Lab 1

Software Testing 2023

2023/02/23

#whoami

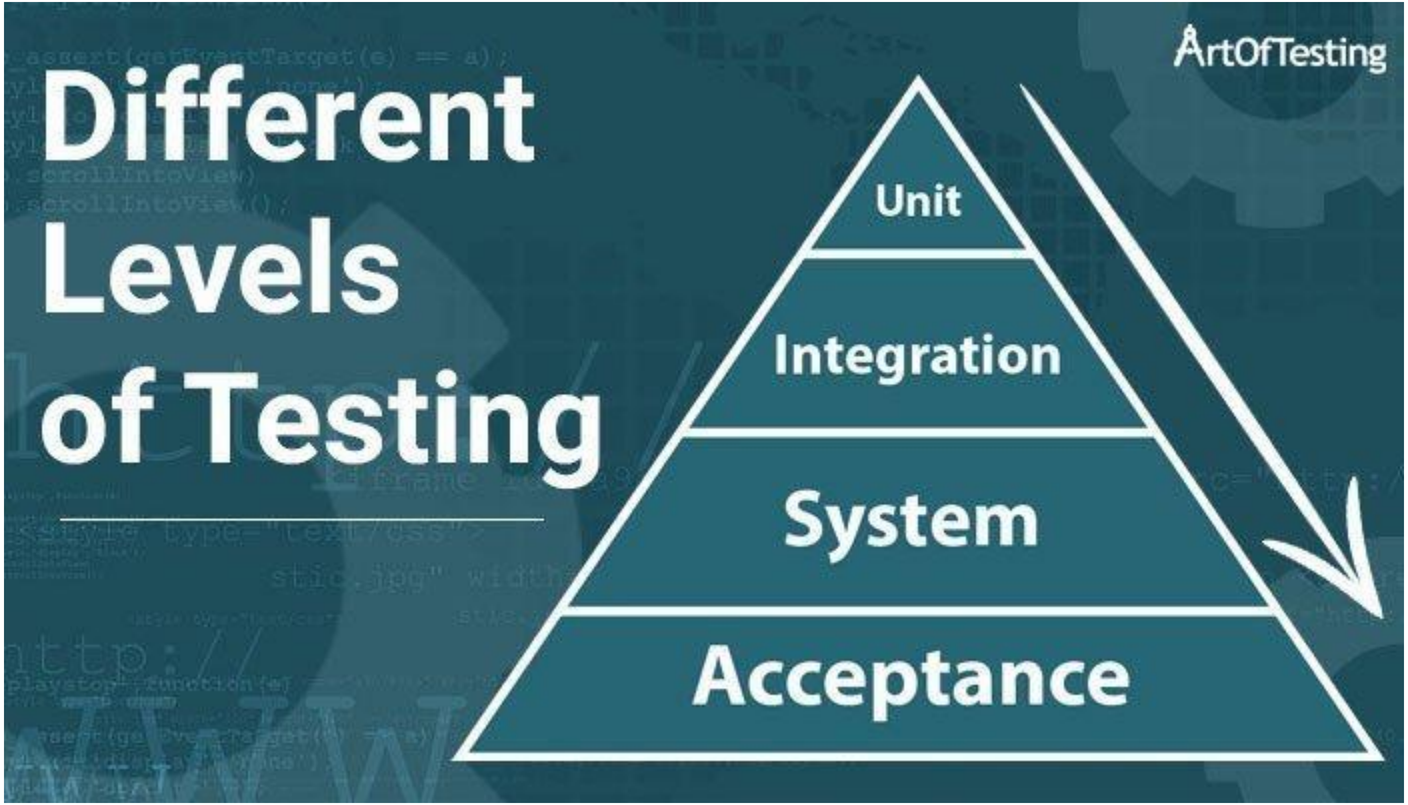
- Software Quality Lab @ EC547
- TA
    a. 蔡惠喬
        - hctsai.cs10@nycu.edu.tw
    b. 陳舜寧
        - xdev11.cs11@nycu.edu.tw

