



Maintaining your code and tests

Because you are never finished

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ADACS Code Testing Workshop 2019



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 - Future you is a different person.
- Python code/packages become outdated incredibly quickly.



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- Solution: Write these down in a *requirements.txt* file;
 - Setup files can take these requirements into account automatically.



Code requirements

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pytest-cov  
pytest-pep8  
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- Two common mistakes:
 - Not specifying all requirements;
 - Not specifying minimum required versions.
- Both are annoying and tedious to deal with as a user, especially the latter.

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 - The requirement in question is a very common package, like NumPy;
 - The requirement in question is satisfied by another requirement.
- This is wrong as you cannot guarantee these assumptions.
- TODO: Specify all YOUR imports as requirements, unless they are builtins.



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- TODO: Use your current versions as the minimum versions.



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 - *pytest-mpl*: Tools for testing and comparing Matplotlib figures;
 - *pytest-pep8*: Tests if your code is PEP8-compliant;
 - *pytest-cov*: Check the code coverage of your tests.
- Can be easily installed using *pip* and enabled with *pytest --xxx*.



Code coverage: What?

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```
----- coverage: platform win32, python 3.6.6-final-0 -----
Name                               Stmts  Miss  Cover   Missing
-----
example_scripts\__init__.py         0      0   100%
example_scripts\downsampler.py      91     69    24%    39-103, 141-172, 215-217, 222-225, 228-231, 263-273
example_scripts\galaxy.py           58     21    64%    51-52, 149, 168-169, 206-219, 245-254
-----
TOTAL                               149     90    40%
```



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- Write near-exhaustive tests;
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- Special test-cases help in the future.



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```
main_code()
if flag: # pragma: no cover
    do_action()
    do_another_action()
main_code_continued()
```

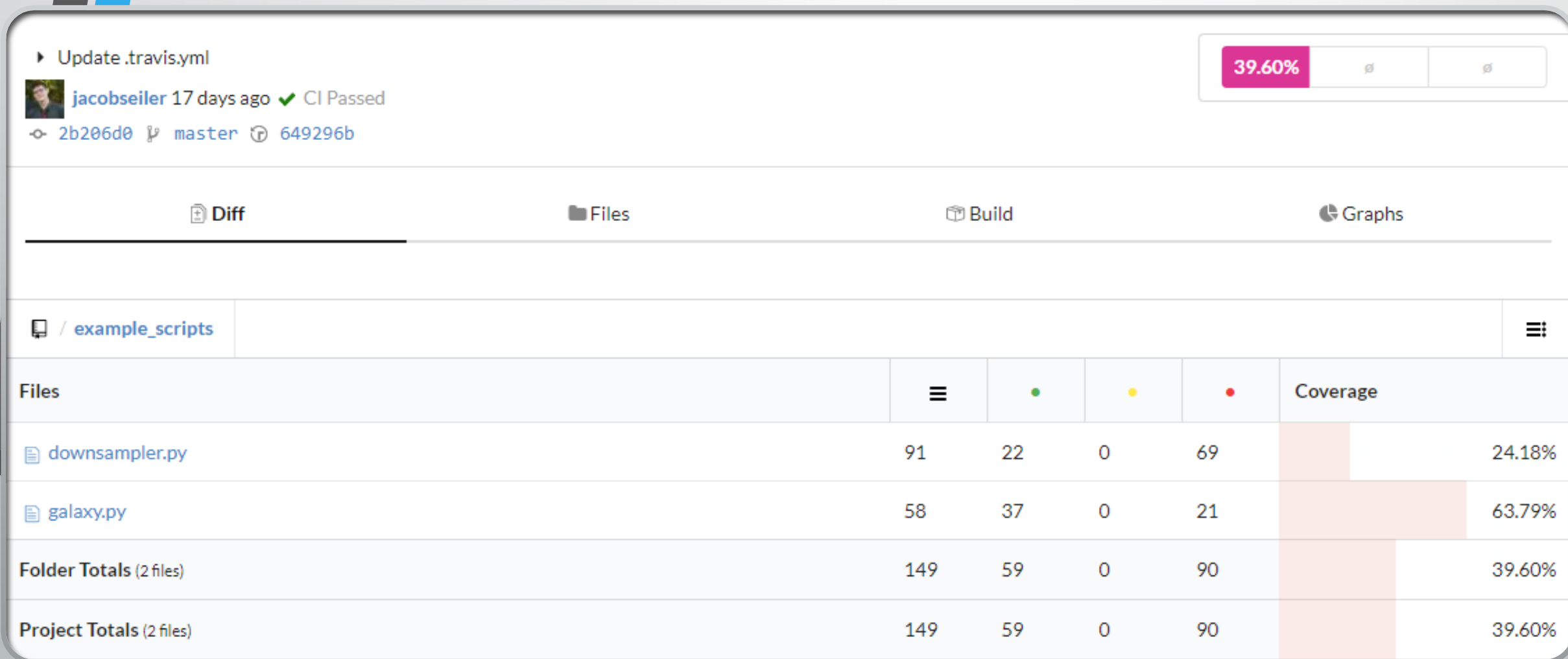
Code coverage: How?

