdge(double edge) {
        this.edge = edge;
    }


}

```

Q3\ThreeDimensionalShape.java

```
package Q3;

abstract class ThreeDimensionalShape extends Shape {

    public ThreeDimensionalShape(String name) {
        super(name);
    }

    //getArea abstrato já vem da classe pai
    public abstract double getVolume();
}

```

Q3\Triangle.java

```
package Q3;

public class Triangle extends TwoDimensionalShape {
    private double base;
    private double height;
    private final String DESCRIPTION = "Three-sided polygon with straight sides.";

    public String getDESCRIPTION() {
        return DESCRIPTION;
    }

    public Triangle(String name, double base, double height){
        super(name);
        this.base = base;
        this.height = height;
    }
```

```
17
18      @Override
19      public double getArea() {
20          return ((base * height)/2);
21      }
22
23      public double getBase() {
24          return base;
25      }
26
27      public void setBase(double base) {
28          this.base = base;
29      }
30
31      public double getHeight() {
32          return height;
33      }
34
35      public void setHeight(double height) {
36          this.height = height;
37      }
38
39  }
40
```

Q3\TwoDimensionalShape.java

```
1   package Q3;
2
3   abstract class TwoDimensionalShape extends Shape {
4
5       public TwoDimensionalShape(String name) {
6           super(name);
7       }
8
9       //método getArea ja presente na classe Shape, coloquei aqui apenas para a classe
    TwoDimensionalShape não ficar vazia
10      public abstract double getArea();
11  }
12
```