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revolucionamos la comunicación

UNIVERSIDAD
COMPLUTENSE
DE MADRID

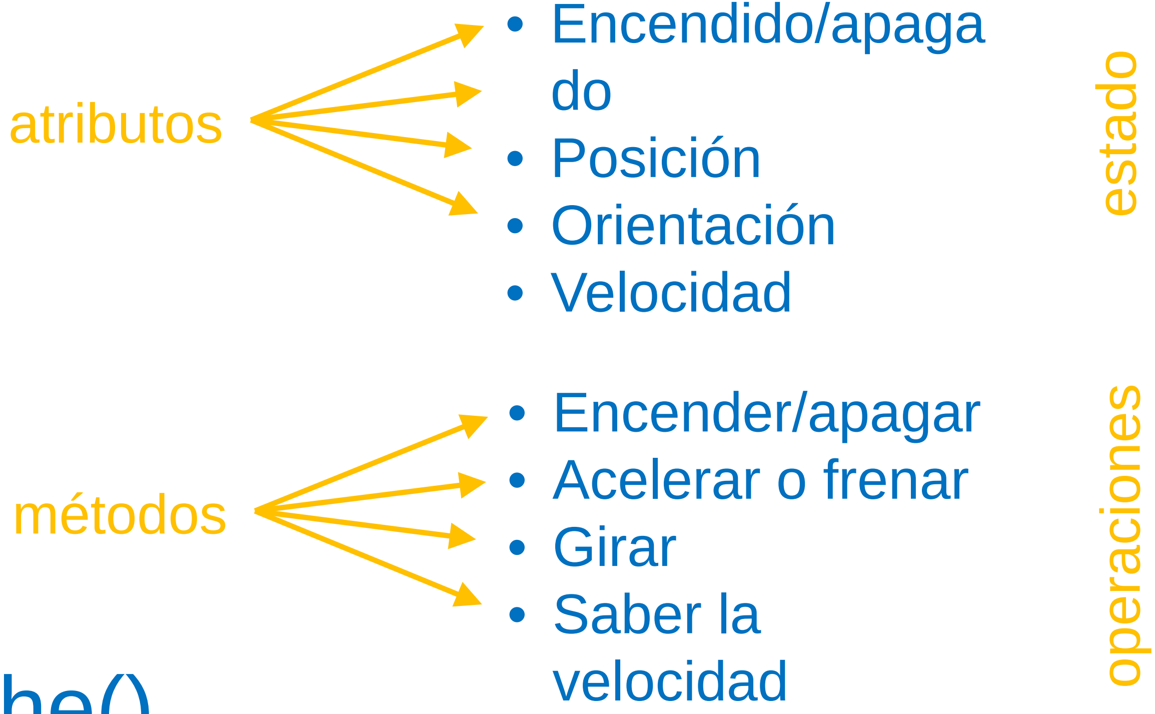
Programación. Python

Clases y objetos

Cristóbal Pareja Flores

Clases
Y
objetos

class Coche(object)



