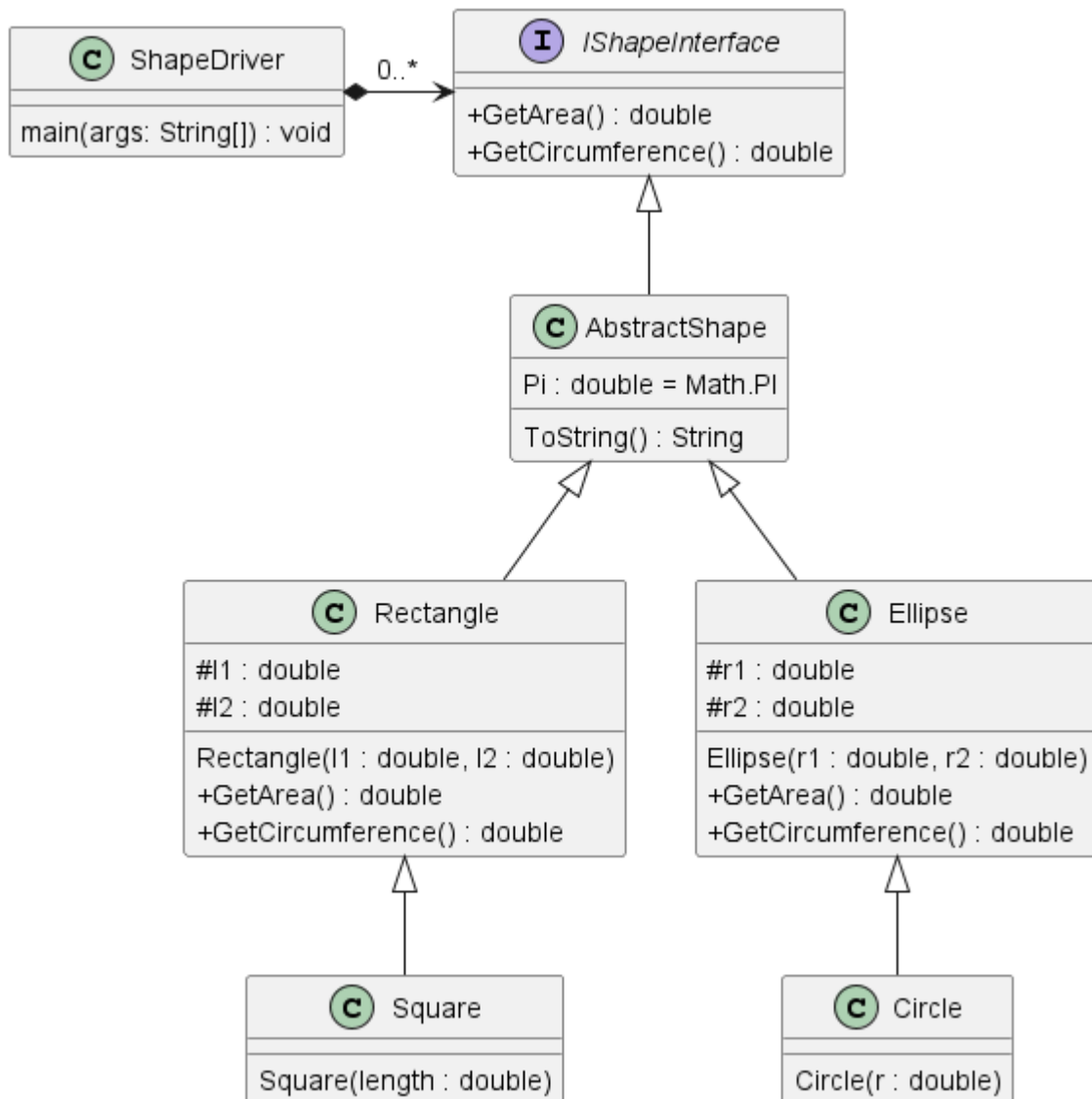


The Objective

Your assignment is to implement the following class diagram:



Supplied code:

- ShapeInterface.cs
- AbstractShape.cs
- ShapeDriver.cs

The tasks below will guide you through the implementation

Task 1 - Ellipse and Rectangle

Implement the Ellipse class.

1. Create a subclass `Ellipse.cs` as follows: `public class Ellipse : AbstractShape`
2. Declare 2 instance variables of type `double`
3. Create a constructor to initialise these variables
4. Implement methods `GetArea()` and `GetCircumference()` using the formula below.

Similarly, do it for Rectangle as well.

1. Create a subclass `Rectangle.cs` as follows: `public class Rectangle : AbstractShape`
2. Declare 2 instance variables of type `double`
3. Create a constructor to initialise these variables
4. Implement methods `GetArea()` and `GetCircumference()` using the formula below.

The following formulas can be used to calculate `GetArea()` and `GetCircumference()` :

	Ellipse	Rectangle
Area	$\pi * r1 * r2$	$l1 * l2$
Circumference	$2 * \pi * \sqrt{\frac{1}{2} * (r1^2 + r2^2)}$	$2 * (l1 + l2)$

Hint: Remember you have access to `Pi` from `AbstractShape`.

You can use `Math.Sqrt()` and `Math.Pow()` for the mathematical expressions.

Task 2 - Circle and Square

Create a subclass Circle.cs as follows: `` public class Circle : Ellipse``

Create a subclass Square.cs as follows: `` public class Square : Rectangle``

Remember that Circles and squares are just Ellipses and Rectangles with $r_1=r_2$ and $l_1=l_2$ respectively.

Hint: Remember that you can call the parent constructor using `` : base(...)``.

E.g.: `` public Circle(double r1) : base(r1, r1) {}``

Task 3 - Testing your implementation

Two run configurations have been created for you to test your program.

For testing the implementation, choose the one without "GUI". For testing your Avalonia GUI, choose the one with "GUI".

dotnet run

dotnet run GUI

When `ShapeDriver` is executed the output must look like the following:

Circle: Area: 36,317 Circumference: 21,363

Rectangle: Area: 14,960 Circumference: 15,600

Ellipse: Area: 28,840 Circumference: 19,289

Square: Area: 11,560 Circumference: 13,600