Jaypee University of Engineering and Technology, Guna
Department of Computer Science and Engineering

Object Oriented Programming Lab (18B17CI271)

Lab Exercise-8(Run time polymorphism)

[Imp Note: All the programs must be written in C++ with distinguished variable names. If any kind of plagiarism is observed, the punctuality marks (10) will be awarded by zero.]

1. Create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data( ) to initialize base class data members and another member function display_area( ) to compute and display the area of figures. Make display_area( ) as a virtual function and redefine this function in the derived classes to suit their requirements.

   (A). Using these three classes, design a program that will accept dimensions of a triangle or a rectangle interactively and display the area using the concept of dynamic binding. Remember the two values given as input will be treated as lengths of two sides in the case of rectangles and as base and height in the case of triangles and used as follows:

   Area of rectangle = x * y

   Area of triangle = ½ * x * y

   (B). Extend the Program-1 to display the area of circle. This requires addition of a new derived class ‘circle’ that computes the area of a circle. Remember, for a circle we need only one value, its radius, but the get_data() function in the base class requires two values to be passed. (Hint: Make the second argument of get_data() function as a default one with zero value.)

   (C). Run the above program with the following modifications:

   - Remove the definition of display_area() from one of the derived classes.
   - In addition to the above change, declare the display_area() as pure virtual in the base class shape.

   Comment on the output in each case.