Fight or Flight?

Gabor Szabo
http://szabgab.com
http://pydigger.com

You

(New) Developer at a company

The optimal situation

The ideal situation

- Git as version control system
- Small functions/methods with clear IO and very limited side-effects
- Loosely coupled modules and objects
- Microservices
- Documentation of the decisions made and the external API of each module
- Unit tests
- Integration tests
- Running CI

The real situation

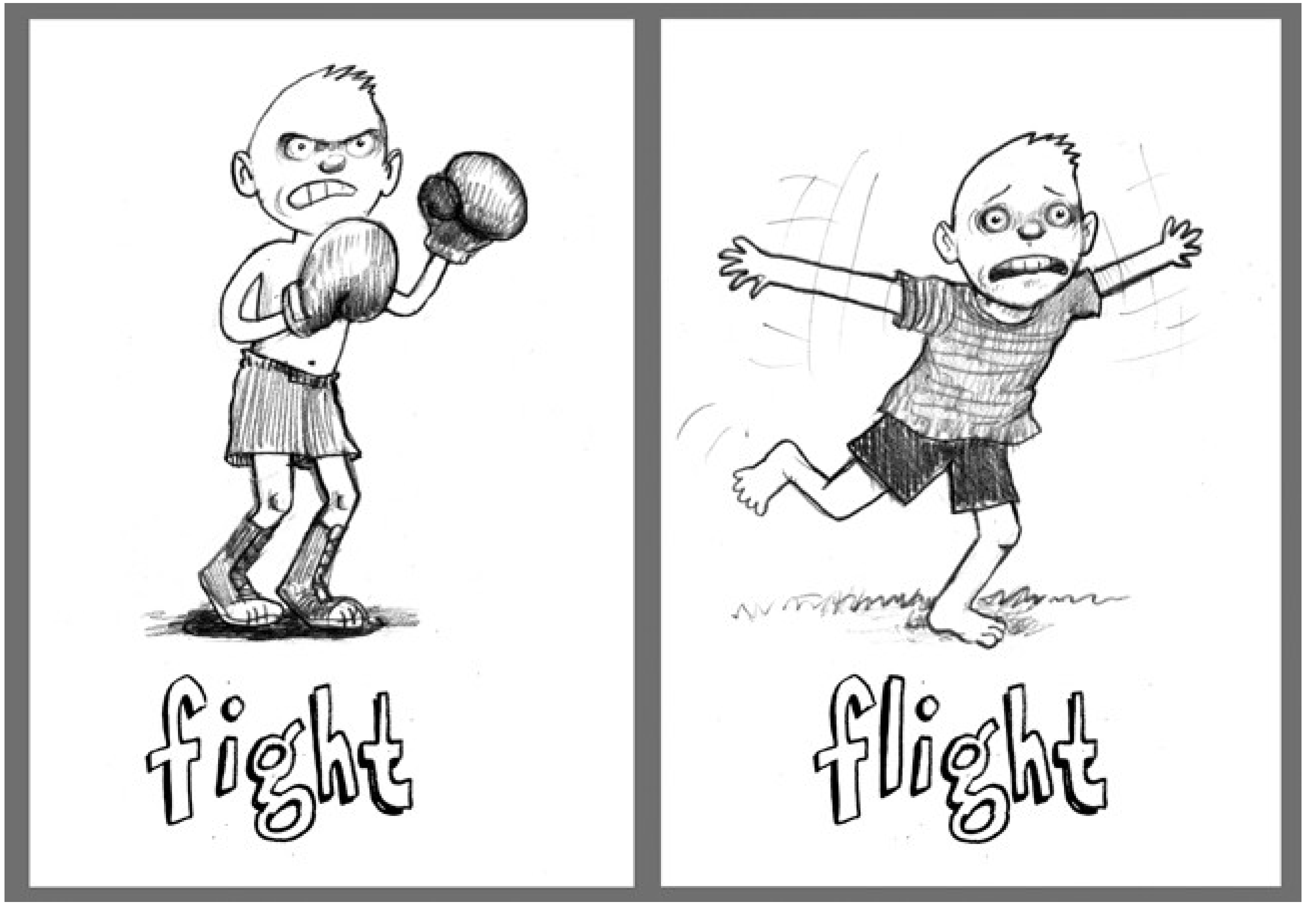
The real situation

- Huge functions (several hundred lines each)
- Circular dependencies of tightly coupled modules
- Global variables
- No tests
- No or incorrect documentation

Solution

Werewolf

Fight of Flight?



