Python ile Meta Programlama

Burak Yiğit Kaya

http://goo.gl/jZOS6

Ben kimim?

- Burak Yiğit Kaya
- DISQUS'ta Yazılım Mühendisi (JavaScript)
- @madbyk
- https://github.com/BYK

Meta Programlama?

- Ne işe yarar?
    - Alana Özgü Diller (DSL)
        - pyml
    - İlişkisel Nesne Modeli Çatısı (ORM Framework)
        - pyresto
    - Web Çatıları
        - webpy

Meta - Sınıfın sınıfı

- Sınıfın sınıfı olur mu?

  -
    ```
    >>> class Something(object):
    ...     pass
    ...
    >>> Something
    <class '__main__.Something'>
    >>> type(Something)
    <type 'type'>
    ```
  - type == class ?!
    - __metaclass__ = type
    - type.__new__ -> class.__init__
  - type -> object -> class

Meta - __metaclass__

```
class Model(object):
    __metaclass__ = ModelBase

class ModelBase(type):
    def __new__(mcls, name, bases, attrs):
        return type(name, bases, attrs)
```

Meta - Gerçek hayat?

```
class ModelBase(ABCMeta):
    def __new__(mcls, name, bases, attrs):
        new_class = super(ModelBase, mcls).__new__(mcls, name, bases, attrs)
     if name == 'Model':  # prevent unnecessary base work
          return new_class

     if not hasattr(new_class, '_path'):  # don't override if defined
         new_class._path = u'/{0}/{{1:id}}'.format(quote(name.lower()))
     else:  # otherwise make sure _path is a unicode instance
         new_class._path = unicode(new_class._path)

     if new_class._secure:
         conn_class = httplib.HTTPSConnection
     else:
         conn_class = httplib.HTTPConnection
     new_class._get_connection = classmethod(lambda c: conn_class(c._host))

     return new_class
```

https://github.com/BYK/pyresto/blob/master/pyresto/core.py#L33

Meta - Descriptor

- @property?
- "property" alanına erişmek istediğimizde ne oluyor?
  - property "sınıfı"

  -
    ```
    def __get__(self, instance, owner):
        return self.__getter(instance)
    ```

  -
    ```
    def __set__(self, instance, value):
        return self.__setter(instance, value)
    ```

  -
    ```
    def __delete__(self, instance):
        pass # acaba? =)
    ```

Meta - Descriptor - Örnek

```
def __get__(self, instance, owner):
    if not instance:
        return self.__model

    if instance not in self.__cache:
        keys = instance._parents
        keys.update(self.__key_extractor(instance))
        pk = keys.pop(self.__model._pk)
        self.__cache[instance] = self.__model.get(pk,
                                                  **keys)

    return self.__cache[instance]
```

