LAB #5: CLASSES

1. Task: Create a `Point` class. The class should contain 2 fields (integers called x and y, for the x and y coordinates, positive values) and the following methods:

- Default and alternate constructors.
- Two getters (accessors) to return the x and y coordinates
- A method named `set` to set the coordinates to the parameters passed; invalid values set to 0
- A method named `print` to print each `Point` object as (x, y)
- A method `toString()`
- A method named `equals` to compare 2 `Point` objects for equality
- 2 methods named `copy` and `getCopy` to make a copy of a `Point` object into another `Point` object
- A method named `distanceFromOrigin` to calculate the distance between a point and the origin at(0, 0)
- A method named `distance` to calculate the distance from a point to a given point.
- A method named `translate` to shift the location of a point by a given amount.
- A method named `isHorizontal` that returns true if any given point lines up horizontally with a given point.
- A method named `isVertical` that returns true if any given `Point` object lines up vertically with a given `Point` object.
- A method named `slope` that returns the slope of the line between this `Point` object and a given `Point` object.

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2. Task: Create a client for the `Point` class. Be very thorough with your testing (including invalid input) and have output similar to the sample output below:

```
---After declaration, constructors invoked--- Using toString():
First point is (0, 0)
Second point is (7, 13)
Third point is (7, 15)
Second point (7, 13) lines up vertically with third point (7, 15)
Second point (7, 13) doesn't line up horizontally with third point (7, 15)
Enter the x-coordinate for first point: retgre
Not an integer! Try again! Enter the x-coordinate for first point: 89.67
Not an integer! Try again! Enter the x-coordinate for first point: -13
ERROR! Should be positive. Enter the x-coordinate for first point: 15
Enter the y-coordinate for first point: fwgfe
Not an integer! Try again! Enter the y-coordinate for first point: 90.6
Not an integer! Try again! Enter the y-coordinate for first point: -32
ERROR! Should be positive. Enter the y-coordinate for first point: b
Not an integer! Try again! Enter the y-coordinate for first point: 23
First point (after call to set) is (15, 23)
Distance from origin for first point =  27.46
Distance from origin for second point =  14.76
Distance between first point and second point =  12.81
First point (after call to translate (5, 10)) is (20, 33)
Second point (after call to translate (15, 5)) is (22, 18)
---Call to equals: The 2 points are NOT equal.
---Calls to copy and print---
First point (after call to copy) is (20, 33)
Second point (after call to copy) is (20, 33)
---Call to equals after call to copy: The 2 points are equal.
```

Notes:
A. The lab will NOT be graded, but you have to submit good quality work in order to get credit.
B. The lab should be completed by the start of the next scheduled lab class. E-mail the **.java** files (attachments) to Rohan Patel (rpatel27@students.towson.edu)
Very important: Make sure that you have COSC 237.section, your name, and Lab#5 in the *Subject* box of your e-mail.
C. In case you have any problems, contact the instructor or the TA for assistance.