Flight

Fight

Business Value

- Increased speed of development (reduce time to market)
- Increased quality of the products/services

Programmer value

- Protect your code
- Reduce the fear, uncertainty, doubt to make changes
- Reduce the difficulty to make changes
- Reduce the WTF/minute in the code
- Your sanity

Measure your progress

Business Value

Measure your progress

- Test coverage (which is probably 0 when you start)
- Code complexity
- Standards or "best practices" compliance
- Execution time, if relevant
- Number of open tickets

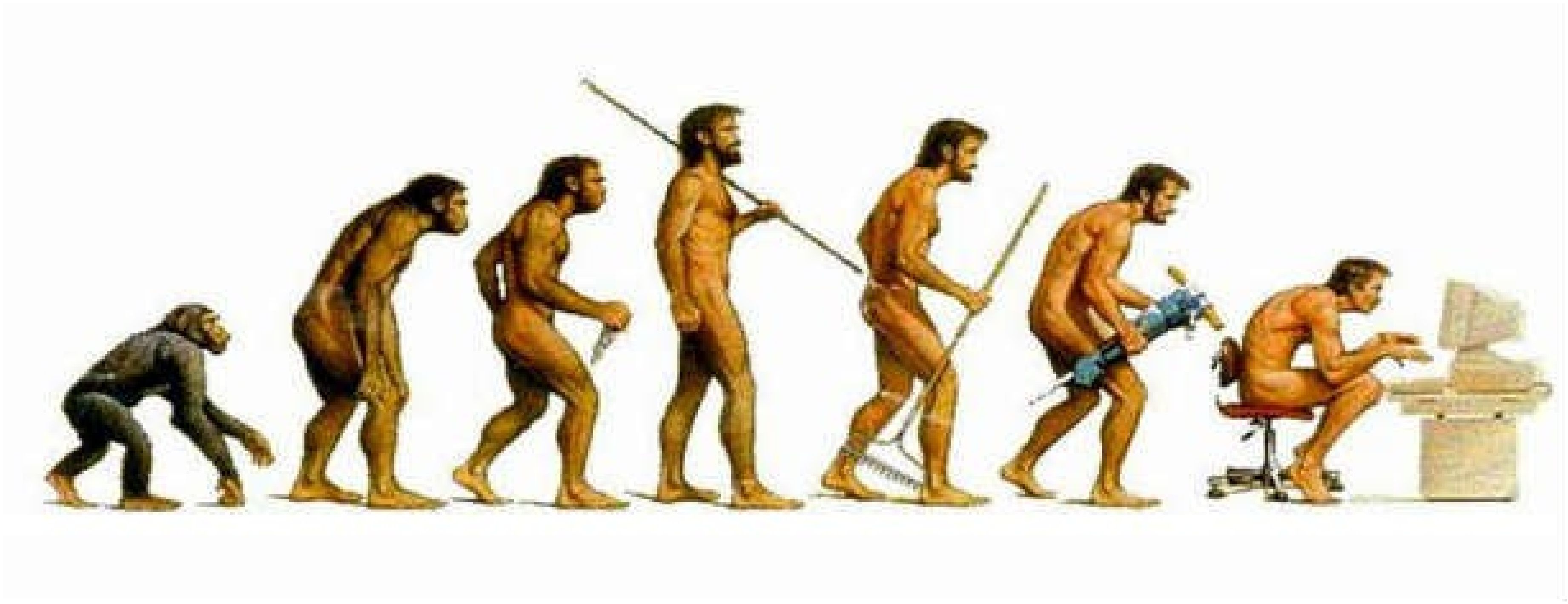
Setup VCS