atributos

- Encendido/apagado
- Posición
- Orientación
- Velocidad

estado

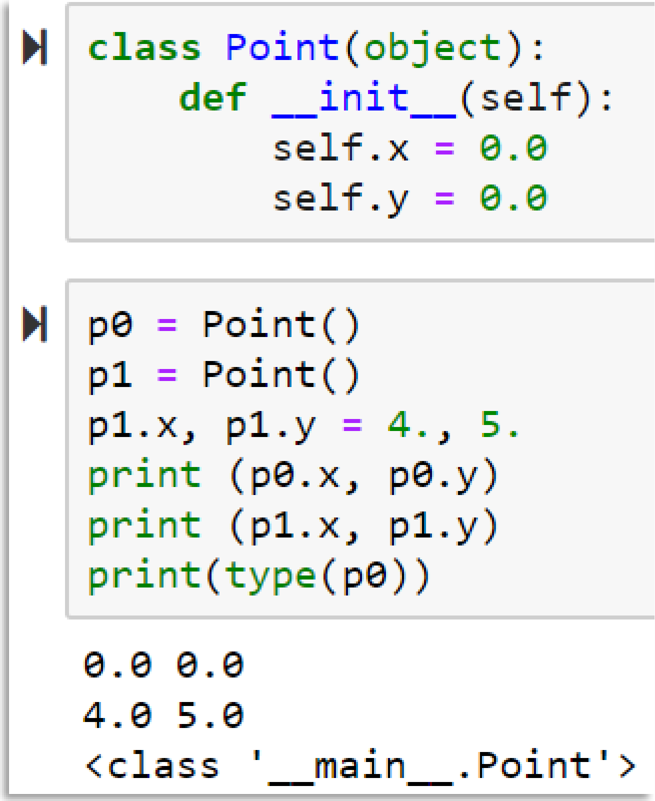
métodos

- Encender/apagar
- Acelerar o frenar
- Girar
- Saber la velocidad

operaciones

co_cris = Coche()

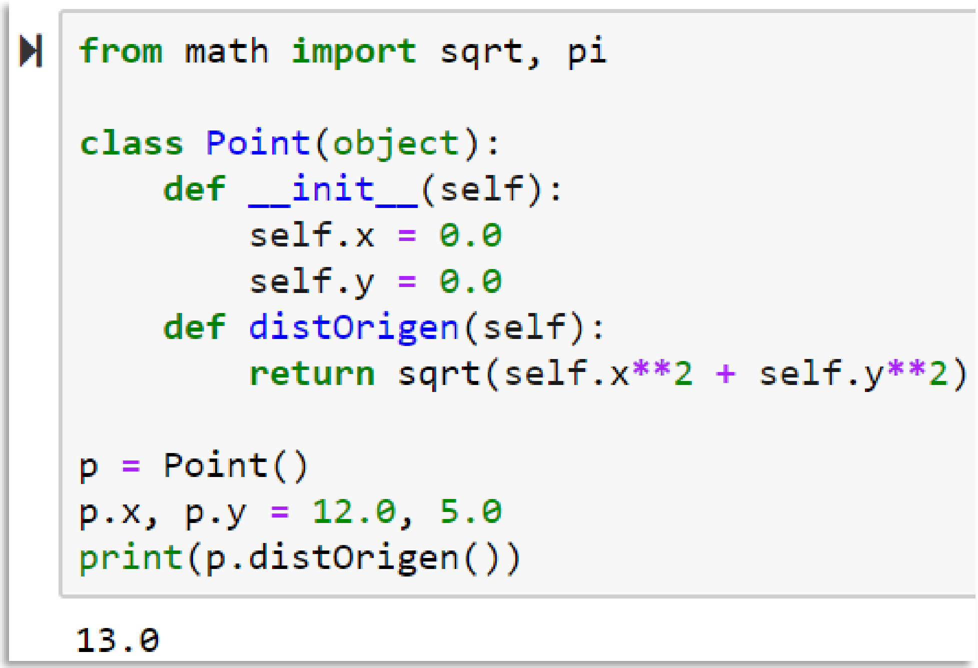
La clase Punto



```python
class Point(object):
    def __init__(self):
        self.x = 0.0
        self.y = 0.0
```

```python
p0 = Point()
p1 = Point()
p1.x, p1.y = 4., 5.
print (p0.x, p0.y)
print (p1.x, p1.y)
print(type(p0))
```

```
0.0 0.0
4.0 5.0
<class '__main__.Point'>
```



