

# CS181, Programming Languages

## Assignment 3

(due: 11-3-2000)

For both problems submit only the source files (.java) using the WWW-Turnin. Remember to include your name in the files!

### Problem one:

Define a class hierarchy of shapes. Try to extract all common properties of shapes into an **abstract** class called *Shape*. Specific shapes should be subclasses of that class. Make your hierarchy tree at least three levels deep. For example polygons have special properties, while circles and ellipsis have different ones. Define at least two **interfaces** that may apply to shapes. An example would be the *Drawable* interface, for objects which should implement a draw method, or maybe the *Selectable* interface for objects that can be selected when the mouse pointer lies inside them. Remember that an interface may apply to any kind of an object and not only a shape. It is more general than a class (for example *Drawable* could be implemented by a string, to draw itself on the screen.)

### Problem two:

Extending your solution to problem one, define the interface *Printable* with a method 'public String toString()'. Make the *Shape* class implement this interface (just the Shape class, not all subclasses!) Every shape now should implement this method and return a string with useful information about itself. Create an application that initializes an array of Printable shapes, like 'Printable[] shapes = {new Circle(0, 10), new Rectangle(1, 3, 10, 20)}'. Using a *for* loop on the array, call the '*toString*' method of each element ('shapes[i].toString()') and print what you get on standard output. Check the output!