SE 116– LAB #6 **2014 – 2015 SPRING**

Aim: Polymorphism

In this lab you will learn and understand **polymorphism** in C++ through prisms. Write the program by following the steps below:

1) Create a class called **Prism** with the following two double data members: **height** and **width**. Also define a **virtual** method called **calculateArea** that will calculate and print the surface area of the shape. Besides, you should implement the appropriate constructors (default and parameterized) and destructor (virtual).

2) Derive a subclass called **Cube**. **Cube** class overrides the **calculateArea** method to calculate and print the surface area of the square. Implement the appropriate constructors (default and parameterized) and destructor.

3) Derive another subclass called **Cylinder**. It will also override **calculateArea** method to calculate and print the surface area. Of course, implement the appropriate constructors and destructor for the class as well.

4) Write a main() function to test your classes using polymorphism. In main(),

i. declare 3 base class pointers; one will point dynamically created (at run-time) base class object, two others will point corresponding dynamically created objects of derived classes using the appropriate parameterized constructors. Then, call **calculateArea** method through each base class pointer. Finally, delete all objects through their base class pointers.

ii. declare and define 3 statically created (at compile-time) objects from each class. Then, declare 3 class references; one will refer to the base class object, two others will refer to the corresponding objects of derived classes. Then, call **calculateArea** method through each base class reference.

The Area formulas if you need:

Cube : 6*height*width

Cylinder: π*width*(height+width/2) , where the radius is width/2