



Ahmet Furkan Teke – 150120202

IT Systems Analysis and Design

HOMEWORK #2

- Write a class called **Polygon** that has two fields: an int for the **number of sides** and a double for the **area**. Add a method called **getNumberOfSides()** that prints out and returns the number of sides.

```
public class Polygon{
    int numberOfSides;
    double area;

    public int getNumberOfSides(){
        System.out.println("Number of sides: " + this.numberOfSides);
        return this.numberOfSides;
    }
}
```

- Override the **toString()** method in Polygon to return a nice string representation of your Polygon class.

```
public String toString(){
    return "This is Polygon super class! " + "Number of sides: " + this.numberOfSides + " Area: " + area;
}
```

- Add a constructor to **Polygon** that takes in an int to represent the number of **sides** and prints out the message “Inside Polygon constructor.”

```
public Polygon(int numberOfSides){
    this.numberOfSides = numberOfSides;
    System.out.println("Inside Polygon constructor.");
}
```

- Write a class called **Triangle** that extends **Polygon**. Add two int fields: one for the **base** and one for the **height**. (Triangles have a base and a height.)

```
public class Triangle extends Polygon{
    int base;
    int height;
```

- Add a constructor to **Triangle** that takes in two int’s for the **base** and **height**. The constructor needs to use **super()** to invoke the constructor in Polygon, passing in 3 for the number of sides. Print out the message “Inside Triangle constructor.”

```
public Triangle(int base, int height) {
    super(3);
    this.base = base;
    this.height = height;
    System.out.println("Inside Triangle constructor. ");
}
```

- Add a **toString()** method to Triangle that prints out the triangle’s base and height.

```
public String toString(){
    return "This is Triangle sub class! " + "Base: " + this.base + " Height: " + this.height + " Area: " + getArea() ;
}
```

- Add a **getArea()** method to Triangle that computes and returns the area. The formula for the area of a triangle is:

area = 1/2 (base * height)

```
public double getArea(){
    return this.area = 0.5 * this.base * this.height;
}
```

- Write a class called **RightTriangle** that extends your **Triangle** class. Add a field of type double called **hypotenuse** to represent the longest side of a right triangle.

```
public class RightTriangle extends Triangle{
    double hypotenuse;
```

- Add a constructor that takes in two int's to represent the base and height. Pass these two values up to the Triangle constructor and then use these two values in the constructor to compute the hypotenuse field. The formula is:

$$\text{hypotenuse} = \text{sqrt}(\text{base} * \text{base} + \text{height} * \text{height})$$

```
public RightTriangle(int base, int height) {
    super(base, height);
    this.hypotenuse = Math.sqrt(this.base*this.base + this.height*this.height);
    System.out.println("Inside RightTriangle constructor.");
}
```

- Use the Math.sqrt() function to compute the square root. Math.sqrt() takes in a double and returns a double. Also, print out a message stating "Inside RightTriangle constructor."
- Add the **toString()** method to **RightTriangle**. Use **super** to invoke **toString()** in the parent and concatenate the result with the hypotenuse.

```
public String toString(){
    return super.toString() + " Hypotenuse: " + this.hypotenuse;
}
```