

## **C++ Programming**

### **Homework 5**

- Define a class hierarchy with the following structure. You get to pick the problem domain, and I suggest you try to pick something you might have found useful in a project you may have worked on or would like to work on in the future. Here are the details:
  - (20 points) Define an abstract base class (e.g., Shape) with one pure virtual function (e.g., area). This class should describe an abstract category (example a Shape). Be sure this class has a constructor and at least one data member.
  - (40 points) Derive three classes directly from your abstract base class and make them concrete by providing implementations for the virtual function you introduced in your abstract base class. The methods for each of these three classes must actually behave differently from one another (example: Circle area vs. Square area vs. Triangle area).
  - (20 points) Write one interesting polymorphic function that operates on any type derived from your abstract base class. It should take a list (or array) of instances of your abstract base class (e.g., Shape \*) and call the virtual function on each to do something interesting. Also, have each of these virtual functions print something so you can see which is being called.
  - (20 points) Write a main program that builds a list (or array) of several instances of each of your concrete classes, then pass this off to your polymorphic function.