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//301242419 COMP123(Sec.012) Programming 2

using System.Xml.Linq;

abstract class Shape

{

protected string Name { get; private set; }

protected abstract double Area { get; }

public Shape(string name) => Name = name;

public override string ToString()

=> $"{Name} has an area of {Area:F2}";

}

class Square : Shape

{

protected double Length { get; set; }

protected override double Area { get { return (Length \* 4); } }

public Square(string name, double length) : base(name)

=> Length = length;

}

class Circle : Square

{

protected override double Area => Math.PI \* Length \* Length;

public Circle(string name, double length) : base(name, length) => Length = length;

}

class Rectangle : Shape

{

public double Width { get; set; }

public double Height { get; set; }

protected override double Area { get { return Width \* Height; } }

public Rectangle(string name, double height, double width) : base(name)

=> (Height, Width) = (height, width);

}

class Ellipse : Rectangle

{

protected override double Area { get => Math.PI \* Width \* Height; }

public Ellipse(string name, double height, double width) : base(name, height, width)

{

}

}

class Triangle : Rectangle

{

protected override double Area => Width \* Height \* 0.5;

public Triangle(string name, double height, double width)

: base(name, height, width) { }

}

class Diamond : Rectangle

{

protected override double Area => Width \* Height;

public Diamond(string name, double height, double width)

: base(name, height, width) { }

}

class Program

{

static void Main()

{

List<Shape> shapes = new List<Shape>();

shapes.Add(new Square("s1", 2));

shapes.Add(new Rectangle("r1", 2, 3));

shapes.Add(new Circle("c1", 2));

shapes.Add(new Triangle("t1", 4, 6));

shapes.Add(new Ellipse("e1", 2, 3));

shapes.Add(new Diamond("d1", 2, 3));

shapes.Add(new Square("s2", 5));

shapes.Add(new Rectangle("r2", 5, 4));

shapes.Add(new Circle("c2", 1));

shapes.Add(new Triangle("t2", 7, 8));

foreach (var s in shapes)

{

Console.WriteLine(s);

}

}

}