GitHub Repo

- <student_id>-ST-2023
- Add collaborators
  - XDEv11, chameleon10712, skhuang

Unit Test

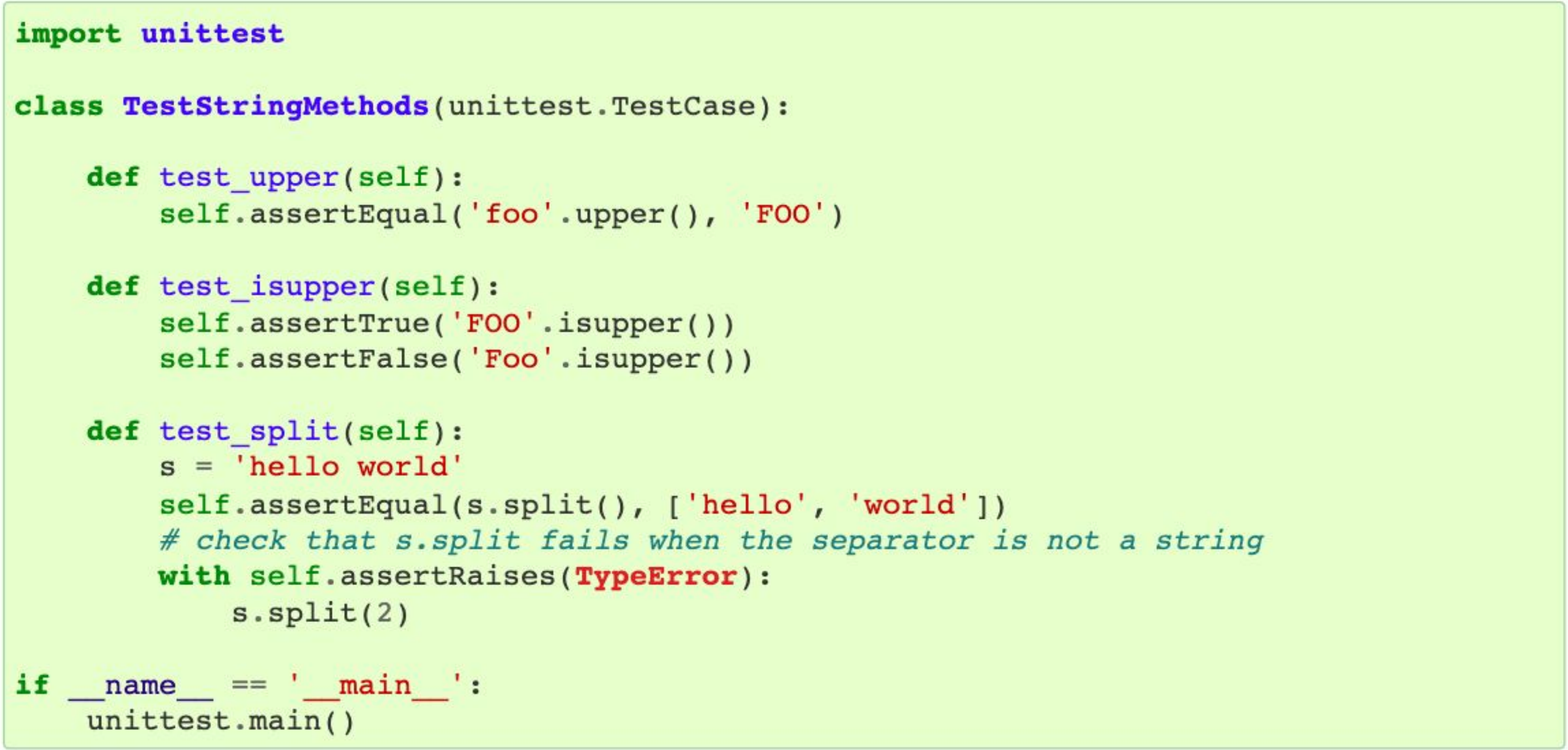
Unit Test


ArtOfTesting
Different Levels of Testing
Unit
Integration
System
Acceptance

Unit Test

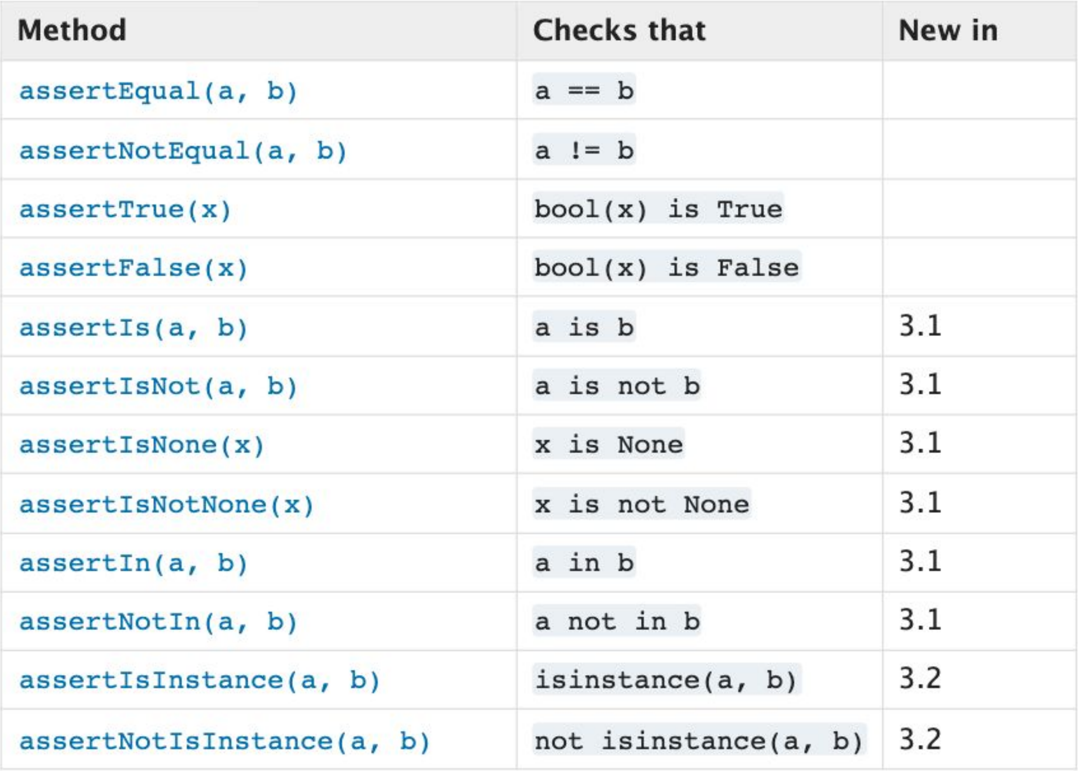
- Python unittest module
- unittest doc

Unit Test



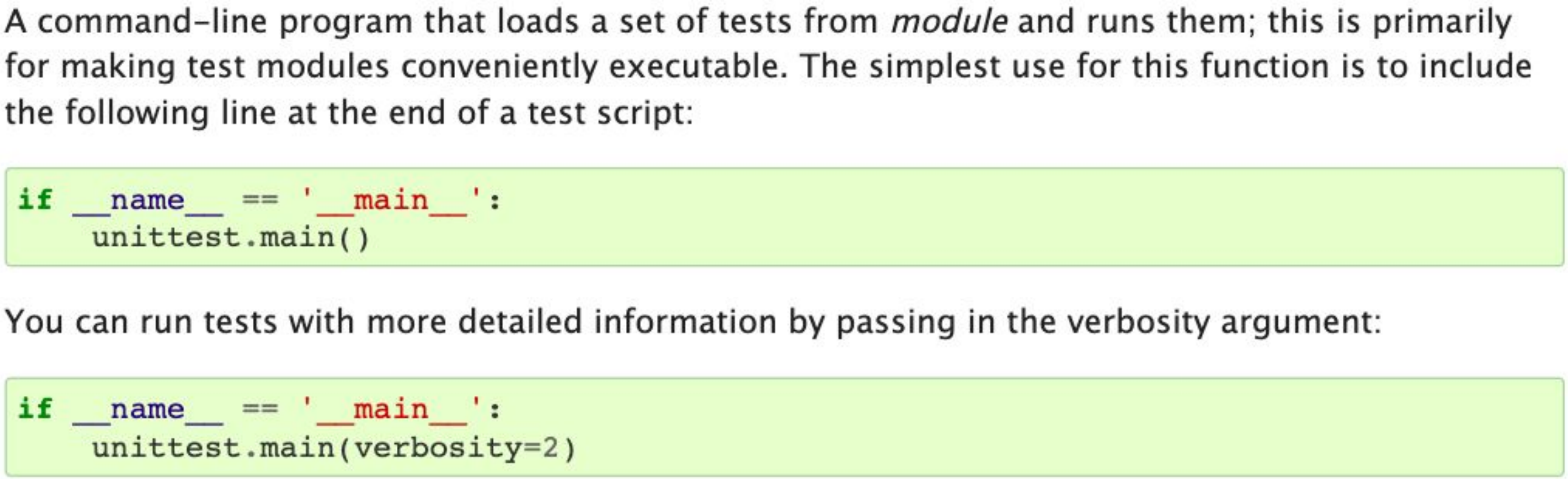
```python
import unittest

class TestStringMethods(unittest.TestCase):

    def test_upper(self):
        self.assertEqual('foo'.upper(), 'FOO')

    def test_isupper(self):
        self.assertTrue('FOO'.isupper())
        self.assertFalse('Foo'.isupper())

    def test_split(self):
        s = 'hello world'
        self.assertEqual(s.split(), ['hello', 'world'])
        # check that s.split fails when the separator is not a string
        with self.assertRaises(TypeError):
            s.split(2)

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

Unit Test



Method	Checks that	New in
assertEqual(a, b)	a == b	
assertNotEqual(a, b)	a != b	
assertTrue(x)	bool(x) is True	
assertFalse(x)	bool(x) is False	
assertIs(a, b)	a is b	3.1
assertIsNot(a, b)	a is not b	3.1
assertIsNone(x)	x is None	3.1
assertIsNotNone(x)	x is not None	3.1
assertIn(a, b)	a in b	3.1
assertNotIn(a, b)	a not in b	3.1
assertIsInstance(a, b)	isinstance(a, b)	3.2
assertNotIsInstance(a, b)	not isinstance(a, b)	3.2

Unit Test



A command-line program that loads a set of tests from *module* and runs them; this is primarily for making test modules conveniently executable. The simplest use for this function is to include the following line at the end of a test script:

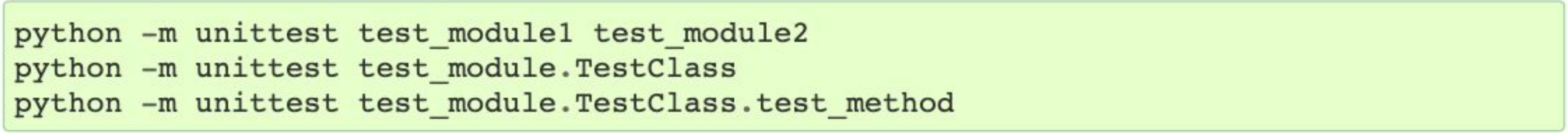
```
if __name__ == '__main__':
    unittest.main()
```

You can run tests with more detailed information by passing in the verbosity argument:

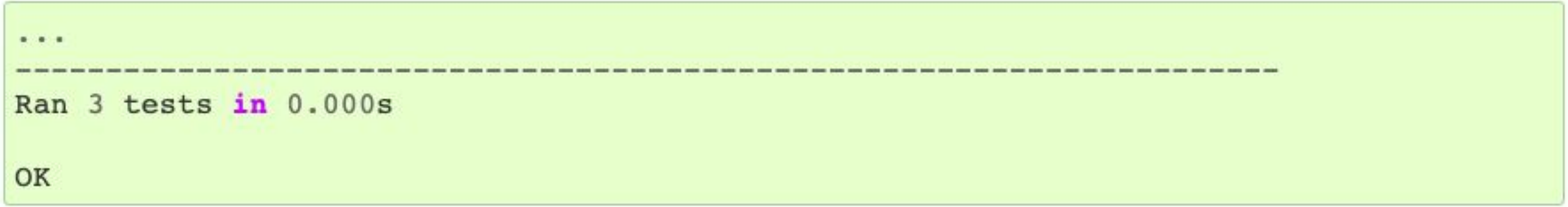
```
if __name__ == '__main__':
    unittest.main(verbosity=2)
```

Unit Test

The unittest module can be used from the command line to run tests from modules, classes or even individual test methods:



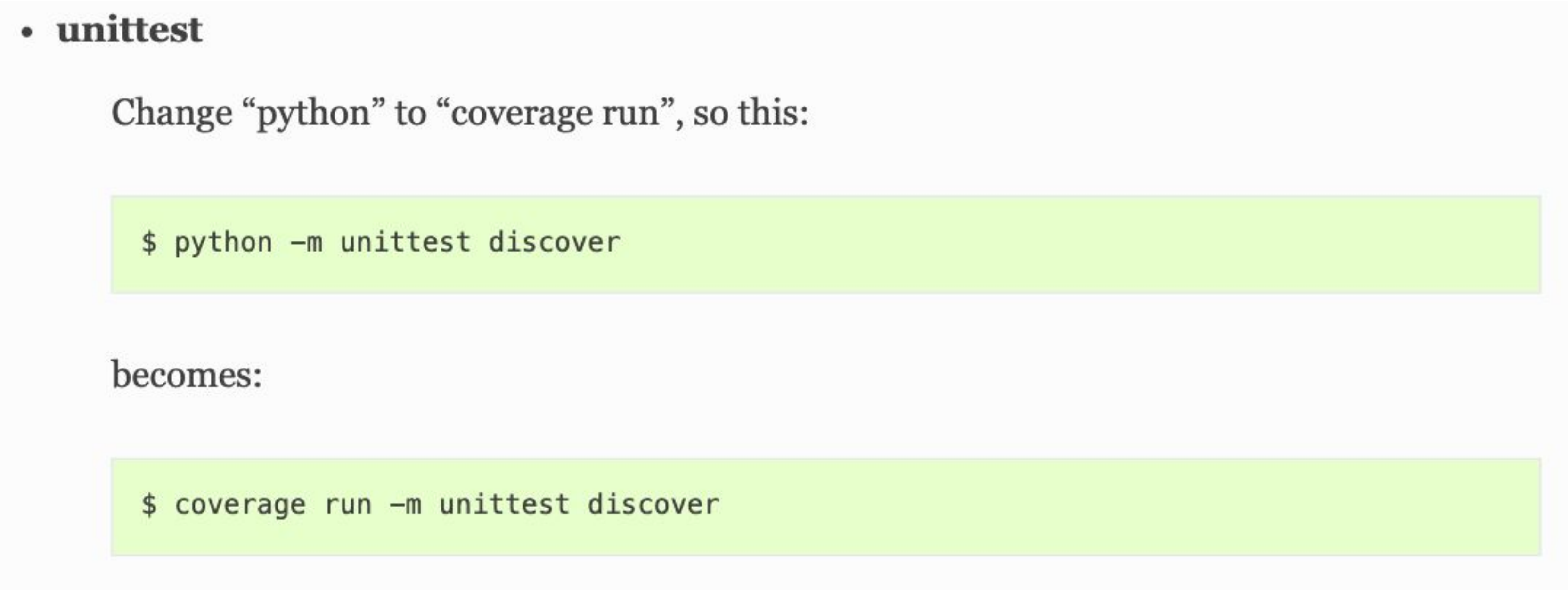
```
python -m unittest test_module1 test_module2
python -m unittest test_module.TestClass
python -m unittest test_module.TestClass.test_method
```



