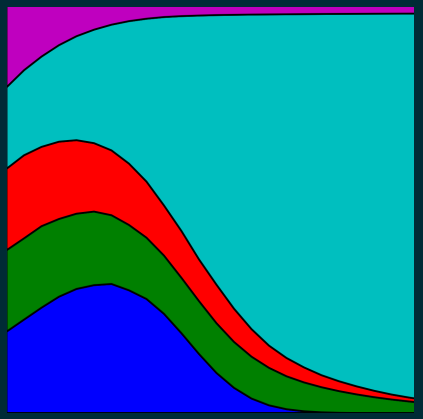
Writing tests for research software

@NikoletaGlyn



Software
Sustainability
Institute

TESTING

0, 1, 1, 2, 3, 5, 8, 13, 21, 34 ...

$$F_n = F_{n-1} + F_{n-2}$$

'main.py'

```
def fib(n):
    if n == 1:
        return 1
    elif n == 0:
        return 0
    else:
        return 2*fib(n-1)
```

$$\frac{F_n}{F_{n-1}} \longrightarrow \phi$$

$$\frac{F_n}{F_{n-1}} \to \phi \simeq 1.61803...$$

```
.
|-- main.py
|-- golden.py
```

'golden.py'

```
import main

for n in range(10, 100000):
    golden_ratio = fib(n)/ fib(n-1)
    print(golden_ratio)
```

'golden.py'

```
import main

for n in range(10, 100000):
    golden_ratio = fib(n)/ fib(n-1)
    print(golden_ratio)
```

```
2.0
2.0
2.0
2.0
2.0
2.0
2.0
2.0
2.0
2.0
...
```

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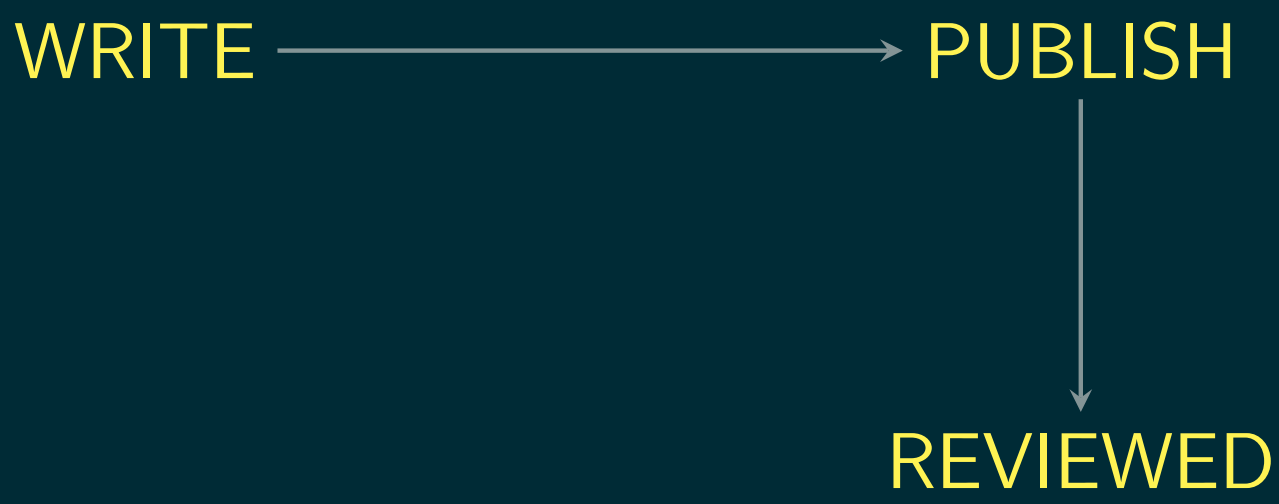
for n in range(10, 100000):
    golden_ratio = fib(n)/ fib(n-1)
    print(golden_ratio)
```

```
2.0
2.0
2.0
2.0
2.0
2.0
2.0
2.0
2.0
...
```

"Nikoleta SOLVES THE FIBONACCI MYSTERY"


WRITE
PUBLISH
REVIEWED

20% OF GENETIC RESEARCH IS WRONG

Gene name errors are widespread in the scientific literature by Mark Ziemann, Yotam Eren and Assam El-Osta

INDUSTRY

INDUSTRY

AMAZON

```
.
|-- main.py
|-- golden.py
|-- test_main.py
```

'test_main.py'

```
import unittest
import main

class TestExample(unittest.TestCase):

    def test_fib(self):
        self.assertEqual(fib(0), 0)
        self.assertEqual(fib(1), 1)
        self.assertEqual(fib(2), 1)
        self.assertEqual(fib(3), 2)
```

'test_main.py'

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```
python -m unittest test_main.py
```

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       self.assertEqual(fib(3), 2)
```

```
python -m unittest test_main.py
```

```
self.assertEqual(fib(2), 1)
AssertionError: 2 != 1

----------------------------
Ran 1 test in 0.000s

FAILED (failures=1)
```

'main.py'

```
def fib(n):
    if n == 1:
        return 1
    elif n == 0:
        return 0
    else:
        return 2*fib(n-1)
```

'main.py'

```
def fib(n):
    if n == 1:
        return 1
    elif n == 0:
        return 0
    else:
        return fib(n-1) + f(n-2)
```

'main.py'

```
def fib(n):
    if n == 1:
        return 1
    elif n == 0:
        return 0
    else:
        return fib(n-1) + f(n-2)
```

```
python -m unittest test_main.py
------------------------------
Ran 1 test in 0.000s

OK
```

'main.py'

```
def fib(n):
    if n == 1:
        return 1
    elif n == 0:
        return 0
    else:
        return fib(n-1) + f(n-2)
```

```
python -m unittest test_main.py
------------------------------
Ran 1 test in 0.000s

OK
```

"Nikoleta TRYING TO RECLAIM REPUTATION"

'main.py'

```
import unittest

def fib(n):
    """Returns the n th fibonacci number.
    For example:

        >>> fib(5)
        5
        >>> fib(6)
        8
    """
    if n == 1:
        return 1
    elif n == 0:
        return 0
    else:
        return fib(n-1) + fib(n-2)
```

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```
import unittest

def fib(n):
    """Returns the n th fibonacci number.
    For example:

        >>> fib(5)
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        8
    """
    if n == 1:
        return 1
    elif n == 0:
        return 0
    else:
        return fib(n-1) + fib(n-2)
```

```
python -m doctest main.py
```

```python
from hypothesis import given
from hypothesis.strategies import integers


class TestFib(unittest.TestCase):
    @given(k=integers(min_value=2))
    def test_fib(self, k):
        self.assertTrue(fib(k), fib(k-1) + fib(k-2))
```

https://github.com/HypothesisWorks

uk/blog/2016-09-12-its-impossible-conduct-research-without-out-10-uk-researchers

USE

92%

IMPOSSIBLE

69%

DEVELOP

56%

TRAINING

79%

@NikoletaGlyn
https://github.com/Nikoleta-v3