In this assignment you would create a hierarchy of classes related by inheritance.

You have been hired to design a set of classes that deal with mathematical shapes. The client has the following shapes in mind right now.

- Circle – Circle is defined by its center (which is a point) and its radius
- Rectangle – a closed polygon with 4 sides with right angles.
- Triangle – a closed polygon with 3 points in the two-dimensional plane.
- Cube – abstraction of a cube in three dimensional space. A cube is defined by its side length.
- Cylinder – a shape in three-dimensional space – defined by its radius and height
- Sphere – a shape in three-dimensional space – defined by its radius
- Cone – a shape in three-dimensional space – defined by its height and radius.

Although these are the shapes the client has in mind right now, in the future he/she may add more shapes to the hierarchy. So you are supposed to design a system that is extensible (means it is easy to add classes later).

We also have a Point class which is **not** part of the hierarchy, but used by classes in the hierarchy. After all, a Point is not really a shape!!

- Point – abstraction of a point in Cartesian coordinate system. A point is denoted by its *x* and *y* coordinates in the system.

The interface minimally should have the following:
A method that tells the client what the name of the shape is.
A method that enables the client to print the shape in a nice format on the screen
For two-dimensional shapes, the client wants operations that give the perimeter and area of each shape
For three-dimensional shape, the client wants operations that give surface area and volume of each shape.

See the Project4_ClassDiagram for the inheritance hierarchy and Project4_Specifications for method specifications.