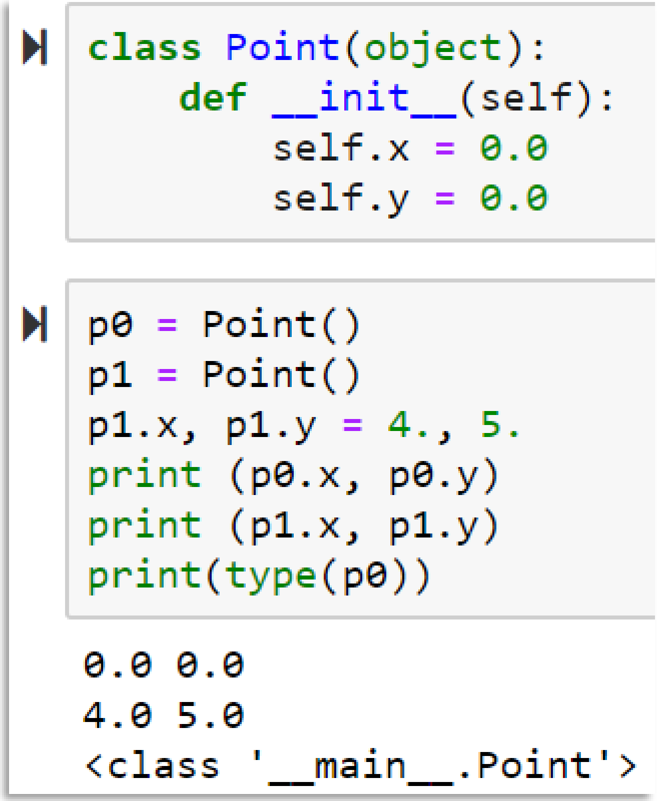
```python
from math import sqrt, pi

class Point(object):
    def __init__(self):
        self.x = 0.0
        self.y = 0.0
    def distOrigen(self):
        return sqrt(self.x**2 + self.y**2)

p = Point()
p.x, p.y = 12.0, 5.0
print(p.distOrigen())
```

```
13.0
```

La clase Punto



```python
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```python
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p1 = Point()
p1.x, p1.y = 4., 5.
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print (p1.x, p1.y)
print(type(p0))
```
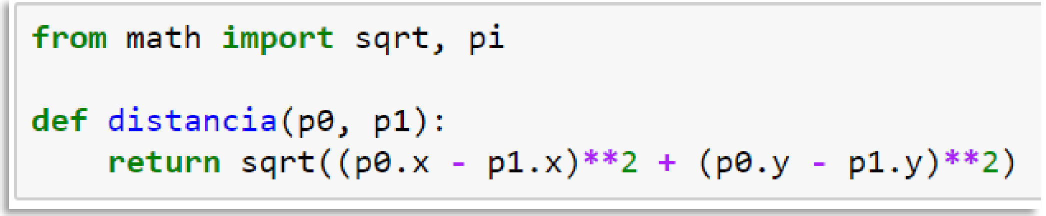
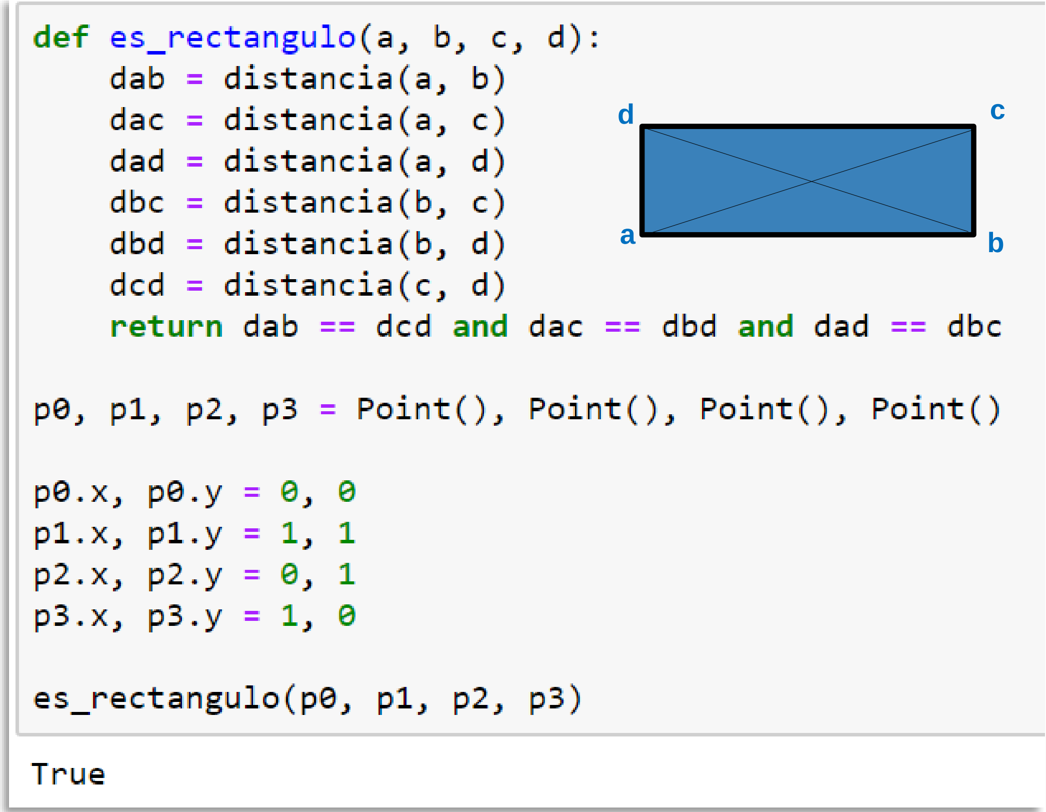

```
0.0 0.0
4.0 5.0
<class '__main__.Point'>
```

