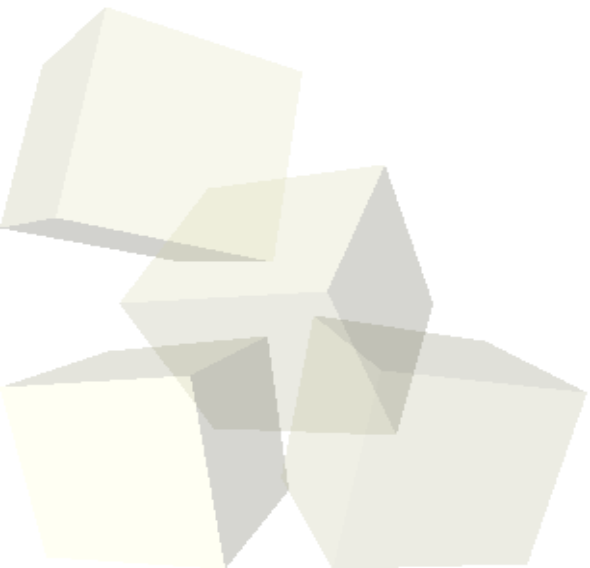
# Quality in Python

« *Bind two birds together: they have twice as many wings. However they are unable to fly.* »

-- Sufi Proverb



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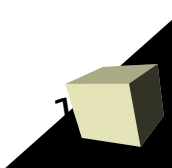
AFPy



# About me

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- http://nic-nac-project.de/~bader/
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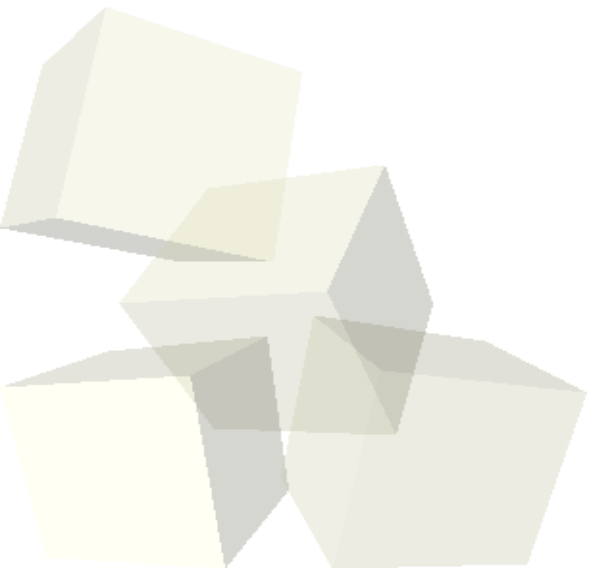
# What does quality mean ?

- ISO 9000 defines quality as "degree to which a set of inherent characteristic fulfils requirements".

- “to fulfill the quality standards”
- Being proud of your code 6 months after writing it

# The Python way of life

- Conform to conventions
- Code tools
- Project requirements



# Conventions Conformance

# Python Enhancement Proposal

- Design issue
- Guideline
- New feature

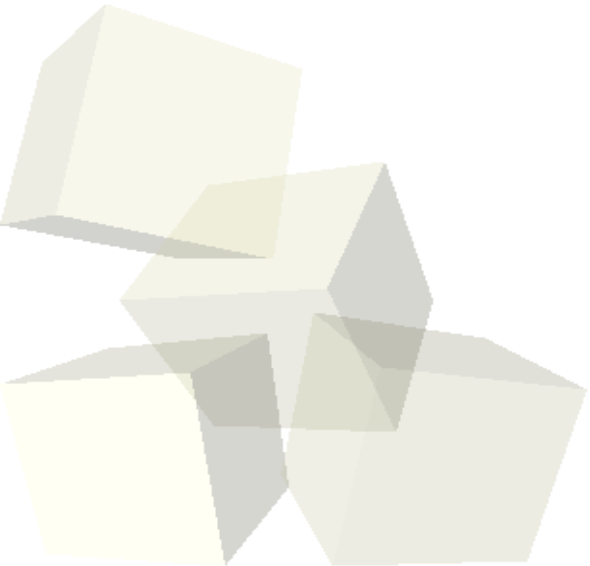
# PEP 20: “Zen of Python”

```
>>> import this
The Zen of Python, by Tim Peters

Beautiful is better than ugly.
Explicit is better than implicit.
Simple is better than complex.
Complex is better than complicated.
Flat is better than nested.
Sparse is better than dense.
Readability counts.
[...]
```