```
...
----------------------------------------------------------------------
Ran 3 tests in 0.000s

OK
```

Coverage

Coverage



- **unittest**

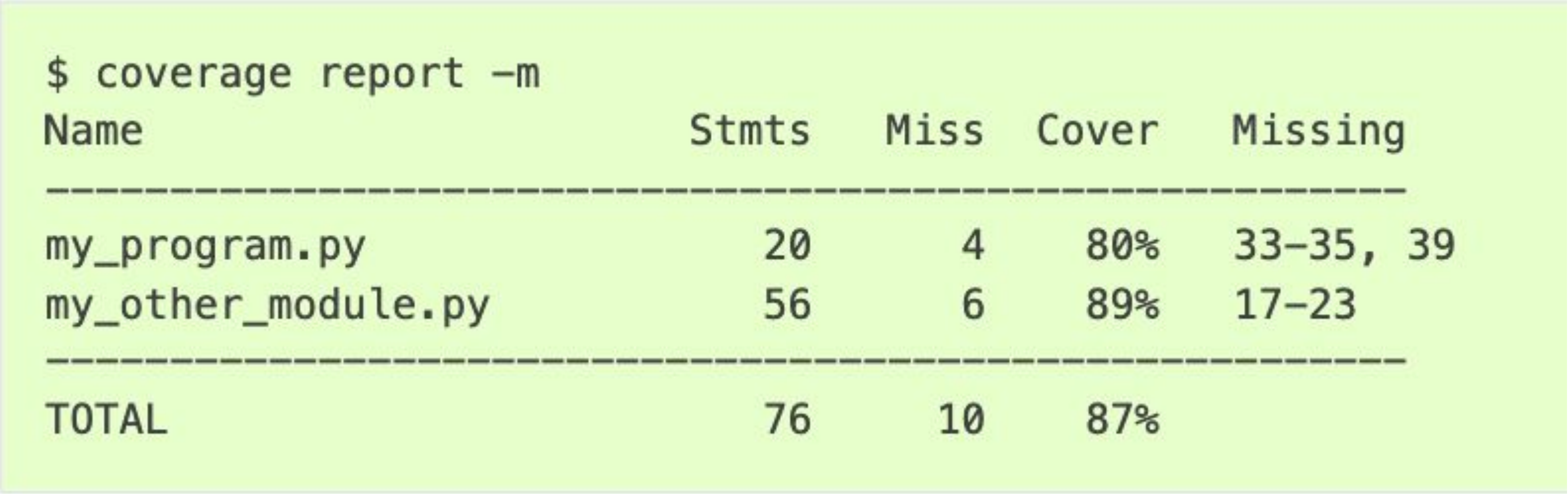
  Change “python” to “coverage run”, so this:

  ```
  $ python -m unittest discover
  ```

  becomes:

