Магические методы

In [1]:
```
class User:
    def __init__(self, name, email):
        self.name = name
        self.email = email

    def get_email_data(self):
        return {
            'name': self.name,
            'email': self.email
        }

jane = User('Jane Doe', 'janedoe@example.com')

print(jane.get_email_data())
```

```
{'name': 'Jane Doe', 'email': 'janedoe@example.com'}
```

In [2]:
```
class Singleton:
    instance = None

    def __new__(cls):
        if cls.instance is None:
            cls.instance = super().__new__(cls)

        return cls.instance


a = Singleton()
b = Singleton()

a is b
```

Out[2]:
```
True
```

__str__

In [3]:
```
class User:
    def __init__(self, name, email):
        self.name = name
        self.email = email

    def __str__(self):
        return '{} <{}>'.format(self.name, self.email)


jane = User('Jane Doe', 'janedoe@example.com')

print(jane)
```

```
Jane Doe <janedoe@example.com>
```

__hash__, __eq__

In [4]:
```
class User:
    def __init__(self, name, email):
        self.name = name
        self.email = email

    def __hash__(self):
        return hash(self.email)

    def __eq__(self, obj):
        return self.email == obj.email


jane = User('Jane Doe', 'jdoe@example.com')
joe = User('Joe Doe', 'jdoe@example.com')


print(jane == joe)
```

```
True
```

In [5]:
```
print(hash(jane))
print(hash(joe))
```

```
7885430882792781082
7885430882792781082
```

In [6]:
```
user_email_map = {user: user.name for user in [jane, joe]}

print(user_email_map)
```

```
{<__main__.User object at 0x107415908>: 'Joe Doe'}
```

__getattr__, __getattribute__, __setattr__, __delattr__

In [7]:
```
class Researcher:
    def __getattr__(self, name):
        return 'Nothing found :('

    def __getattribute__(self, name):
        return 'nope'


obj = Researcher()

print(obj.attr)
print(obj.method)
print(obj.DFG2H3J0OKLL)
```

```
nope
nope
nope
```

In [8]:
```
class Researcher:
    def __getattr__(self, name):
        return 'Nothing found :(\n'

    def __getattribute__(self, name):
        print('Looking for {}'.format(name))
        return object.__getattribute__(self, name)


obj = Researcher()

print(obj.attr)
print(obj.method)
print(obj.DFG2H3J0OKLL)
```

```
Looking for attr
Nothing found :(

Looking for method
Nothing found :(

Looking for DFG2H3J0OKLL
Nothing found :(
```

In [9]:
```
class Ignorant:
    def __setattr__(self, name, value):
        print('Not gonna set {}!'.format(name))


obj = Ignorant()
obj.math = True
```

```
Not gonna set math!
```

In [10]:
```
print(obj.math)
```

```
---------------------------------------------------------------------------
AttributeError                            Traceback (most recent call last)
<ipython-input-10-677c3efbe80d> in <module>()
----> 1 print(obj.math)

AttributeError: 'Ignorant' object has no attribute 'math'
```

In [11]:
```
class Polite:
    def __delattr__(self, name):
        value = getattr(self, name)
        print(f'Goodbye {name}, you were {value}!')

        object.__delattr__(self, name)


obj = Polite()

obj.attr = 10
del obj.attr
```

```
Goodbye attr, you were 10!
```

__call__

In [12]:
```
class Logger:
    def __init__(self, filename):
        self.filename = filename

    def __call__(self, func):
        with open(self.filename, 'w') as f:
            f.write('Oh Danny boy...')
        return func

logger = Logger('log.txt')

@logger
def completely_useless_function():
    pass
```

In [13]:
```
completely_useless_function()

with open('log.txt') as f:
    print(f.read())
```

```
Oh Danny boy...
```

__add__

In [14]:
```
import random


class NoisyInt:
    def __init__(self, value):
        self.value = value

    def __add__(self, obj):
        noise = random.uniform(-1, 1)
        return self.value + obj.value + noise


a = NoisyInt(10)
b = NoisyInt(20)
```

In [15]:
```
for _ in range(3):
    print(a + b)
```

```
30.605646527205856
30.170967742734117
29.071231797981817
```

Написать свой контейнер с помощью __getitem__, __setitem__

In [16]:
```
class PascalList:
    def __init__(self, original_list=None):
        self.container = original_list or []

    def __getitem__(self, index):
        return self.container[index - 1]

    def __setitem__(self, index, value):
        self.container[index - 1] = value

    def __str__(self):
        return self.container.__str__()


numbers = PascalList([1, 2, 3, 4, 5])

print(numbers[1])
```

```
1
```

In [17]:
```
numbers[5] = 25

print(numbers)
```

```
[1, 2, 3, 4, 25]
```