

```
public abstract class Shape {  
    protected double var;  
  
    public Shape () {  
        var = 0;  
    }  
  
    public Shape(double v) {  
        var = v;  
    }  
}
```

```
public abstract class TwoDimensionalShape extends Shape {  
    public TwoDimensionalShape (double v) {  
        super (v);  
    }  
  
    public abstract double getArea ();  
}
```

```
public abstract class ThreeDimensionalShape extends Shape {  
    public ThreeDimensionalShape (double v) {  
        super (v);  
    }  
  
    public abstract double getArea ();  
    public abstract double getVolume ();  
}
```

```
public class Square extends TwoDimensionalShape {  
    public Square(double v) {  
        super(v);  
    }  
  
    public double getArea() {  
        return var * var;  
    }  
}
```

```
import java.lang.Math;

public class Circle extends TwoDimensionalShape {
    public Circle(double v) {
        super(v);
    }

    public double getArea() {
        return Math.PI * v * v;
    }
}
```

```
public class Cube extends ThreeDimensionalShape {
    public Cube(double v) {
        super(v);
    }

    public double getArea() {
        return 6 * var * var;
    }

    public double getVolume() {
        return var * var * var;
    }
}
```

```
import java.lang.Math;

public class Sphere extends ThreeDimensionalShape {
    public Sphere(double v) {
        super(v);
    }

    public double getArea() {
        return 4 * Math.PI * var * var;
    }

    public double getVolume() {
        return 4/3 * Math.PI * var * var * var;
    }
}
```

```
public class Test {
    public static void main(String[] args) {
        Shape[] s = new Shape[6];

        s[0] = new Square(2);
        s[1] = new Circle(3);
        s[2] = new Cube(2);
        s[3] = new Sphere(3);
        s[4] = new Square(4);
        s[5] = new Circle(5);

        for(int i = 0; i < s.length; i++) {
            if(s[i] instanceof Square) {
                Square x = (Square)s[i];

                System.out.println("Type: Square");
                System.out.println("Area: " + x.getArea());
            }
            else if(s[i] instanceof Circle) {
                Circle x = (Circle)s[i];

                System.out.println("Type: Circle");
                System.out.println("Area: " + x.getArea());
            }
            else if(s[i] instanceof Cube) {
                Cube x = (Cube)s[i];

                System.out.println("Type: Cube");
                System.out.println("Area: " + x.getArea());
                System.out.println("Volume: " + x.getVolume());
            }
            else if(s[i] instanceof Sphere) {
                Sphere x = (Sphere)s[i];

                System.out.println("Type: Sphere");
                System.out.println("Area: " + x.getArea());
                System.out.println("Volume: " + x.getVolume());
            }
        }
    }
}
```