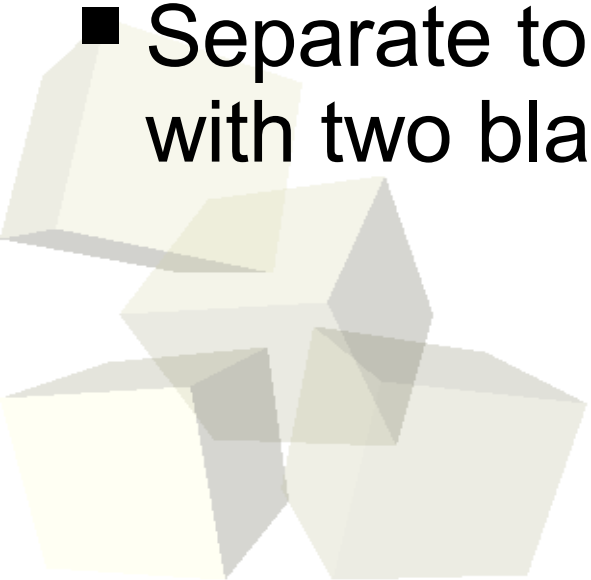
# PEP 8 -- Style Guide

- Code is read much more than it is written
- PEP 20: “Readability counts”



# PEP 8: Code lay-out

- Use 4 spaces per indentation level.
- Never mix tabs and spaces.
- Limit all lines to a maximum of 79 characters.
- Separate top-level function and class definitions with two blank lines.



# (Tabs are Evil ?)

- yes, they are !
  - http://www.emacswiki.org/cgi-bin/wiki/TabsAreEvil

- Emacs solution
  - `M x untabify`
  - in your .emacs
    - `(setq-default indent-tabs-mode nil)`

# PEP 8: Imports

- No: `import sys, os`
- Always put them at the top of the file
- (No: `from os import *`)

# PEP 8: Whitespaces (1/8)

Not immediately inside parentheses, brackets or braces.

Yes:

```
spam(ham[1], {eggs: 2})
```

No:

```
spam( ham[ 1 ], { eggs: 2 } )
```

# PEP 8: Whitespaces (2/8)

Not immediately before a comma, semicolon, or colon:

Yes:

```
if x == 4:
    print x, y
    x, y = y, x
```

No:

```
if x == 4 :
    print x , y
    x , y = y , x
```

# PEP 8: Whitespaces (3/8)

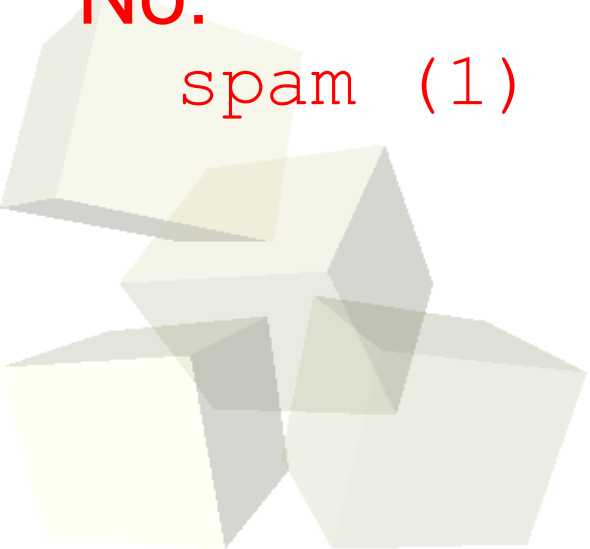
Not immediately before the open parenthesis that starts the argument list of a function call:

Yes:

```
spam(1)
```

No:

```
spam (1)
```



# PEP 8: Whitespaces (4/8)

Immediately before the open parenthesis that starts an indexing or slicing:

Yes:

```
dict['key'] = list[index]
```

No:

```
dict ['key'] = list [index]
```

# PEP 8: Whitespaces (5/8)

No more than one space around an assignment (or other) operator to align it with another.