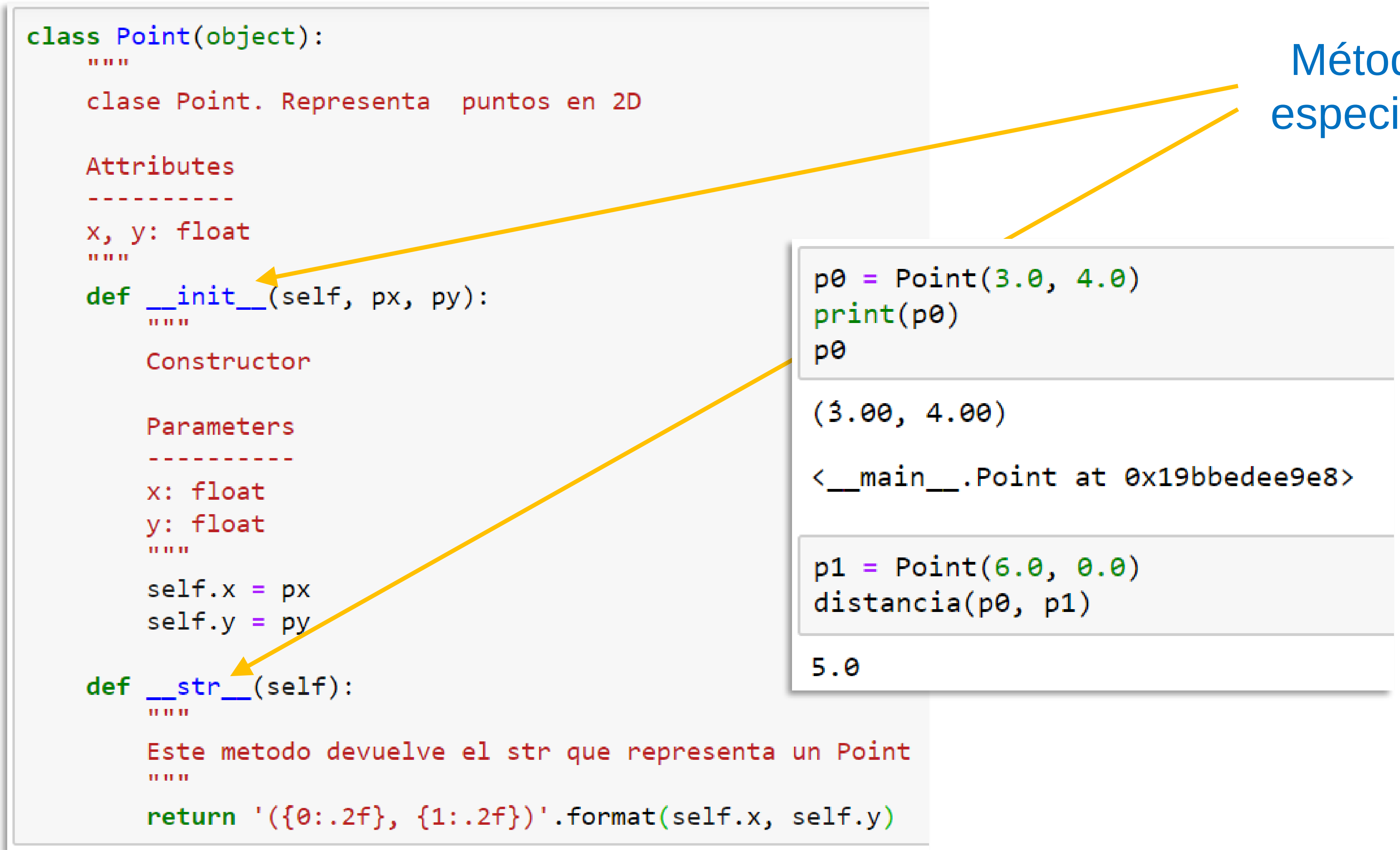


```python
from math import sqrt, pi

def distancia(p0, p1):
    return sqrt((p0.x - p1.x)**2 + (p0.y - p1.y)**2)
```



```python
def es_rectangulo(a, b, c, d):
    dab = distancia(a, b)
    dac = distancia(a, c)
    dad = distancia(a, d)
    dbc = distancia(b, c)
    dbd = distancia(b, d)
    dcd = distancia(c, d)
    return dab == dcd and dac == dbd and dad == dbc

p0, p1, p2, p3 = Point(), Point(), Point(), Point()

p0.x, p0.y = 0, 0
p1.x, p1.y = 1, 1
p2.x, p2.y = 0, 1
p3.x, p3.y = 1, 0

es_rectangulo(p0, p1, p2, p3)
```

```
True
```