  ```
  $ coverage run -m unittest discover
  ```

Coverage



```
$ coverage report -m
Name                      Stmts   Miss  Cover   Missing
-------------------------------------------------------
my_program.py                20      4    80%   33-35, 39
my_other_module.py           56      6    89%   17-23
-------------------------------------------------------
TOTAL                        76     10    87%
```

Lab 1

Part 1 - unittest

- In this Lab, you are going to implement unit test for Students.py.

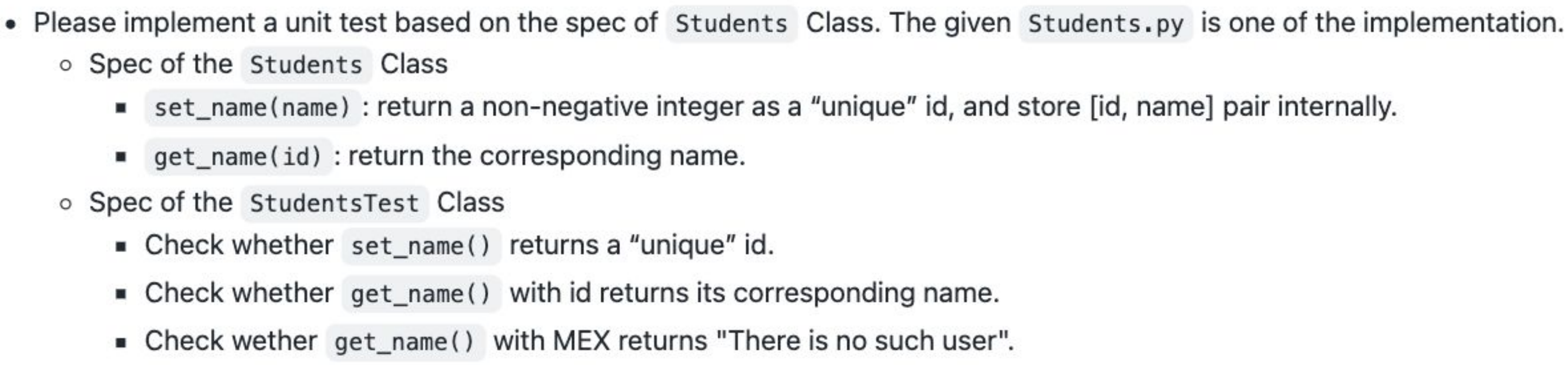
- spec

  - There are 4 students in the classroom, who are John, Mary, Thomas, and Jane. Please modify StudentsTest.py and add these names to a student object. You need to test for set_name and get_name method in Students Class. The required output is listed in page 15.

Part 1 - unittest

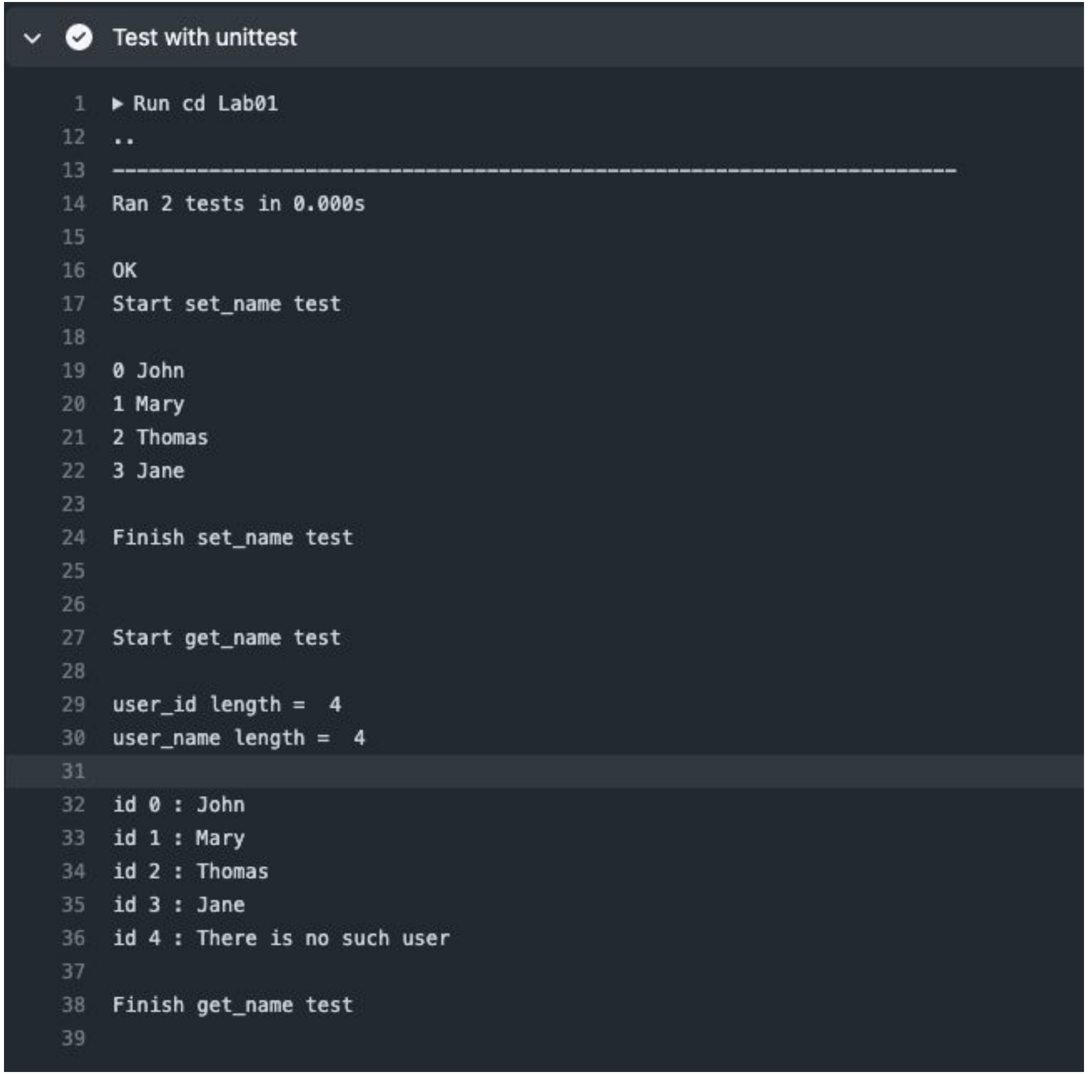
- spec
  - In test_1_get_name(), you have to test for all the valid ids, and an invalid id using mex.
  - Mex
    - The mex of a set of integers is the smallest non-negative integer that does not belong to the set.

Part 1 - 補充



- Please implement a unit test based on the spec of `Students` Class. The given `Students.py` is one of the implementation.
    - Spec of the `Students` Class
        - `set_name(name)` : return a non-negative integer as a “unique” id, and store [id, name] pair internally.
        - `get_name(id)` : return the corresponding name.
    - Spec of the `StudentsTest` Class
        - Check whether `set_name()` returns a “unique” id.
        - Check whether `get_name()` with id returns its corresponding name.
        - Check wether `get_name()` with MEX returns "There is no such user".

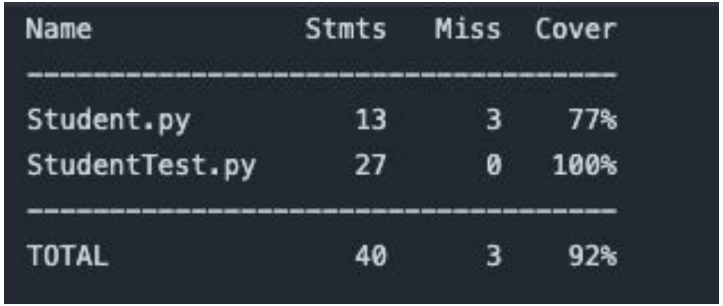
spec



```
▶ Run cd Lab01
..
----------------------------------------------------------------------
Ran 2 tests in 0.000s

OK
Start set_name test

0 John
1 Mary
2 Thomas
3 Jane

Finish set_name test


Start get_name test

user_id length =  4
user_name length =  4

id 0 : John
id 1 : Mary
id 2 : Thomas
id 3 : Jane
id 4 : There is no such user

Finish get_name test

```

Part 1 - unittest

- python3 -m unittest StudentsTest.py

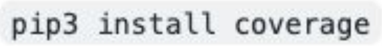