Virtualenv

Write tests

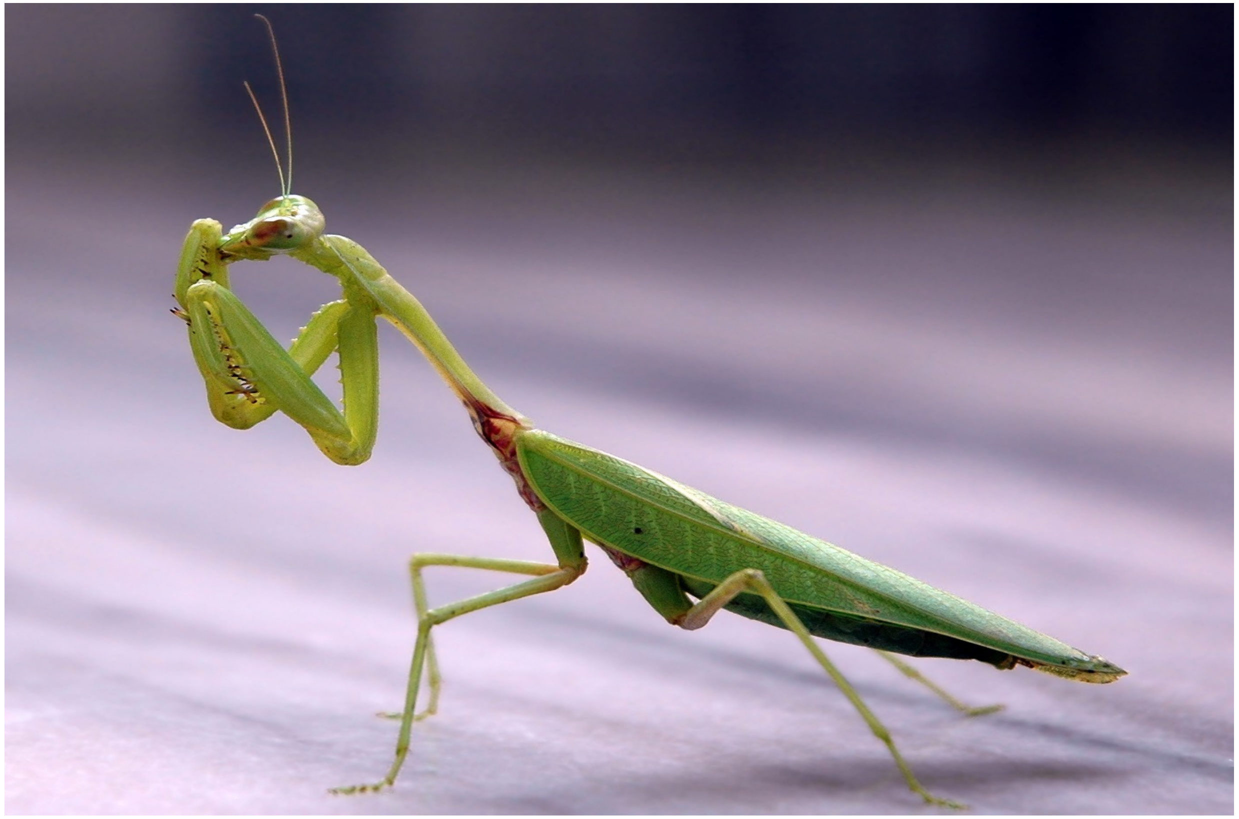
- doctest
- unittest
- nose
- pytest

Regression Tests



Integration or unit tests

Input + action == expected output + bugs



Integration or unit tests

In spaghetti code every unit test is also an integration tests as all the units are tightly "integrated".

Observing my_calc.py

```
# use_my_calc.py

import my_calc

print(my_calc.sum(2, 3))
print(my_calc.sum(2, 3, 4))
```

Testing my_calc.py

```python
# test_my_calc.py


import my_calc

def test_mycalc():

    assert(my_calc.sum(2, 3) == 5)

    assert(my_calc.sum(2, 3, 4) == 9)
```

