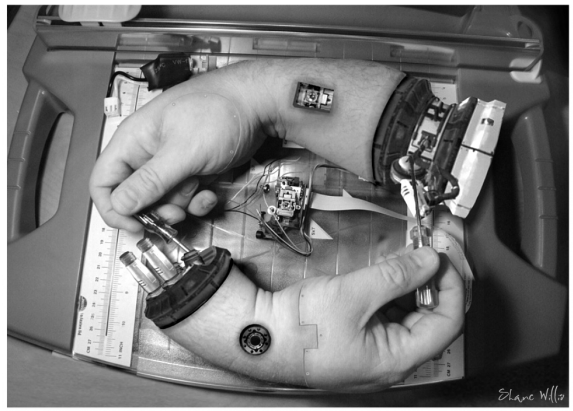
Metaprogramming in Python



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Metaprogramming

- **Metaprogramming** is a programming technique in which computer programs have the ability to treat programs as their data
- What does it mean?:
  - a program can be designed to read, generate, analyse or transform other programs, and even modify itself while running
- the language in which the metaprogram is written is called the *metalanguage*
- the ability of a programming language to be its own metalanguage is called *reflection*

Wikipedia

Examples of metaprogramming

- Generative programming (code generation)
  - *Quine* (self-generating program)

PYTHON

```
>>>s = 's = %r\nprint(s%%s)'
>>>print(s%s)

s = 's = %r\nprint(s%%s)'
print(s%s)
```

Examples of metaprogramming

- Generative programming
    - run time code generation or evalutation

PYTHON

```
>>> exec("""d = {'code': 'run time created!'}""")
>>> d['code']
'run time created!'

>>> s = "{'code': 'evaluated'}"
>>> d = eval(s)
>>> d['code']
'evaluated'
```

Examples of metaprogramming

- Self-modified run time program

PYTHON

```
>>>s = 's = %r\nprint(s%%s)'
>>>print(s%s)

s = 's = %r\nprint(s%%s)'
print(s%s)
```

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