Metaohjelmointi Python-kielellä

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Python

```
print 'foobar!' # Shazbot
```

Python

- Foo
- Bar

Luokat

```
class MyClassA(object):
  def a(self):
    print('foo')
class MyClassB(object):
  def b(self):
    print('bar')

class MyClassC(MyClassA, MyClassB):
  """Moniperija"""
  def c(self):
    self.a()
    self.b()

olio = MyClassC()
olio.c()
# foo
# bar
```

Introspektio

```
for attr in dir(olio):
  print(attr)

# __class__
# __delattr__
# __dict__
# __doc__
# __format__
# __getattribute__
# __hash__
# ...
# a
# b
# c
```

inspect-moduuli

```
import inspect

print(len(dir(inspect)))  # 87

print(inspect.getdoc(inspect.getdoc))
# Get the documentation string for an object.
#
# All tabs are expanded to spaces.  To clean up docstrings that are
# indented to line up with blocks of code, any whitespace than can be
# uniformly removed from the second line onwards is removed.

print(inspect.getdoc(inspect))
# Get useful information from live Python objects.
#
# This module encapsulates the interface provided by the internal speci
# attributes (co_*, im_*, tb_*, etc.) in a friendlier fashion.
# It also provides some help for examining source code and class layout
#
```

inspect-moduuli

```
for attr in dir(olio):
        docstring_header = str(inspect.getdoc(getattr(olio, attr))).split
        print("olio.%s: %s" % (attr, docstring_header))

# olio.__class__: Moniperija
# olio.__delattr__: x.__delattr__('name') <==> del x.name
# olio.__dict__: dict() -> new empty dictionary
# olio.__doc__: str(object) -> string
# olio.__format__: default object formatter
# olio.__getattribute__: x.__getattribute__('name') <==> x.name
# olio.__hash__: x.__hash__() <==> hash(x)
# olio.__init__: x.__init__(...) initializes x; see help(type(x)) for s
# ...
# olio.a: None
# olio.b: None
# olio.c: None
```

Ohjelman ajonaikainen muokkaus

Monkey patching

Esimerkiksi jonkin kirjaston toiminnallisuuden muuttaminen ajon aikana.

Koodin kääntäminen ajonaikana

AST-puun muokkaus