

# Assignment #4

## CSE110 - Arizona State University

### *Topics*

- Conditional and Loops (Chapter 4)
- Implementing classes (Chapter 5)
- Understanding and accessing instance variables (Chapter 8)
- Implementing methods (Chapter 6)
- Object construction (Chapter 6)
- Constructors (chapter 8)
- Encapsulation (Chapter 8)

### *Coding Guidelines:*

- Give identifiers semantic meaning and make them easy to read (examples numStudents, grossPay, etc).
- Keep identifiers to a reasonably short length.
- Use upper case for constants. Use title case (first letter is upper case) for classes. Use lower case with uppercase word separators for all other identifiers (variables, methods, objects).
- Use tabs or spaces to indent code within blocks (code surrounded by braces). This includes classes, methods, and code associated with ifs, switches and loops. Be consistent with the number of spaces or tabs that you use to indent.
- Use white space to make your program more readable.

### *Part #1: Written Exercises (0 pts)*

None

### *Part #2 - Programming (20 pts)*

Your assignment is to write a class definition (not a program, there is no main method) named `Triangle` (saved in a file `Triangle.java`). A `Triangle` has 3 instance variables:

```
int side1, side2, side3;
```

The class `Triangle` must include the following constructors and methods: (If your class does not contain any of the following methods, points will be deducted).

- `public Triangle (int s1, int s2, int s3)` - Sets up a triangle with the specified side lengths.
- `private int largest()` - Returns the length of the longest side of the triangle. This is a helper method.

- `private int shortest()` Returns the length of the shortest side of the triangle. This is a helper method.
- `public boolean is_equilateral()` - Determines whether a triangle is equilateral. If the longest side is equal to the shortest side, then the triangle is equilateral.
- `public boolean is_isosceles()` - Determines whether a triangle is isosceles. Any (and at least) two sides must be equal.
- `public boolean is_scalene()` - Determines whether a triangle is scalene. No two sides are equal.
- `public String toString()` - Prints the sides of the triangle.

Save the `Triangle` class in a file called `Triangle.java` and use the following program stored in `Assignment4.java` which has the main method to create a new `Triangle` object and to test what kind of `Triangle` it is. A sample output is shown below.

### *Important*

Your class should have exactly the method headers that are described or otherwise your class will not work with the test driver program (`Assignment4.java`) that is provided. You should never change the test driver program if the test driver is provided but instead make changes to `Triangle` class to make it work.

### *Helpful Hints*

- Work on it in steps - write one method, test it with a test driver and make sure it works before going on to the next method.
- Always make sure your code compiles before you add another method.
- Your methods should be able to be called in any order.

```
Triangle equal = new Triangle (6, 6, 6); //example of equilateral (and isosceles) triangle
Triangle isosceles = new Triangle (3, 7, 7); // example of isosceles triangle
Triangle scalene = new Triangle (4, 5, 6); // example of scalene triangle
```

### *Sample Outputs*

Sample 1:

Enter the sides of the triangle:

**3 4 5**

3 4 5 triangle:

It is not isosceles

It is not a equilateral

It is scalene

Check another Triangle (y/n)? **y**

Enter the sides of the triangle:

**4 5 6**

4 5 6 triangle:

It is not isosceles

It is not a equilateral

It is scalene

Check another Triangle (y/n)? **y**

Enter the sides of the triangle:

**4 4 4**

4 4 4 triangle:  
It is isosceles  
It is equilateral  
It is not scalene

Check another Triangle (y/n)? **y**

Enter the sides of the triangle:

**3 7 7**

3 7 7 triangle:

It is isosceles

It is not a equilateral

It is not scalene

Check another Triangle (y/n)? **n**

Press any key to continue . . .

## ***Submission***

- Go to the course web site (my.asu.edu), and then click on the on-line Submission tab.
- Submit your Assignment4.java file on-line. Make sure to choose Hw4 from drop-down box.
- Assignment4.java should have the following, in order:
  - In comments, the assignment header.
  - The working Java code requested in Part #2.
  - The Assignment4.java file must compile and run as you submit it. You can confirm this by viewing your submission results.

**Important Note:** You may resubmit as many times as you like until the deadline, but we will only mark your last submission.

**NO LATE ASSIGNMENTS WILL BE ACCEPTED.**