Polymorphism Homework

Assume that there is a Java interface named Measurable. The only method in the interface is method getMeasure(), which returns a string describing an object's measurement (if of type Measurement). Assume that there are three classes of type Measureable: Rectangle (with measurement height and width, in inches), Package (with measurement of weight in lbs and ounces), and WindSpeed (with measurement in miles per hour). Give sufficient code to demonstrate the use of polymorphism involving objects of each of these three types.

Interface Class Implemented

```java
Polymorphism > J Measurable.java > ...
1    package Polymorphism;
2
3    public interface Measurable {
4        public String getMeasure();
5    }
6
```

Abstract Class Type

```java
Polymorphism > J Measurement.java > Measurement
1    package Polymorphism;
2
3    public abstract class Measurement {
4
5    }
6
```

Class implementation

Polymorphism > **J** Package.java > � Package > ⬡ getMeasure()

```java
package Polymorphism;

public class Package extends Measurement implements
Measurable {
    public double pounds;
    public double ounces;

    public Package(double pounds, double ounces) {
        this.pounds = pounds;
        this.ounces = ounces;
    }

    public String getMeasure() {
        return "Measurement of package is: " + pounds + "
pounds and " + ounces + " ounces";
    }
}
```

Polymorphism > J Rectangle.java > ⑤ Rectangle

```java
package Polymorphism;

public class Rectangle extends Measurement implements
Measurable {
    private double width;
    private double height;

    public Rectangle(double width, double height) {
        this.width = width;
        this.height = height;
    }

    public String getMeasure() {
        return "Measurement of rectangle is " + width + "
        width x " + height + " height";
    }

}
```

```
Polymorphism >  J WindSpeed.java >  ⌘ WindSpeed
  1    package Polymorphism;
  2    public class WindSpeed extends Measurement implements
       Measurable {
  3        public double milesPerHour;
  4
  5        public WindSpeed(double milesPerHour) {
  6            this.milesPerHour = milesPerHour;
  7        }
  8
  9        public String getMeasure() {
 10            return "Measurement of wind speed is: " +
             milesPerHour + "mph";
 11        }
 12    }
 13
```

Polymorphism with use of a Client

```java
Polymorphism > J Client.java > Client > main(String[])
1    package Polymorphism;
2
3    public class Client {
         Run | Debug
4        public static void main(String[] args) {
5
6            // Polymorphism example
7            Measurable packageOne = new Package(pounds:25,ounces:2);
8            Measurable rectangle = new Rectangle(width:5, height:10);
9            Measurable windSpeed = new WindSpeed(milesPerHour:50);
10
11           System.out.println(packageOne.getMeasure());
12           System.out.println(rectangle.getMeasure());
13           System.out.println(windSpeed.getMeasure());
14
15           // Create an array of Measurable objects
16           Measurable[] measurements = new Measurable[3];
17
18           // Initialize with different types
19           measurements[0] = new Rectangle(width:10.5, height:20.0);
20           measurements[1] = new Package(pounds:5, ounces:8.5);
21           measurements[2] = new WindSpeed(milesPerHour:15.7);
22
23           // Demonstrate polymorphism by iterating through array
24           System.out.println(x:"\nMeasurements using polymorphism:");
25           for (Measurable item : measurements) {
26               System.out.println(item.getMeasure());
27           }
28
29
30
31    }
```

```
PROBLEMS  11   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   COMMENTS

c01f\redhat.java\jdt_ws\src_fb77fa83\bin' 'Polymorphism.Client'
Measurement of package is: 25.0 pounds and 2.0 ounces
Measurement of rectangle is 5.0 width x 10.0 height
Measurement of wind speed is: 50.0mph

Measurements using polymorphism:
Measurement of rectangle is 10.5 width x 20.0 height
Measurement of package is: 5.0 pounds and 8.5 ounces
Measurement of wind speed is: 15.7mph
PS C:\Users\aimab\OneDrive\Towson\Fall 25\Object-Oriented Programming\src> []
```