```
Name              Stmts   Miss  Cover
-------------------------------------
Student.py           13      3    77%
StudentTest.py       27      0   100%
-------------------------------------
TOTAL                40      3    92%
```

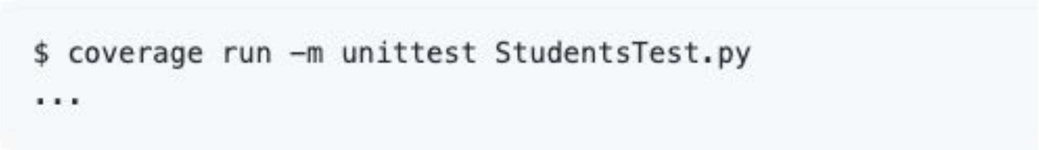
Part 2 - coverage

- Please test the coverage of your program. Modify Students.py and StudentsTest.py to make coverage to 100%.

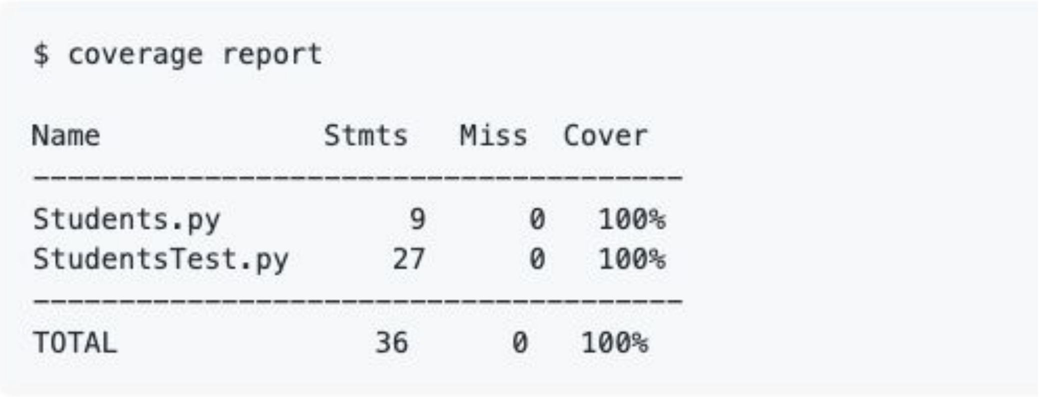
Part 2 - coverage



```
pip3 install coverage
```



```
$ coverage run -m unittest StudentsTest.py
...
```

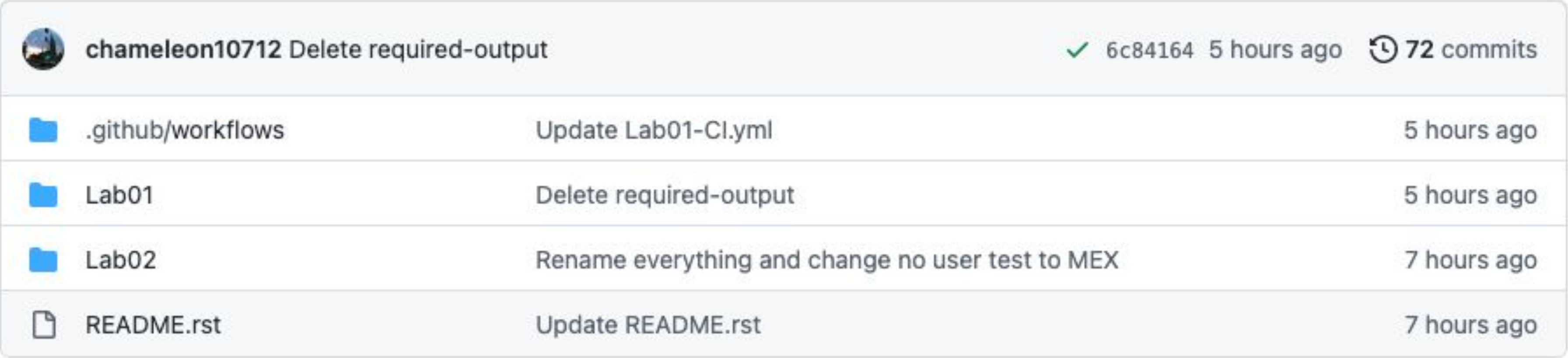


