CISC 3120 Fall 2012 Lab II.3

1. A small class hierarchy

   - We'll start by defining our old friend class `Point`.
   - Then define a class `Shape` which has one field `center` of type `Point`.
   - Write a constructor that sets the value of `center` and a function `perimeter` that has no body.
   - Write a subclass `Triangle` which contains three `Points` attributes and a constructor that sets these three points and the `center` of the `Triangle`.
   - Write a `public` method `perimeter` that computes the perimeter of the `Triangle`.
     Hint: the distance between points (x_1, y_1) and (x_2, y_2) is:

     $$\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

     and the perimeter is the sum of the distances between (x_1, y_1) and (x_2, y_2) and (x_3, y_3).
   - Write another subclass of `Shape` called `Rectangle` that contains four `Points` attributes and a constructor that sets these four points and the `center` of the `Rectangle`.
   - Write a `public` method `perimeter` that computes the perimeter of the `Rectangle`.
     Hint: You can assume that the `Points` are stored in a such a way that the perimeter can be computed by calculating the distance between the `Points` in sequence.

2. Using the hierarchy.
   Write an object with a `main` method that

   - Declares an array of 5 `Shape` objects.
   - Creates and intializes 3 `Triangles` and 2 `Rectangles` and places them in the array.
   - iterates through the array, computing the perimeter of each `Shape` in the array and printing it out.

3. An abstract class

   - Now make `Shape` and abstract class that includes the an abstract `Perimeter` function.