Métodos especiales

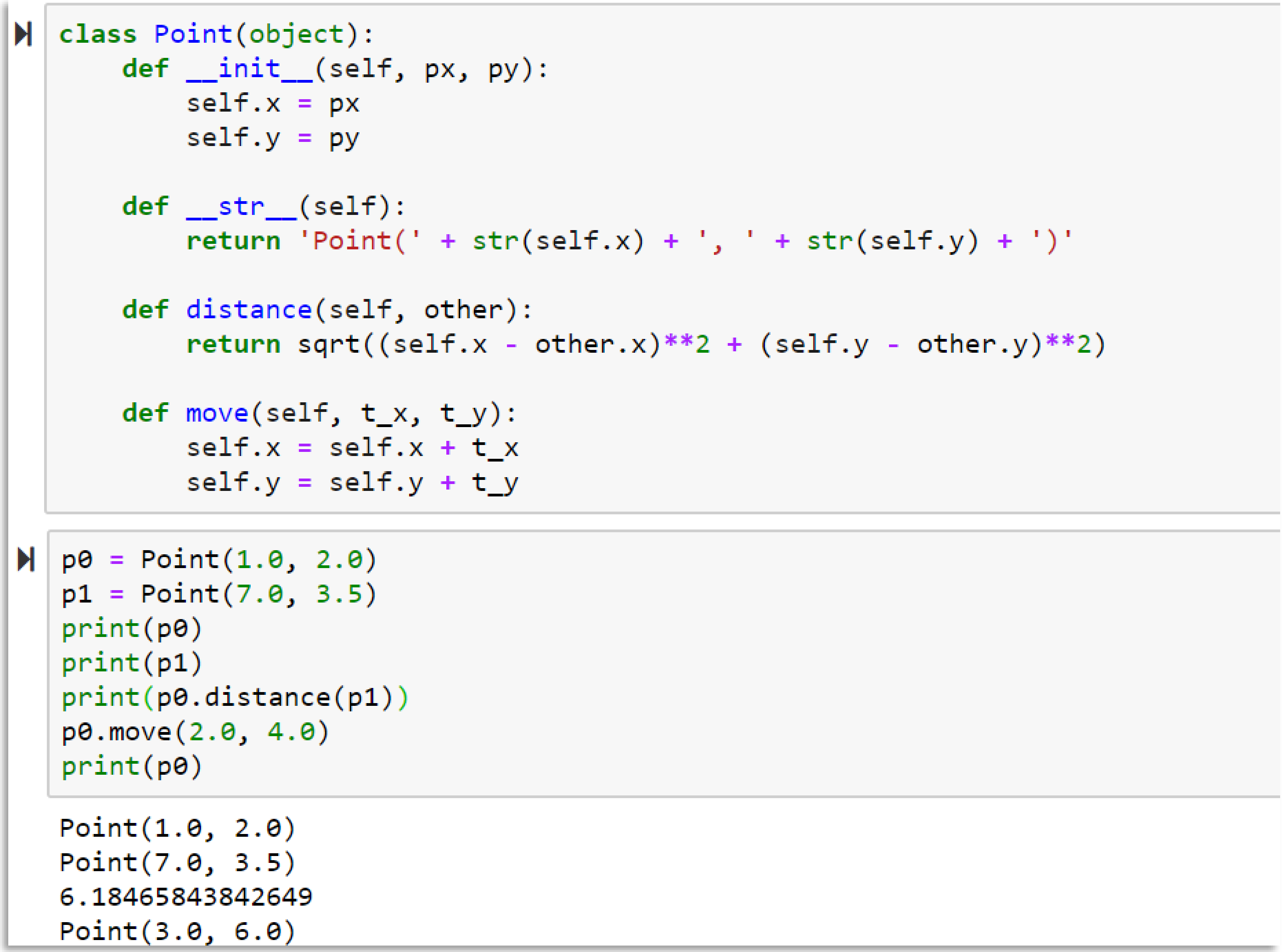
```python
class Point(object):
    """
    clase Point. Representa  puntos en 2D

    Attributes
    ----------
    x, y: float
    """
    def __init__(self, px, py):
        """
        Constructor

        Parameters
        ----------
        x: float
        y: float
        """
        self.x = px
        self.y = py

    def __str__(self):
        """
        Este metodo devuelve el str que representa un Point
        """
        return '({0:.2f}, {1:.2f})'.format(self.x, self.y)
```

```python
p0 = Point(3.0, 4.0)
print(p0)
p0
```

```
(3.00, 4.00)

<__main__.Point at 0x19bbedee9e8>
```

```python
p1 = Point(6.0, 0.0)
distancia(p0, p1)
```

