

Week 9:Pointer, Reference, Virtual Function

Learning Materials: Chapter 10

TASK 1:

Define classes **Triangle**, **Rectangle**, **Square** and **Hexagon** which will inherit **TwoDimensionalShape** class. Implement an appropriate constructor in each class definition to store the information.

In main function create a **single** list (array) of shapes where two objects of each kind of shapes (e.g. Isoceles, Rhombus etc.) will be stored.

TASK 2:

Implement **shapeDetails** function which displays the information about the shape. A sample output of Triangle is shown below:

```
Number of sides: 3
Type: Triangle
Area: 18.12
Perimeter= 17
```

TASK 3:

Now you want to add an **attribute** called color for each type of the shapes. Take necessary actions so that an attribute color can be added for each shape object. Modify the **shapeDetails** function so that color is also displayed with **shapeDetails** function.

TASK 4:

Implement **sortShapeArea(TwoDimensionalShape**,n)**, (*n* is the number of elements in the array) it will sort the array in descending order based on the area of the shape. You may need to add some member functions in the appropriate class.

***** Hints:**

Square:

Area (A) = side length (s) × side length (s)

Perimeter (P) = 4 × side length (s)

Triangle (for a generic triangle with sides a, b, and c and semi-perimeter s):

Area (A) = $\sqrt{s \times (s - a) \times (s - b) \times (s - c)}$

Perimeter (P) = a + b + c

Rectangle:

Area (A) = length (l) × width (w)

Perimeter (P) = 2 × (length (l) + width (w))

Hexagon:

Area (A) = $\frac{3\sqrt{3}}{2}a^2$

Perimeter (P) = 6a