

EXERCISE

Create a python module implementing

- `class Shape(object)`
 - Instance variable: color
- `class Rectangle(Shape)`
 - Instance variable: width, height
 - Methods: calculate_area()
- `class Circle(Shape)`
 - Instance variable: radius
 - Methods: calculate_area()

SOLUTION

```
import numpy as np

class Shape(object):
    num = 0

    def __init__(self, color):
        self.color = color
        Shape.num += 1

    @staticmethod
    def how_many():
        return Shape.num
```

SOLUTION

```
class Rectangle(Shape):  
  
    def __init__(self, width, height, color):  
        super(Rectangle, self).__init__(color)  
        self.width = width  
        self.height = height  
  
    def calculate_area(self):  
        return self.width * self.height
```

SOLUTION

```
class Circle(Shape):  
  
    def __init__(self, radius, color):  
        super(Circle, self).__init__(color)  
        self.radius = radius  
  
    def calculate_area(self):  
        return np.pi * self.radius ** 2
```

SOLUTION

```
rect1 = Rectangle(10, 10, 'white')
circ1 = Circle(2, 'blue')

print(rect1.calculate_area())
print(circ1.calculate_area())
print(Shape.how_many())
```

```
>>> >>> 100
12.566370614359172
2
```