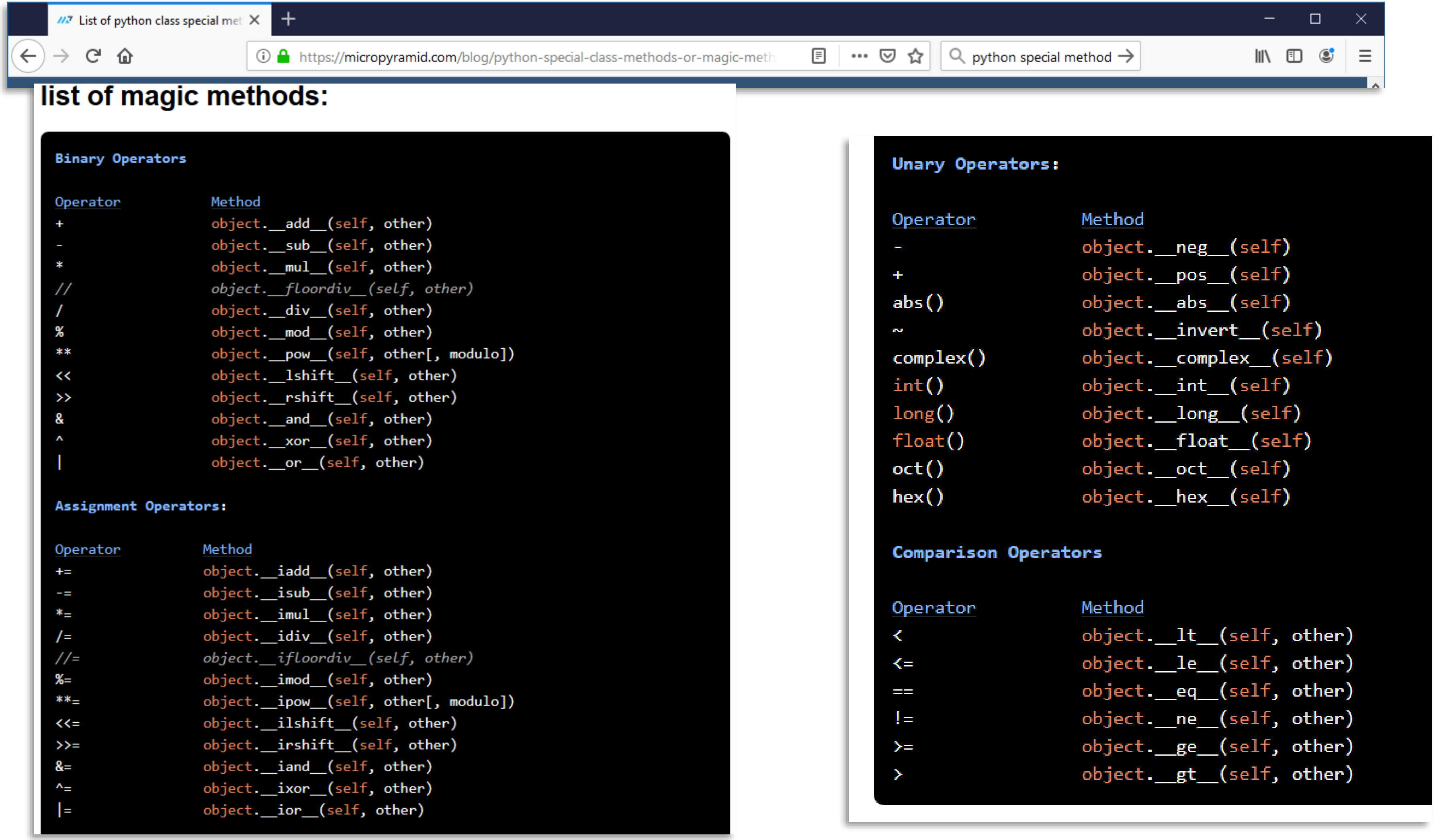
```
5.0
```



```python
class Point(object):
    def __init__(self, px, py):
        self.x = px
        self.y = py

    def __str__(self):
        return 'Point(' + str(self.x) + ', ' + str(self.y) + ')'

    def distance(self, other):
        return sqrt((self.x - other.x)**2 + (self.y - other.y)**2)

    def move(self, t_x, t_y):
        self.x = self.x + t_x
        self.y = self.y + t_y
```

```python
p0 = Point(1.0, 2.0)
p1 = Point(7.0, 3.5)
print(p0)
print(p1)
print(p0.distance(p1))
p0.move(2.0, 4.0)
print(p0)
```

```
Point(1.0, 2.0)
Point(7.0, 3.5)
6.18465843842649
Point(3.0, 6.0)
```


