PHYS 495 Problem Set 5

Date: Thursday, December 11th, 2003
Due date: Thursday, December 18th, 2003

Instructions: Work should be submitted on or before due date. Submit your work both in electronic and printed formats to the teaching assitant.

Reading: Class notes.

• **Problem 1** - [35 points]

In the notes distributed previously, we have the abstract class `Shape` and the subclasses `Circle` and `Rectangle`. First, type them in (if you already have not done so) in the form presented in the notes. Now, modify (or write from scratch) the `Triangle` class so that it extends `Shape`. The `Triangle` class must *not* be `abstract`! (It must implement `getArea()` and `getPerimeter()`.)

• **Problem 2** - [35 points]

Again, in the distributed class notes, the `Movable` interface is defined. Once again, do type it in as in the notes, if you already have not done so. Also, the implementation of this interface is done for you in the case of the `Circle` class. Add that implementation to the existing `Circle` class.

Modify `Rectangle` so that it implements `Movable`. The "reference point" for a rectangle should be the upper left corner.

Also modify `Triangle` so that it implements `Movable` too. This time, the reference point should be the center of mass of the triangle (this is a bit trickier than the case for `Rectangle`.

• **Problem 3** - [30 points]

Write a new interface, called `Scalable`. It should contain one method: `void scale(double factor)`. The idea is to change the overall size of the object; i.e. a call to `scale(0.5)` should scale every length in the object down to half the original length. Now implement this in `Circle`, `Rectangle`, and `Triangle`. In the case of the triangle, the center of mass should not move as the size changes.