COMPSCI 590N
Lecture 12: Documentation and Testing

Roy J. Adams

College of Information and Computer Sciences
University of Massachusetts Amherst

Outline

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- Reading uncommented code is tedious and time consuming.
- If you are using code for science, it is good practice to treat comments like a lab journal. This documents the experiments you are running for reproducibility.

Comments in Python

There are two types of comments in Python:

```
# Single line comments start
# with a # sign.

"""
Multiline comments start
and end with triple quotes.
"""
```

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- For example: The documentation for a function should describe the function, its inputs, its outputs, and any exceptions it might raise.
- If you want anyone to use your code, it needs to be commented and documented.

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- Instead Python reads and stores docstrings and makes them accessible through the `help` function.
- Docstrings can be used to provide documentation for scripts, functions, and classes.
- Docstrings must use triple quotes: `""" comment """`

Docstrings

```
"""
    Place a docstring at the top of a script to document
        usage.

    Usage:
        python -h doc_script.py
"""
```

Docstrings

```
def fun(args):
"""
    Place a docstring under a def statement to document
        a function.
    Call help(fun) to view the docstring.

    Inputs: Describe the inputs.

    Outputs: Describe the outputs.

    Raises: Describe the possible exceptions.
"""
```

Docstrings

```
class Foo:
"""
    Place a docstring under a class statement to
        document a class.
    Call help(Foo) to view the docstring.

    Inputs: Describe the inputs to __init__.

    Members: Describe the members functions and
        attributes.
"""
```

Docstrings

Demo

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- Writing good tests for your code is hard, but is extremely important. It saves you time in the long run and saves you a lot of embarrassment.
- Many companies (e.g. Google) have strict testing guidelines.

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- This is not true in science, yet we are making scientific assertions premised on the the correctness of our code.
- Notable examples of failure:
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  - “Growth in a Time of Debt”.
  - Numerous times in my own attempts to recreate other’s experiments.

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```
assert <logical_statement>
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- Why use unit testing?
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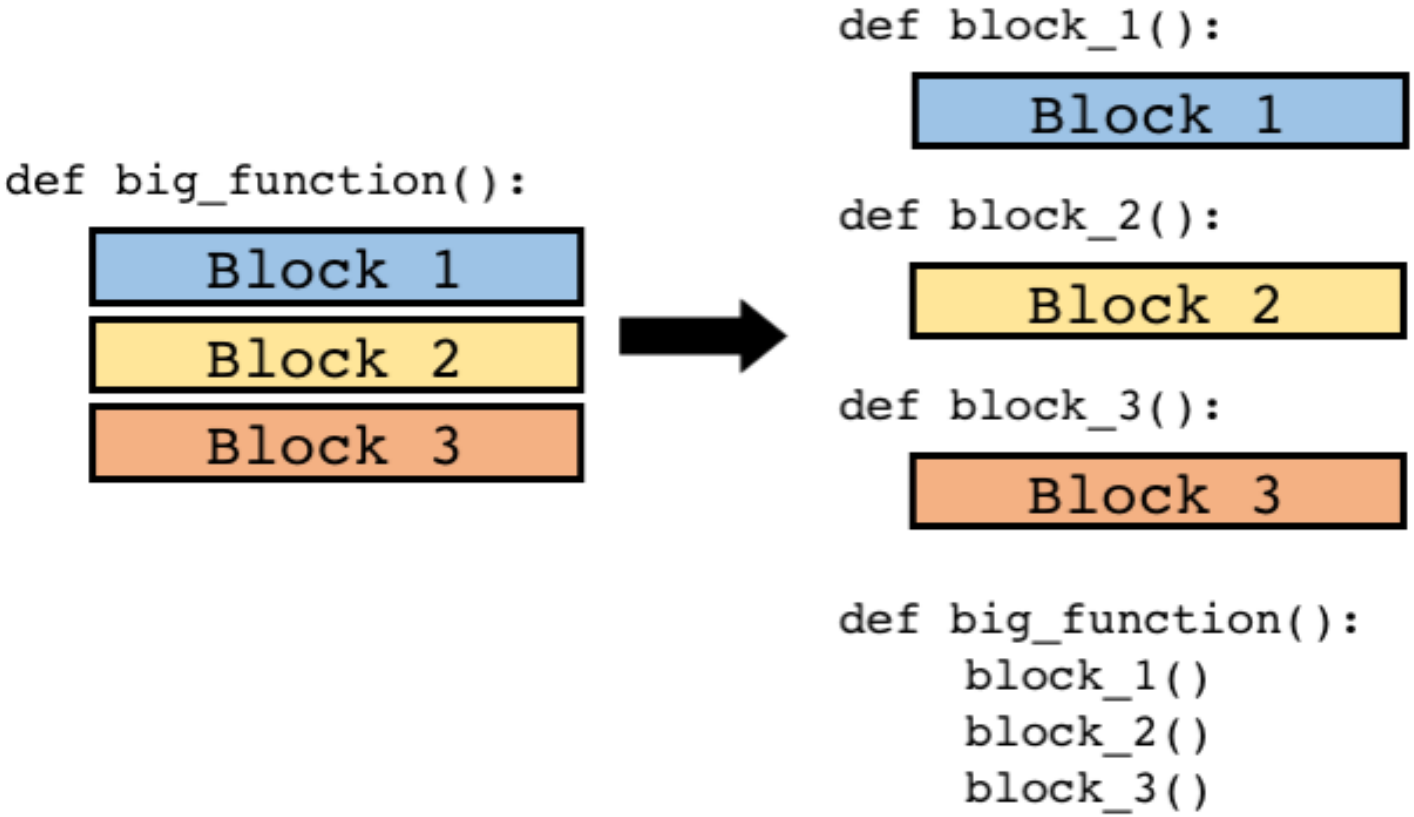
  - Easier to identify which part of the program is causing an error.
  - If changes are made only to a single unit, you can be confident that all of the other units are still valid.

Strategies for Testing: Unit Testing

```
def big_function():
    Block 1
    Block 2
    Block 3
```

Strategies for Testing: Unit Testing



unittest

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```
import unittest

def fun(x):
    return x**2

class FunTester(unittest.TestCase):
    def test_case_1(self):
        got = fun(3)
        expected = 9
        self.assertEqual(got,expected)

if __name__=="__main__":
    unittest.main()
```

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  - Many more.
- Many modules extend unittest to either add features or simplify the syntax: py.test, nose, testify, etc.

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To run the tests call doctest on the script:

```
python -m doctest script.py
```