Yes:

```
x = 1
y = 2
long_variable = 3
```

No:

```
x             = 1
y             = 2
long_variable = 3
```

# PEP 8: Whitespaces (6/8)

Use spaces around arithmetic operators.

Yes:

```
submitted += 1
x = x * 2 - 1
c = (a + b) * (a - b)
```

No:

```
submitted +=1
x = x*2 - 1
c = (a+b) * (a-b)
```

# PEP 8: Whitespaces (7/8)

Don't use spaces around the '=' sign when used to indicate a keyword argument or a default parameter value.

Yes:

```
def complex(real, imag=0.0):
    return magic(r=real, i=imag)
```

No:

```
def complex(real, imag = 0.0):
    return magic(r = real, i = imag)
```

# PEP 8: Whitespaces (8/8)

Compound statements (multiple statements on the same line) are generally discouraged.

Yes:

```
if foo == 'blah':
    do_one()
    do_two()
    do_three()
```

No:

```
if foo == 'blah': do_one(); do_two();
 do_three()
```

# PEP 8: Comments

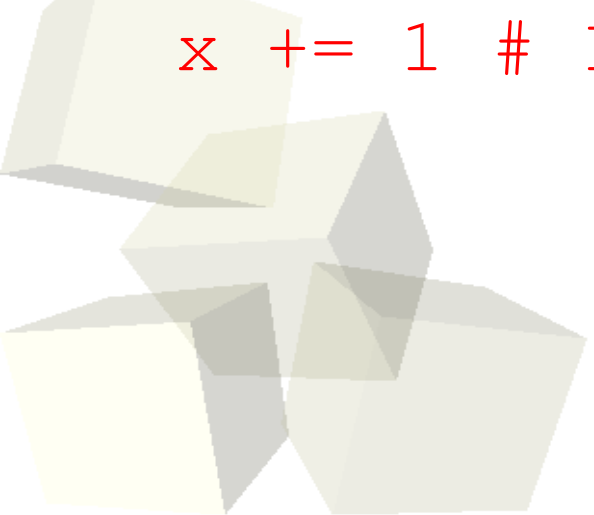
Comments should be complete sentences and in English please.

Yes:

```
x += 1 # Compensate for border
```

No:

```
x += 1 # Increment x
```



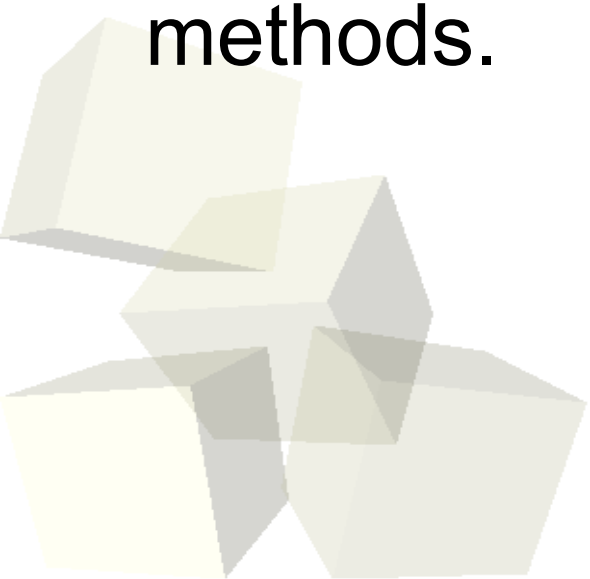
# PEP 8: Naming Conventions (1/4)

- Avoid names: `l, O, I`
- Modules should have short, lowercase names, without underscores. `[a-z]{2,}[0-9]`
- Class names use the `CapWords` convention.
- Function names should be lowercase, with words separated by underscores `[a-z_][a-z0-9_]*`

# PEP 8: Naming Conventions (2/4)

Arguments.

- Always use 'self' for the first argument to instance methods.
- Always use 'cls' for the first argument to class methods.



# PEP 8: Naming Conventions (3/4)

Class members.

- Use one leading underscore only for non-public methods and instance variables.
  - `def _private_method(self):`
- Append a single trailing underscore to avoid conflicts.
  - `print_`

# PEP 8: Naming Conventions (4/4)

Class attributes.

Expose attribute name, without complicated accessor/mutator methods.

