练习

1、Shape基类，要求所有子类都必须提供面积的计算，子类有三角形、矩形、圆。
2、上题圆类的数据可序列化

三角形面积——海伦公式：

$$p = (a+b+c)/2$$
$$S = \sqrt{p(p-a)(p-b)(p-c)}$$

参考

1、Shape基类，要求所有子类都必须提供面积的计算，子类有三角形、矩形、圆。

```
import math

class Shape:
    @property
    def area(self):
        raise NotImplementedError('基类未实现')

class Triangle(Shape):
    def __init__(self, a, b, c):
        self.a = a
        self.b = b
        self.c = c

    @property
    def area(self):
        p = (self.a + self.b + self.c) / 2
        return math.sqrt(p * (p-self.a) * (p-self.b) * (p-self.c))

class Rectangle(Shape):
    def __init__(self, width, height):
        self.width = width
        self.height = height

    @property
    def area(self):
        return self.width * self.height


class Circle(Shape):
    def __init__(self, radius):
        self.d = radius * 2

    @property
    def area(self):
```

```
        return math.pi * self.d * self.d * 0.25


shapes = [Triangle(3,4,5), Rectangle(3,4), Circle(4)]
for s in shapes:
    print('The area of {} = {}'.format(s.__class__.__name__,s.area))
```

2、圆类的数据可序列化

```
import json
import msgpack

class SerializableMixin:
    def dumps(self, t='json'):
        if t == 'json':
            return json.dumps(self.__dict__)
        elif t == 'msgpack':
            return msgpack.packb(self.__dict__)
        else:
            raise NotImplementedError('没有实现的序列化')

class SerializableCircleMixin(SerializableMixin, Circle):
    pass

scm = SerializableCircleMixin(4)
print(scm.area)
s = scm.dumps('msgpack')
print(s)
```