```
$ coverage report

Name             Stmts   Miss  Cover
--------------------------------------
Students.py          9      0   100%
StudentsTest.py     27      0   100%
--------------------------------------
TOTAL               36      0   100%
```

Lab 1 Submission

Submission

- Please create a directory named Lab01 in your <student_id>-ST-2023 repo
- Lab01 shall contain Students.py and StudentsTest.py

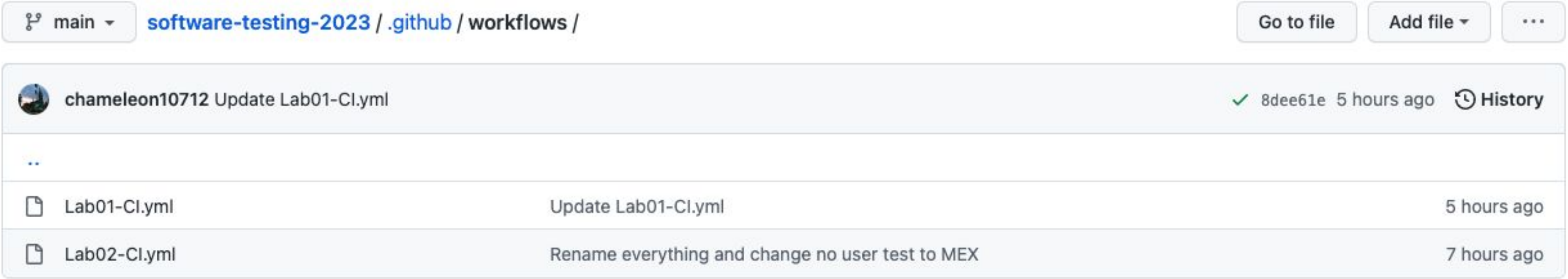


chameleon10712 Delete required-output ✓ 6c84164 5 hours ago 72 commits

.github/workflows	Update Lab01-CI.yml	5 hours ago
Lab01	Delete required-output	5 hours ago
Lab02	Rename everything and change no user test to MEX	7 hours ago
README.rst	Update README.rst	7 hours ago

Submission

- Please add Lab01-CI.yml to .github/workflows.



software-testing-2023 / .github / workflows /

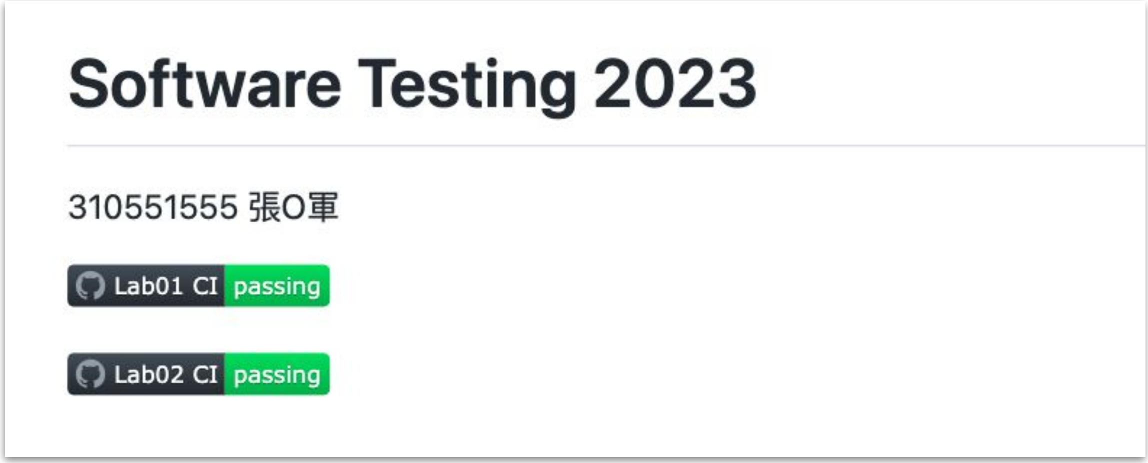
chameleon10712 Update Lab01-CI.yml ✓ 8dee61e 5 hours ago

..

Lab01-CI.yml	Update Lab01-CI.yml	5 hours ago
Lab02-CI.yml	Rename everything and change no user test to MEX	7 hours ago

Submission

- Please add Lab 1 CI status badge in your README



Software Testing 2023

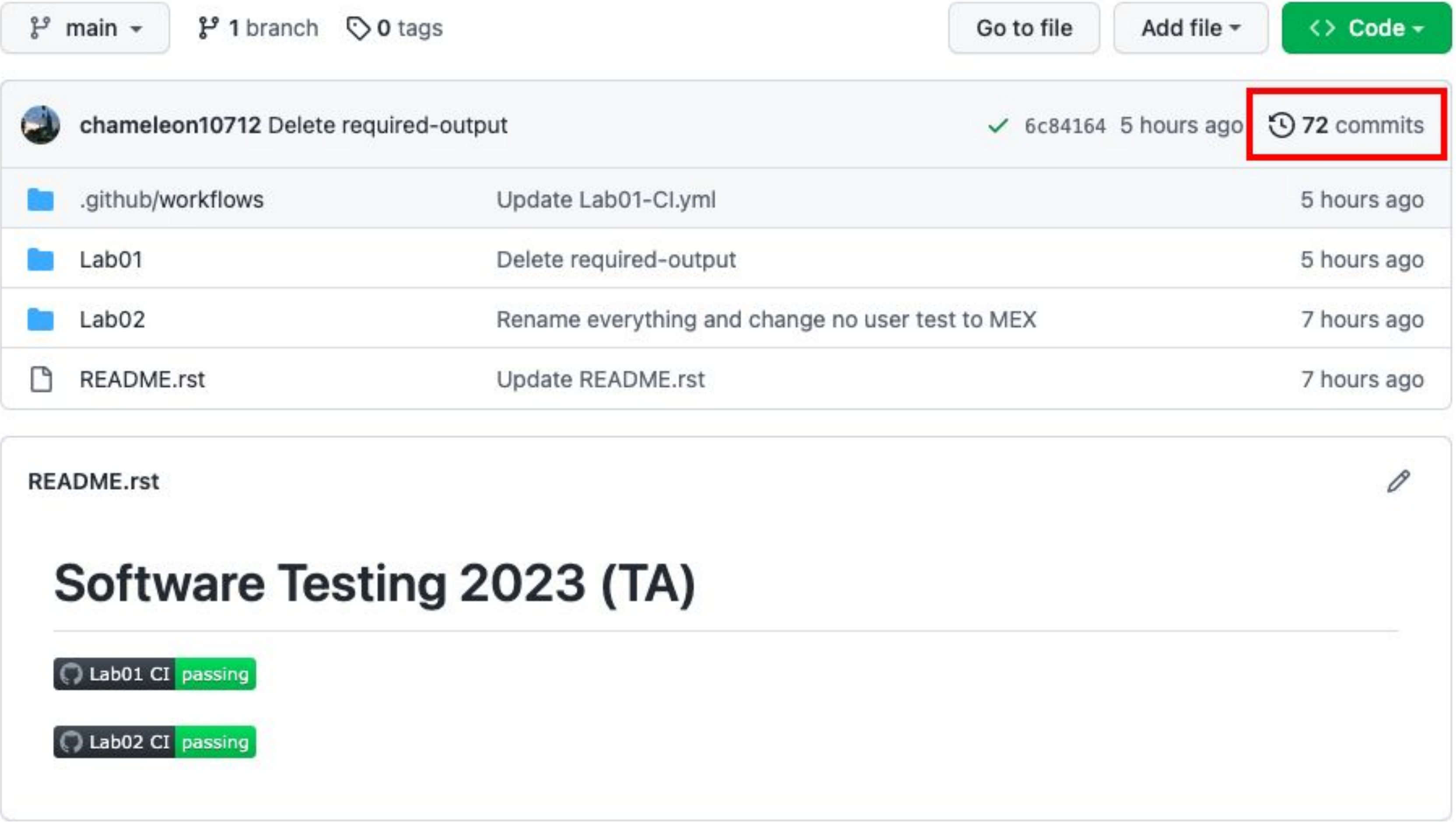
310551555 張O軍

Lab01 CI passing

Lab02 CI passing

Submission

- Please submit your commit url to E3



chameleon10712 Delete required-output ✓ 6c84164 5 hours ago 72 commits