Yes:

```
self.foo = 'baz'
```

No:

```
def get_foo(self):
    return self._foo

def set_foo(self, foo):
    self._foo = foo
```

<footer><numéro></footer>

# PEP 8: Programming (1/3)

Boolean comparison.

Yes:

```
if greeting:
```

No:

```
if greeting == True:
```

**Worse:**

```
if greeting is True:
```

# PEP 8: Programming (2/3)

Comparison.

None:

Yes:

```
a is None
```

No:

```
a == None
```

Type:

Yes:

```
if isinstance(obj, int):
```

No:

```
if type(obj) is type(1):
```

# PEP 8: Programming(3/3)

Strings.

Concatenation:

Yes:

```
''.join(a, b)
```

No:

```
a+b
```

Is it a String ? (unicode, str, etc.)

Yes:

```
if isinstance(obj, basestring):
```

No:

```
if isinstance(obj,str):
```

# PEP 257 – Docstrings

- Modules, class and functions should have docstrings
- Example:

```
def complex(real=0.0, imag=0.0):
    """Form a complex number.

    Keyword arguments:
    real -- the real part (default 0.0)
    imag -- the imaginary part (default 0.0)
    """
```

- Not a function signature:

```
def function(a, b):
    """function(a, b) -> list"""
```

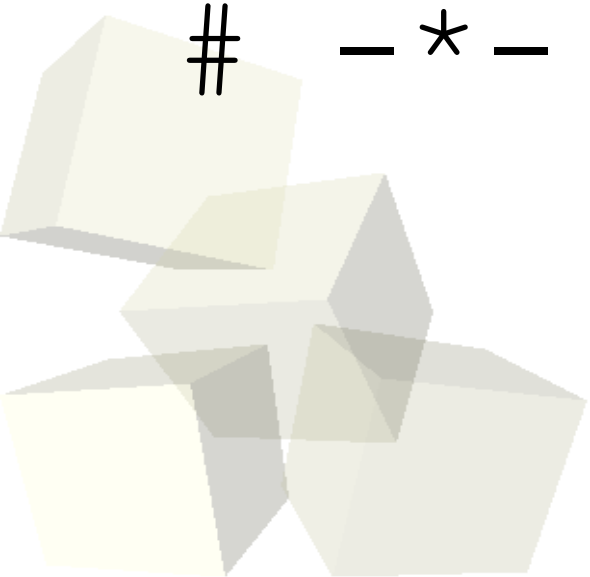
# Module Variables

- `__version__` (PEP 8)
  - `__version__ = "4.2"`
  - module version
- `__all__` (PEP 8)
  - `__all__ = ("foo_bar", "FooBar")`
  - list of public module objects that are designed for use via `from module import *`
- semi-officials: `__author__`, `__copyright__`, `__license__`

# PEP 263 -- Encoding

- encoding matters
- you have to deal with encodings
- everything has an encoding
- ***especially*** if you're using utf-8

