JAC444 Fall 2018: Workshop 2 - (10%)

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Due Sunday September 30, 2018 - 11:00 pm

Instructions

Please read the instructions carefully and follow the naming conventions specified for each question. Solutions must be submitted in the Blackboard Dropbox created for the workshop 1. **The deliverables will be questions placed a single package named *jac444.wk2*. The submission shall be in single jar file (called *jac444wk2.jar*) which contains both source (*.java) and bytecode (*class) files.** Your solution should be well documented using the JavaDoc utility to describe both your interface and your solution design.

Note that the deadline is strictly enforced. The system tracks the exact time that submissions are uploaded and late submissions will be rejected.

Question 1) Define a class called *Point* with a constructor **public** *Point*(**double** *x*, **double** *y*) and accessor methods *getX*, *getY*. Define a subclass *LabeledPoint* with a constuctor *LabeledPoint*(*String* **label**, **double** *x*, **double** *y*) and an accessor method *getLabel*. Ensure that all instance variables are only accessible by their subclasses.
Define *toString*, *equals and hashCode* methods for both classes. Use conventions noted in the course text (Section 4.2).

Question 2) Define an abstract class Shape with

- an instance variable of class Point
- a constructor
- a concrete method **public void** *moveBy*(**double** *dx*, **double** *dy*) which moves the point by the given amount
- an abstract method *Point getCentre*()

Question 3) Create the following concrete subclasses for Shape

- *Circle* - with constructor *Circle*(*Point centre*, **double** *radius*)
- *Rectangle* - with constructor *Rectangle*(*Point topLeft*, **double** *width*, **double** *height*)
- *Line* - with constructor *Line*(*Point from*, *Point to*)

Question 4) Create a **class** *Country* that has the following instance variables.

- name
- area (square kilometers)

Question 5) Create an interface called *Measurable* that has the following method

- *String getArea*() it shall return a string indicating the object's area

Question 6) Have classes in Question 3 and 4 implement this interface. (Since the units for Question 3 are not specified, it is sufficient to use "units squared")