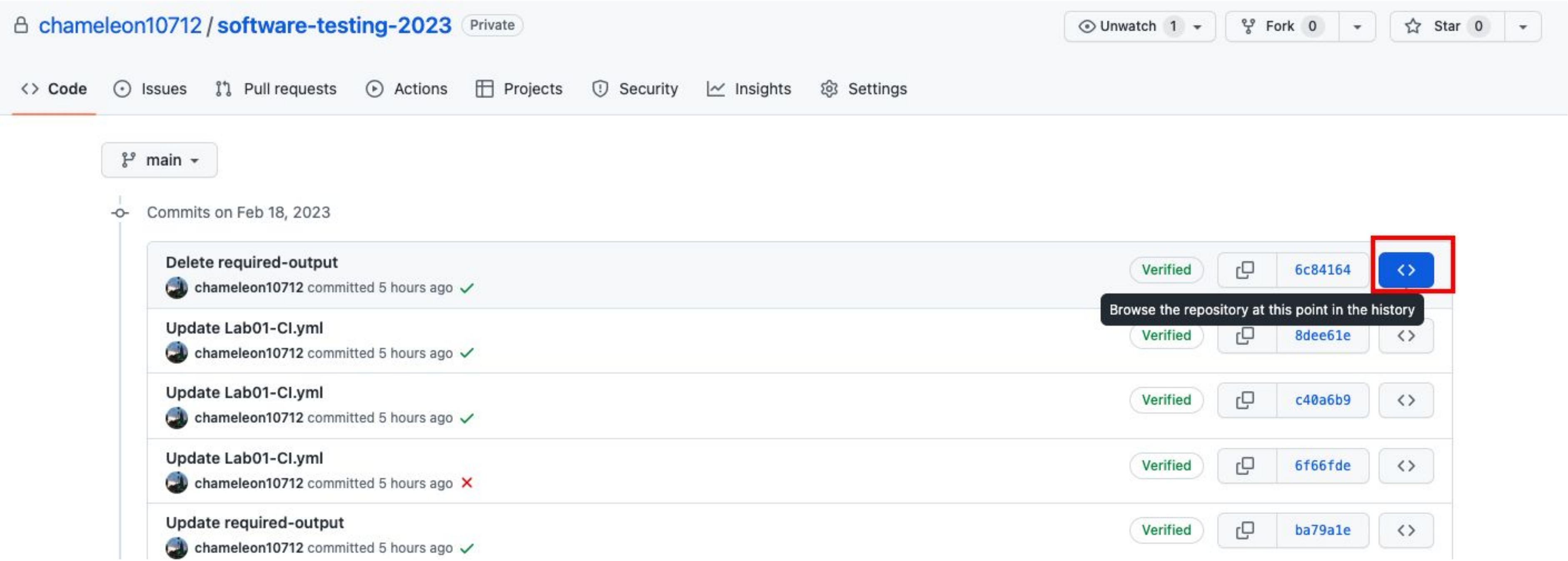
.github/workflows	Update Lab01-CI.yml	5 hours ago
Lab01	Delete required-output	5 hours ago
Lab02	Rename everything and change no user test to MEX	7 hours ago
README.rst	Update README.rst	7 hours ago

README.rst

Software Testing 2023 (TA)

Lab01 CI passing

Lab02 CI passing



Commits on Feb 18, 2023

Delete required-output
chameleon10712 committed 5 hours ago ✓
Verified 6c84164

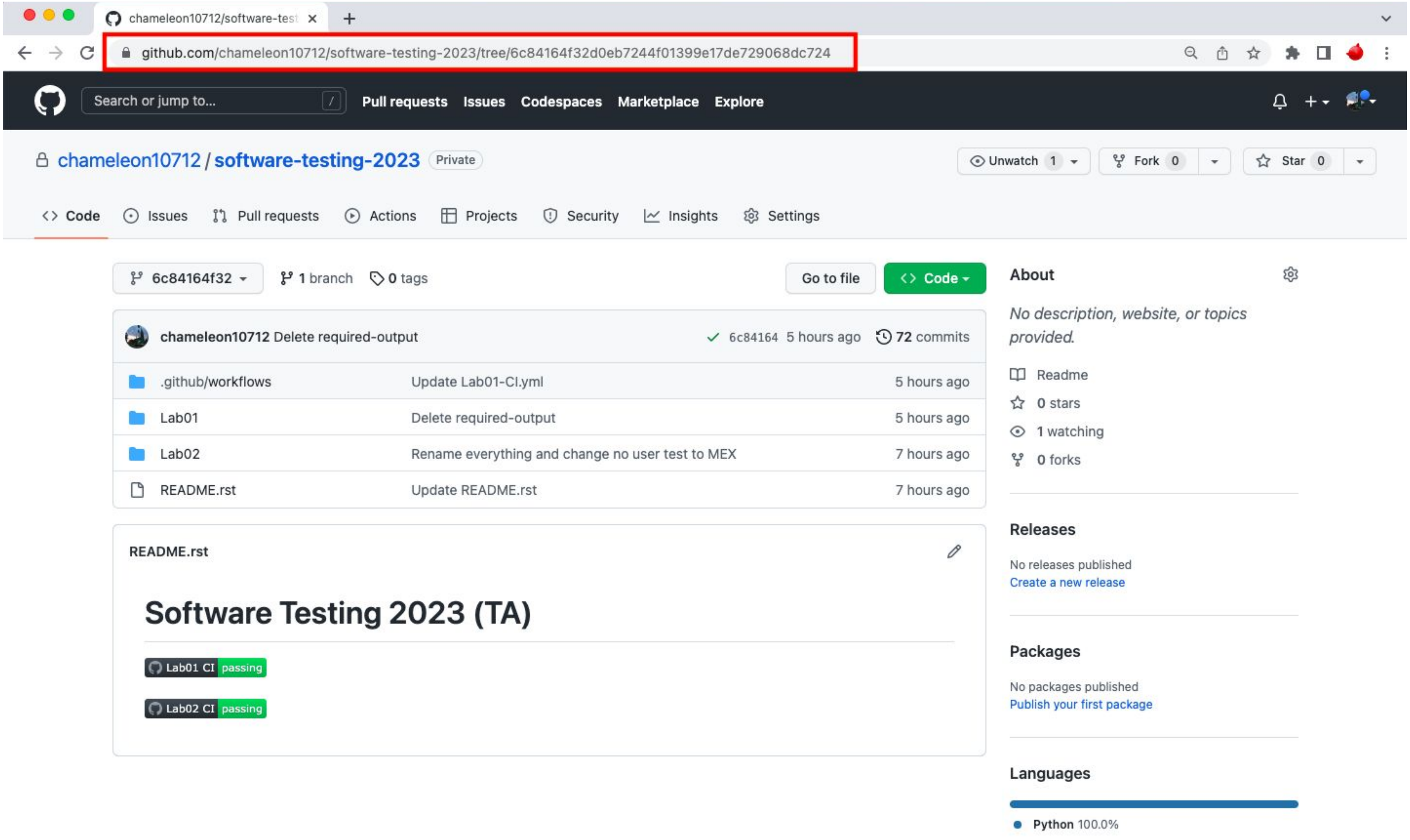
Browse the repository at this point in the history

Update Lab01-CI.yml
chameleon10712 committed 5 hours ago ✓
Verified 8dee61e

Update Lab01-CI.yml
chameleon10712 committed 5 hours ago ✓
Verified c40a6b9

Update Lab01-CI.yml
chameleon10712 committed 5 hours ago ✗
Verified 6f66fde

Update required-output
chameleon10712 committed 5 hours ago ✓
Verified ba79a1e



github.com/chameleon10712/software-testing-2023/tree/6c84164f32d0eb7244f01399e17de729068dc724

chameleon10712 / software-testing-2023

chameleon10712 Delete required-output ✓ 6c84164 5 hours ago 72 commits

.github/workflows	Update Lab01-CI.yml	5 hours ago
Lab01	Delete required-output	5 hours ago
Lab02	Rename everything and change no user test to MEX	7 hours ago
README.rst	Update README.rst	7 hours ago

README.rst

Software Testing 2023 (TA)

No description, website, or topics provided.

No releases published
Create a new release

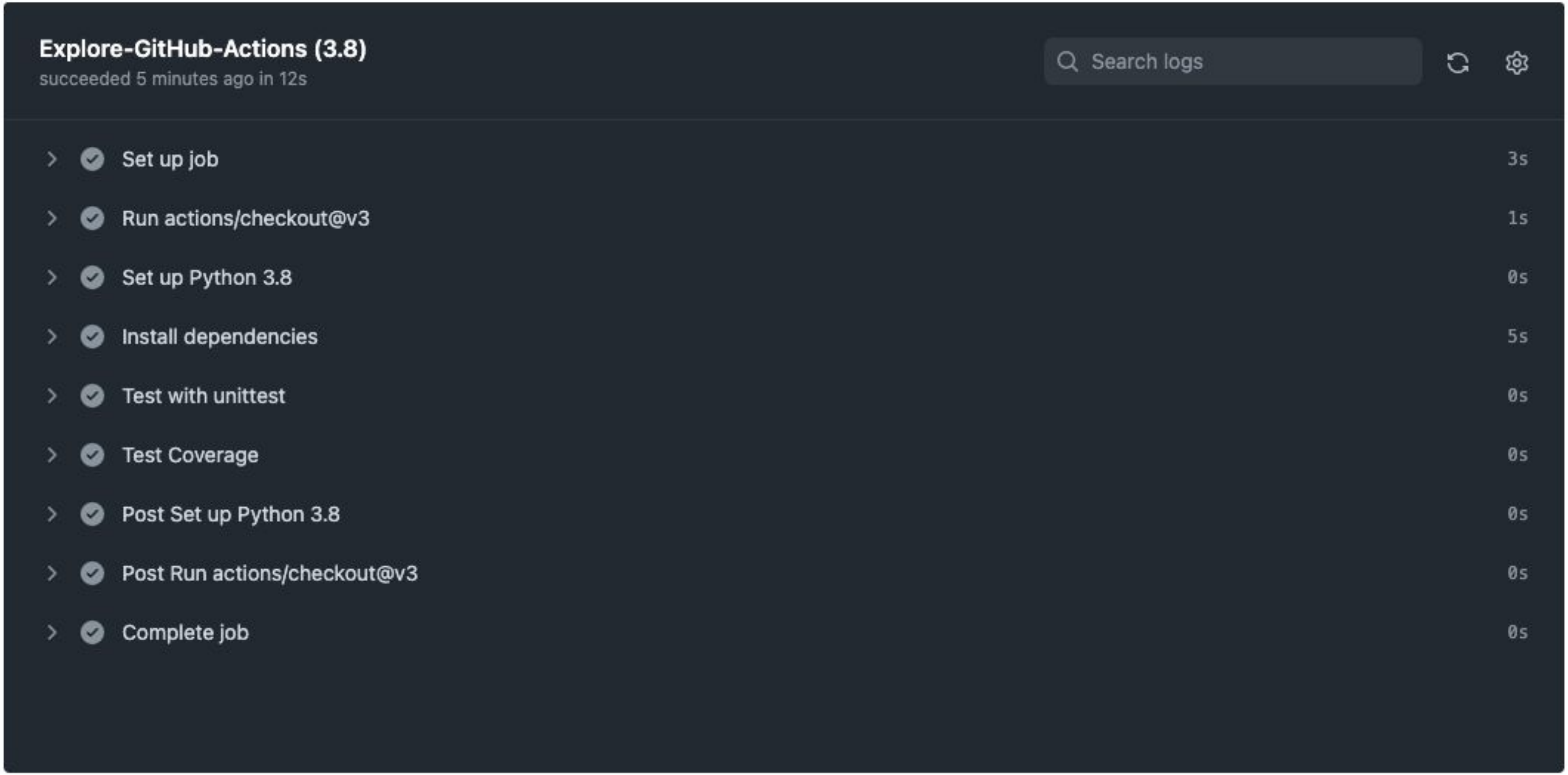