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-
```



nose, doctest, pyunit, unittest, DataTest, gtktest, guitest, TestGears, testoob, thrud,

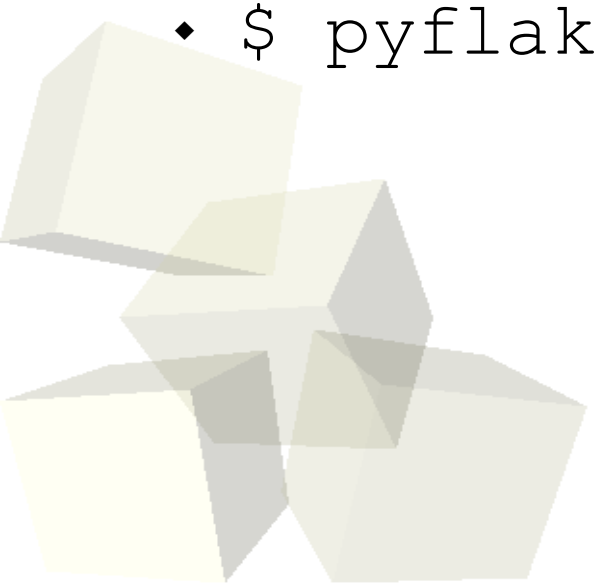
# CodeTools

# Code Tools

- Syntax checker:
  - pyflakes, pylint, pychecker
- Doc generation:
  - pydoc, epydoc, happydoc, pudge
- Code Coverage
  - coverage.py, pycover
- Kwalitee
  - Cheesecake project (Google SoC 2006)

# pyflakes

- Simple (relaxed?) syntax checker
- Output example:
  - `$ pyflakes /usr/lib/python2.4/*.py`



# pylint

- checks for compliance with PEP 8
- much more pedantic
- highly configurable
  - default configuration
    - `$ pylint --generate-rcfile`
  - sample configuration:
    - http://nic-nac-project.de/~bader/misc/pylintrc

# Code Coverage: coverage.py

- Measures code coverage during Python execution.
- Which lines are executable
- Which have been executed
- Usage:
  - $ coverage -x module.py
  - $ coverage -rm module.py

# Project Files

- README (reStructuredText)
- COPYRIGHT (GNU GPLv2)
- INSTALL
- CHANGELOG
- setup.py (setuptools > distutils)
- package/
- tests/
- doc/

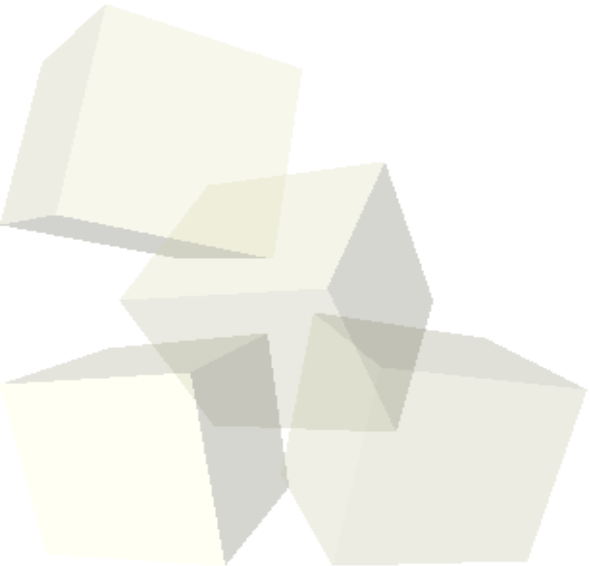
# Kwalitee (Coming Soon)

- CheeseCake, Google Summer of Code 2006
- *«What is a good module? That's hard to say. What is good code? That's also hard to say. "Quality" is not a well-defined term in computing ... and especially not Perl. One man's Thing of Beauty is another's man's Evil Hack. »*
- Set of indicators about a project
  - ex: has_readme
    - → Checks if the distribution includes a README

# Conclusion

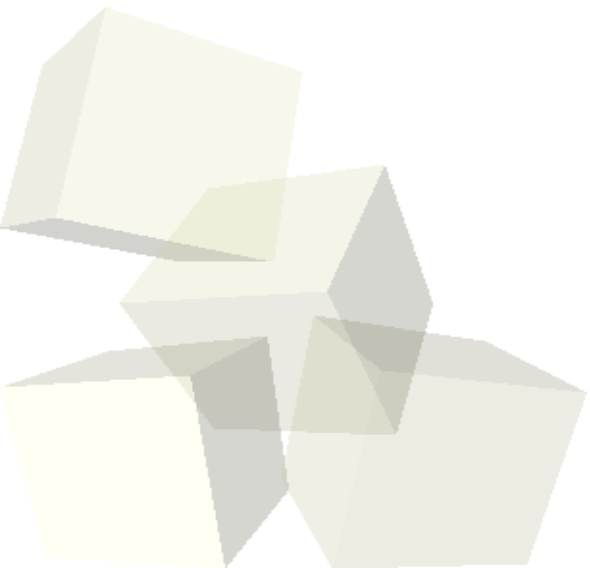
«*Tout ce qui peut être fait un autre jour, le peut être aujourd'hui.*»

-- Montaigne



# References

- PEP 1 – Python Enhancement Proposal
- PEP 8 – Style Guide
- PEP 20 – “Zen of Python”
- PEP 257 – Docstrings
- PEP 263 – Encoding
- Kwalitee http://cpants.perl.org/kwalitee.html



# Questions

Don't forget to tell some joke *now*