py.test test_my_calc.py

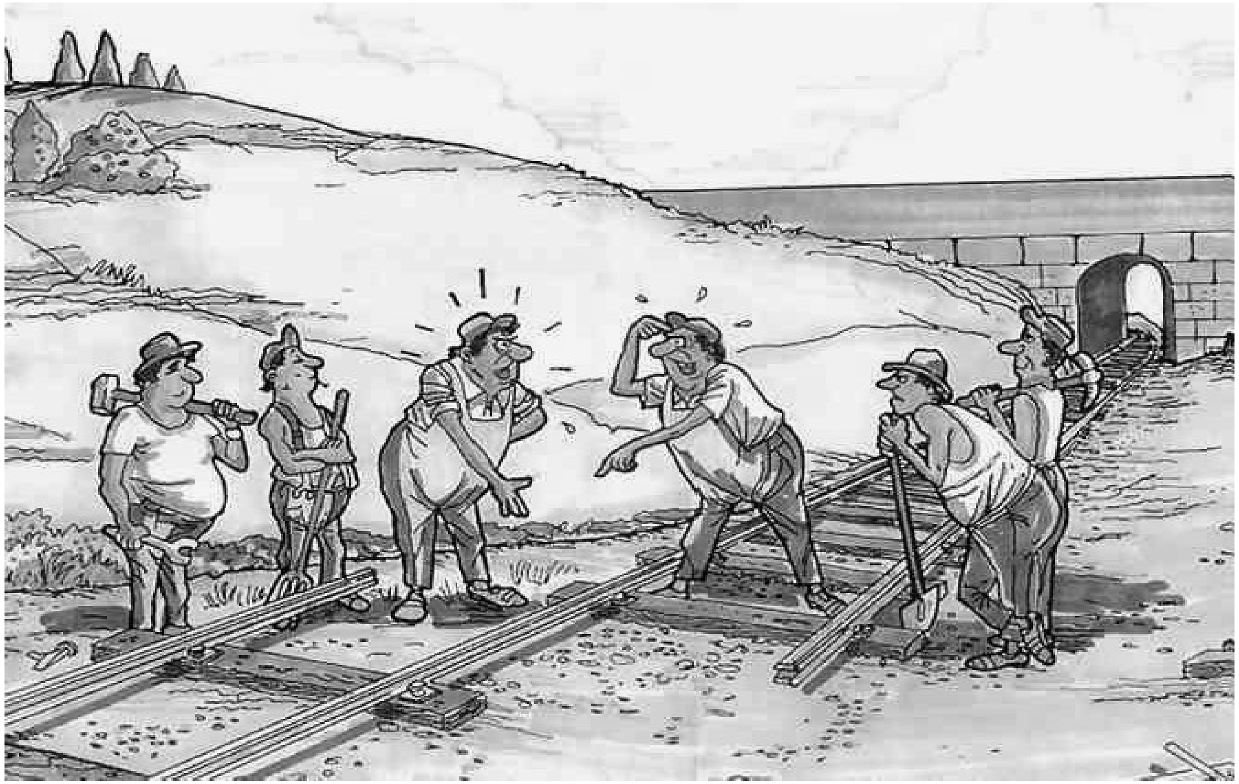
```
=========== test session starts ===========
platform darwin -- Python 2.7.10, pytest-2.9.1, py-1.4.31, pluggy-0.3.1
rootdir: /Users/gabor/work/articles/examples/python/talk, inifile:
collected 1 items


test_mycalc.py .


========= 1 passed in 0.02 seconds =========
```

py.test test_my_calc.py

```
______________ test_mycalc _______________________

    def test_mycalc():

        assert my_calc.sum(2, 3) == 5

>       assert my_calc.sum(2, 3, 4) == 9

E       assert 5 == 9

E        +  where 5 = <function sum at 0x10fcb1aa0>(2, 3, 4)

E        +    where <function sum at 0x10fcb1aa0> = my_calc.sum


test_mycalc.py:6: AssertionError

================ 1 failed in 0.01 seconds ===========
```

Continuous Integration - CI

- Jenkins
- Buildbot
- Travis-CI
- cron-job



Mocking

- Complex, interdependent functions
- External services
- Unit tests

library.py

```
import random


def main(x, y):
    z = helper(x)
    return y + z


def helper(q):
    if random.random() < 0.5:
        raise Exception("Bad luck")
    return q**2
```

test_library.py

```
import library

def test_library():

    assert library.main(2, 1) == 5

    assert library.main(2, -1) == 3
```