No packages published
Publish your first package

Python 100.0%

Reference

- https://coverage.readthedocs.io/en/7.1.0/
- https://docs.python.org/3/library/unittest.html
- https://coverage.readthedocs.io/en/7.1.0/branch.html#structurally-partial-branches
- https://plainenglish.io/blog/a-quick-intro-to-to-test-coverage-in-python-9bf299711c6c

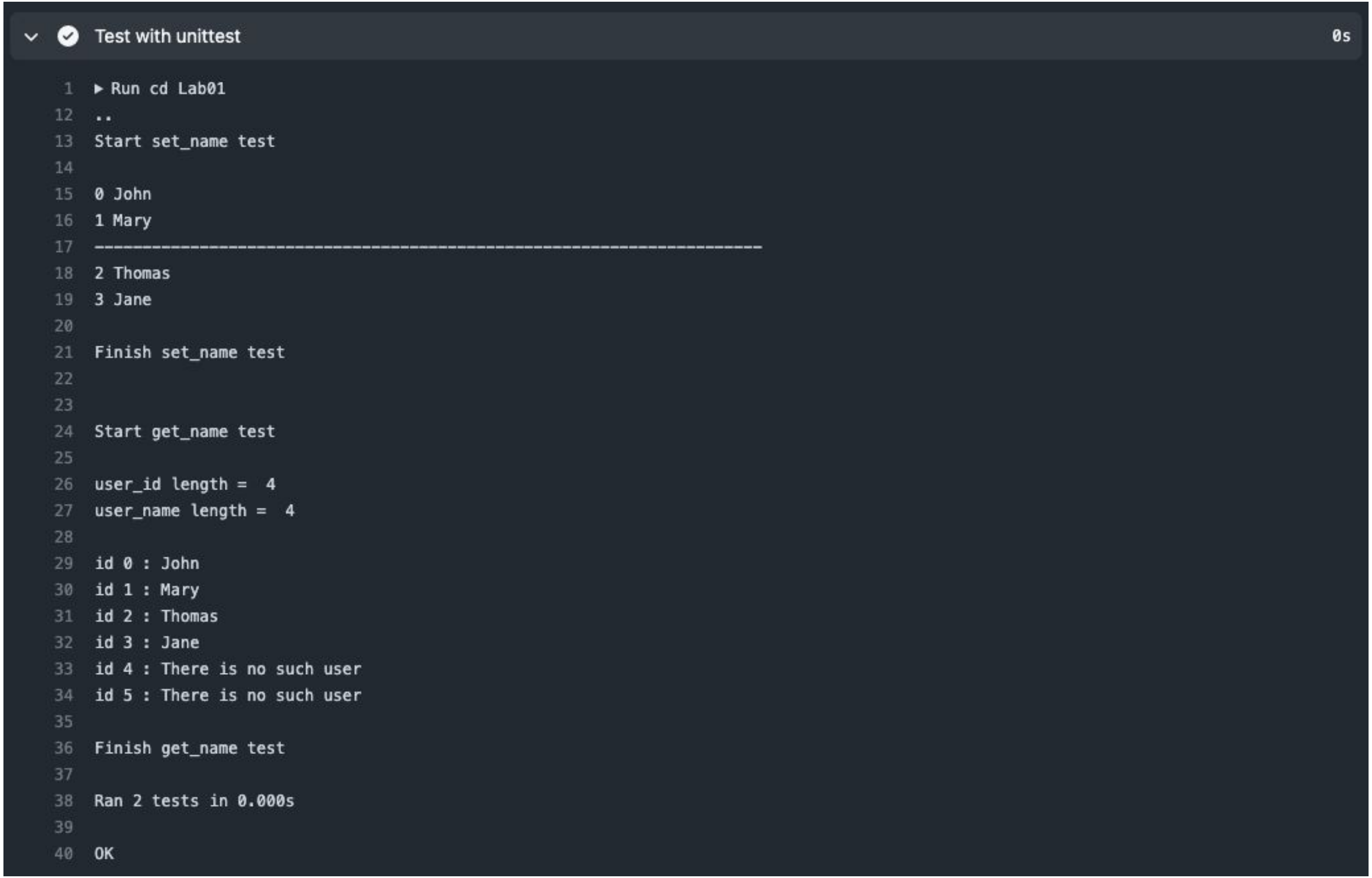
Lab 1 CI output



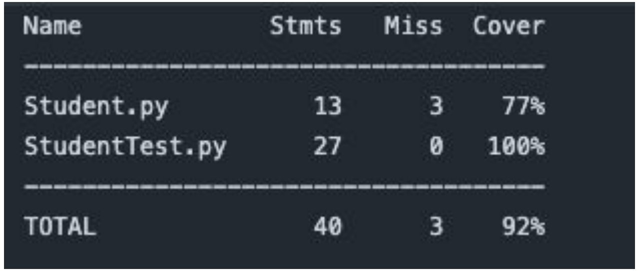
Explore-GitHub-Actions (3.8)

succeeded 5 minutes ago in 12s

✓	Set up job	3s
✓	Run actions/checkout@v3	1s
✓	Set up Python 3.8	0s
✓	Install dependencies	5s
✓	Test with unittest	0s
✓	Test Coverage	0s
✓	Post Set up Python 3.8	0s
✓	Post Run actions/checkout@v3	0s
✓	Complete job	0s



```
▶ Run cd Lab01
..
Start set_name test

0 John
1 Mary
----------------------------------------------------------------------
2 Thomas
3 Jane

Finish set_name test


Start get_name test

user_id length =  4
user_name length =  4

id 0 : John
id 1 : Mary
id 2 : Thomas
id 3 : Jane
id 4 : There is no such user
id 5 : There is no such user

Finish get_name test

Ran 2 tests in 0.000s

OK
```



```
Name                 Stmts   Miss  Cover
------------------------------------
Student.py              13      3    77%
StudentTest.py          27      0   100%
------------------------------------
TOTAL                   40      3    92%
```