https://github.com/BYK/pyresto/blob/master/pyresto/core.py#L291

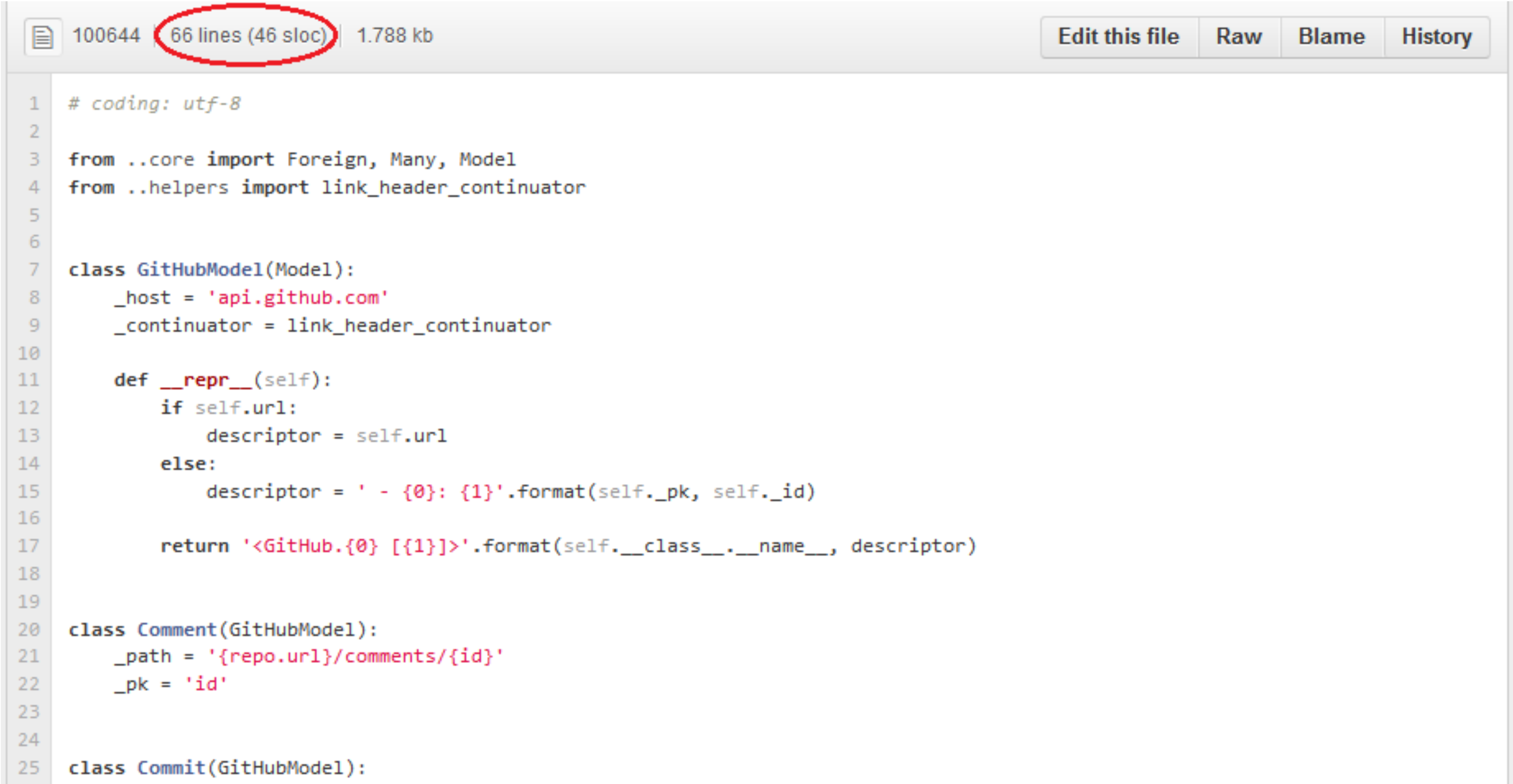
Meta - Daha?

Bunu alan, şunları da aldı:

- __eq__
- __gt__
- __getattr__
- __getattribute__
- ve dahası...

Sonuç

- 65 satırda GitHub API istemcisi:



```
# coding: utf-8

from ..core import Foreign, Many, Model
from ..helpers import link_header_continuator


class GitHubModel(Model):
    _host = 'api.github.com'
    _continuator = link_header_continuator

    def __repr__(self):
        if self.url:
            descriptor = self.url
        else:
            descriptor = ' - {0}: {1}'.format(self._pk, self._id)

        return '<GitHub.{0} [{1}]>'.format(self.__class__.__name__, descriptor)


class Comment(GitHubModel):
    _path = '{repo.url}/comments/{id}'
    _pk = 'id'


class Commit(GitHubModel):
```

Kaynaklar

- https://github.com/berkerpeksag/notes/blob/master/python/metaclassess.md
- https://github.com/BYK/pyresto/blob/master/pyresto/apis/GitHub.py
- http://martyalchin.com/2007/nov/23/python-descriptors-part-1-of-2/
- http://docs.python.org/reference/datamodel.html
- http://www.voidspace.org.uk/python/articles/metaclasses.shtml

Teşekkürler!

Sorular?