Mocking the helper

```
import library

import mock

def my_helper(a):

    if a == 2:

        return 4

    raise Exception("Invalid test input '{}'".format(a))


library.helper = mock.MagicMock(side_effect=my_helper)

def test_library():

    assert library.main(2, 1) == 5

    assert library.main(2, -1) == 3
```

print in the function

```
# echo_calc.py
def add(x, y):
    print x+y
```

```
# use_echo_calc.py
import echo_calc
echo_calc.add(2, 3)
```

Mocking print

```
import echo_calc
import mock
from StringIO import StringIO
def test_add():
    with mock.patch('sys.stdout', new=StringIO()) as out:
        echo_calc.add(2, 3)
        assert out.getvalue() == "5\n"

    with mock.patch('sys.stdout', new=StringIO()) as out:
        echo_calc.add(3, 4)
        assert out.getvalue() == "7\n"
```

Getting others on board

- Lead by example
- Show how tests saved you time
- Offer to write tests for their code
- Convert their code snippets to real tests
- Ask them to review your code
- Review their code
- Increase communication among developers

Getting others on board

Thank You

Questions?

Gabor Szabo

http://szabgab.com/

http://pydigger.com/

Resources

Best Coding Practices https://en.wikipedia.org/wiki/Best_coding_practices

How to motivate co-workers to write unit-tests?
http://programmers.stackexchange.com/questions/157287/how-to-motivate-co-workers-to-write-unit-tests

How do you persuade others to write unit tests? http://stackoverflow.com/questions/416231/how-do-you-persuade-others-to-write-unit-tests

Python Testing blogs and podcast by Brian Okken http://pythontesting.net/

Writing Great Unit Tests: Best and Worst Practices
http://blog.stevensanderson.com/2009/08/24/writing-great-unit-tests-best-and-worst-practises/

Python Testing Frameworks

- doctest https://docs.python.org/2/library/doctest.html
- unittest https://docs.python.org/2/library/unittest.html
- unittest2 https://pypi.python.org/pypi/unittest2
- nose https://pypi.python.org/pypi/nose/
- pytest http://pytest.org/

Continuous Integration Systems

- Jenkins https://en.wikipedia.org/wiki/Jenkins_%28software%29
- Travis-CI https://en.wikipedia.org/wiki/Travis_CI
- Buildbot https://en.wikipedia.org/wiki/Buildbot

Images

- Flowers and snakes: http://img08.deviantart.net/8f2a/i/2012/112/7/3/snakes_like_flowers_by_kathillion-d4x8cir.jpg
- Big ball of mud: https://tommcfarlin.com/wp-content/uploads/2014/08/big-ball-of-mud.jpg
- Fight or Flight https://lawrules.files.wordpress.com/2011/07/flightflight1.jpg
- Silver bullet: http://www.nurtur-health.eu/WebRoot/StoreNL/Shops/62902058/50AB/33F7/232B/F188/F3CD/C0A8/28BE/BCA0/SBPacks.JPG
- We are hiring: http://www.nktphotonics.com/wp-content/uploads/2015/08/We-are-hiring-sign.jpg
- Git: https://git-scm.com/images/logos/downloads/Git-Logo-1788C.png
- Spaghetti code http://i.imgur.com/B9JkZTz.png
- Money: http://weknowyourdreamz.com/images/money/money-07.jpg
- Virtualenv http://s.hswstatic.com/gif/virtual-reality-8.jpg
- Regression testing: https://alphabytesoup.files.wordpress.com/2012/07/evolution_of_man.jpg
- Bugs: http://www.betterbugs.com/Images/Ma2.jpg
- Silhouette http://www.missuniversegb.co.uk/images/silhouette.gif
- Fight: http://horoscope.tips/uploads/cat_fight_by_strech1-d56629p.jpg
- Mocking http://www.voidspace.org.uk/python/articles/images/mocking.jpg
- Growth: http://www.skipprichard.com/wp-content/uploads/2015/04/bigstock-Blue-Books-Graph-With-Red-Arro-71471887.jpg
- Werewolf http://i.imgur.com/HUvBZhR.png
- On board http://www.bangkokpost.com/media/content/20150623/1051580.jpg
- CI https://blogs.msdn.microsoft.com/africaapps/2013/09/11/integration-testing-on-steroids/