List of python class special met
https://micropyramid.com/blog/python-special-class-methods-or-magic-meth
python special method

list of magic methods:

```
Binary Operators

Operator     Method
+            object.__add__(self, other)
-            object.__sub__(self, other)
*            object.__mul__(self, other)
//           object.__floordiv__(self, other)
/            object.__div__(self, other)
%            object.__mod__(self, other)
**           object.__pow__(self, other[, modulo])
<<           object.__lshift__(self, other)
>>           object.__rshift__(self, other)
&            object.__and__(self, other)
^            object.__xor__(self, other)
|            object.__or__(self, other)

Assignment Operators:

Operator    Method
+=          object.__iadd__(self, other)
-=          object.__isub__(self, other)
*=          object.__imul__(self, other)
/=          object.__idiv__(self, other)
//=         object.__ifloordiv__(self, other)
%=          object.__imod__(self, other)
**=         object.__ipow__(self, other[, modulo])
<<=         object.__ilshift__(self, other)
>>=         object.__irshift__(self, other)
&=          object.__iand__(self, other)
^=          object.__ixor__(self, other)
|=          object.__ior__(self, other)
```

```
Unary Operators:

Operator          Method
-                 object.__neg__(self)
+                 object.__pos__(self)
abs()             object.__abs__(self)
~                 object.__invert__(self)
complex()         object.__complex__(self)
int()             object.__int__(self)
long()            object.__long__(self)
float()           object.__float__(self)
oct()             object.__oct__(self)
hex()             object.__hex__(self)

Comparison Operators

Operator          Method
<                 object.__lt__(self, other)
<=                object.__le__(self, other)
==                object.__eq__(self, other)
!=                object.__ne__(self, other)
>=                object.__ge__(self, other)
>                 object.__gt__(self, other)
```