

CSCI 161: Homework #10

Due: Friday, April 27th @ 11:59PM

Graded for completion, not correctness

1). What is the output of the following:

```
public class ReferenceMystery1 {
    public static void main(String[] args) {
        int x = 0;
        int[] a = new int[4];
        x = x + 1;
        mystery(x, a);
        System.out.println(x + " " + Arrays.toString(a));
        x = x + 1;
        mystery(x, a);
        System.out.println(x + " " + Arrays.toString(a));
    }
    public static void mystery(int x, int[] a) {
        x = x + 1;
        a[x] = a[x] + 1;
        System.out.println(x + " " + Arrays.toString(a));
    }
}
```

2). Write a method called `countInRange` that accepts an *array of integers*, a *minimum value*, and a *maximum value* as parameters and returns the **count** of how many elements from the array fall between the minimum and maximum (inclusive). For example, in the array `[14, 1, 22, 17, 36, 7, -43, 5]`, for minimum value 4 and maximum value 17, the method should return 4.

3). Write a method called `isSorted` that accepts an array of real numbers as a parameter and returns true if the list is in sorted (nondecreasing) order and false otherwise. For example, if arrays named `list1` and `list2` store `[16.1, 12.3, 22.2, 14.4]` and `[1.5, 4.3, 7.0, 19.5, 25.1, 46.2]` respectively, `isSorted(list1)` should return false and `isSorted(list2)` should return true. You may assume the array has at least one element. A one-element array is considered to be sorted.

4). Describe the difference between object-oriented programming and procedural programming.

5). What is the difference between an accessor and a mutator?

6). What is abstraction? How do objects provide abstraction?

7). Add the following accessor method to the Point class:

```
public int quadrant()
```

Returns which quadrant of the x/y plane the current Point object falls in.

- Quadrant 1 contains all points whose x and y values are both positive.
- Quadrant 2 contains all points with negative x but positive y.
- Quadrant 3 contains all points with negative x and y values.
- Quadrant 4 contains all points with positive x but negative y.
- If the point lies directly on the x and/or y axis, return 0.

8). Add the following accessor method to the Point class:

```
public int manhattanDistance(Point other)
```

Returns the “Manhattan distance” between the current Point object and the given other Point object.

The Manhattan distance refers to the distance between two places if one can travel between them only by moving horizontally or vertically, as though driving on the streets of Manhattan. In our case, the Manhattan distance is the sum of the absolute values of the differences in their coordinates; in other words, the difference in x plus the difference in y between the points.