**Shape Interface Practice**

**Directions:** Create the Shape Interface and the Pentagon, Hexagon, and Heptagon classes. Create a main to test the classes and interface.

**Shape Interface**

**Required Method Signatures:**

* area() – returns a double
* perimeter() – returns a double
* toString()
* setSide(**double** side)
* getSide() – returns a double

**Pentagon, Hexagon, && Heptagon classes**

\*\*All classes implement Shape Interface

**Variables:**

* One double instance variable for the side length of the polygon
* One public final static variable for the number of sides of the polygon

**Constructors:**

* Create a default constructor for each class that initializes the side length to 0
* Create a constructor for each class that accepts a double and assigns it to the side-length instance variable

**Methods:**

* Provide implementation for all of the methods in the Shape Interface
  + *toString()* of the form:

Pentagon:

Side: 5.0

Area: 43.012

Perimeter: 25.0

* *round(double input)* – rounds to the nearest thousandth

**ShapeMain**

**Directions:**

1. Instantiate a Pentagon, Hexagon, and Heptagon with each having a side length of 5.
2. Instantiate a new List that can only contain Shapes.
3. Add the Pentagon, Hexagon, and Heptagon to the list.
4. Use a for-each loop to iterate through the list and print the area of each Shape within the list.

\*\*Assume that you do not know the order of the shapes. You must determine what the shape is by using the *instanceof* operator.

1. Use a for-each loop to iterate through the list and print the perimeter of each Shape within the list. Again, assume that you do not know the order of the list.
2. Create a helper method *findNumSides(List<Shape> list)* that determines the total number of sides contained within all of the Shapes within the list parameter.
3. Use the helper method to print the number of sizes in the shapes in the original list.

**A correct printout)**

Area of Pentagon: 43.012

Area of Hexagon: 64.952

Area of Heptagon: 90.848

Perimeter of Pentagon: 25.0

Perimeter of Hexagon: 30.0

Perimeter of Heptagon: 35.0

Total sides in list: 18