- Aim for 100% coverage, including branch coverage;
- If that is not possible, ask yourself why (maybe use *pragma: no cover*);
- Make sure to write a single test for a single coverage case (e.g., do not cover multiple exception cases in the same test).



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- CodeCov keeps track of your code coverage;
- It can also provide commit status messages.

Code coverage: Where?

Listing all repositories sort by **most recent commit**



PRISM

Latest commit 2 days ago by 1313e

79.27%

< 0.00% >



e13Tools

Latest commit 3 days ago by 1313e

100.00%

< 100.00% >



software-testing

Latest commit 17 days ago by jacobseiler

39.60%



mpi4pyd

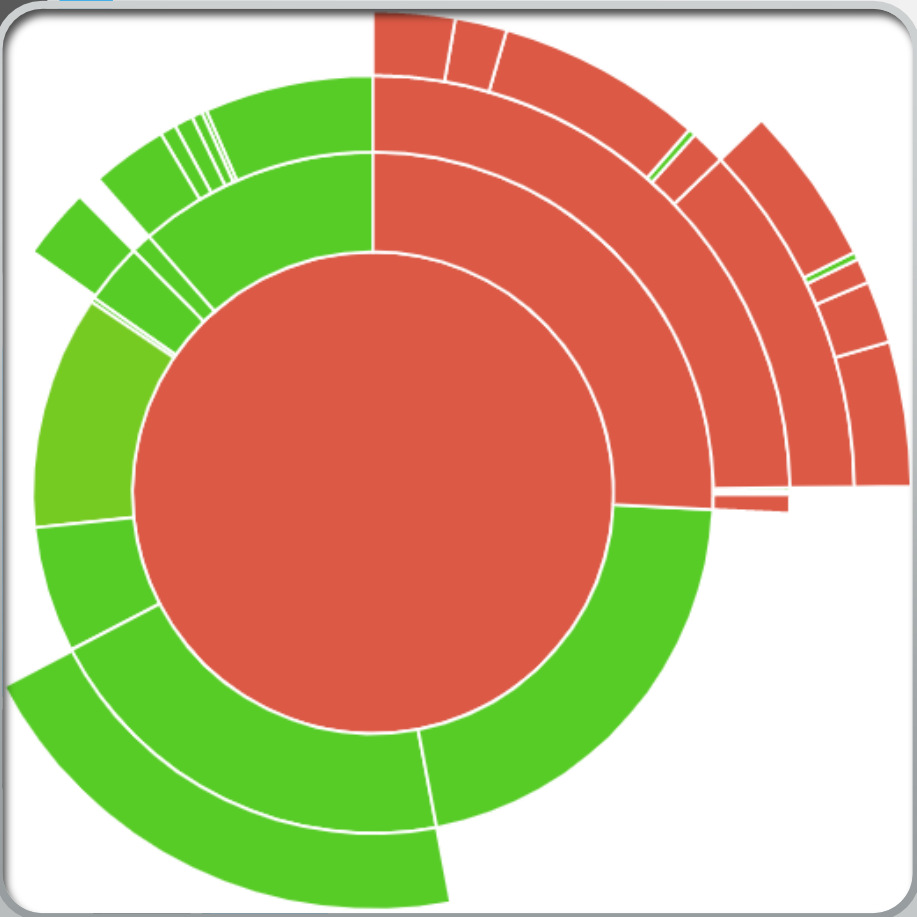
Latest commit 3 months ago by 1313e

76.27%

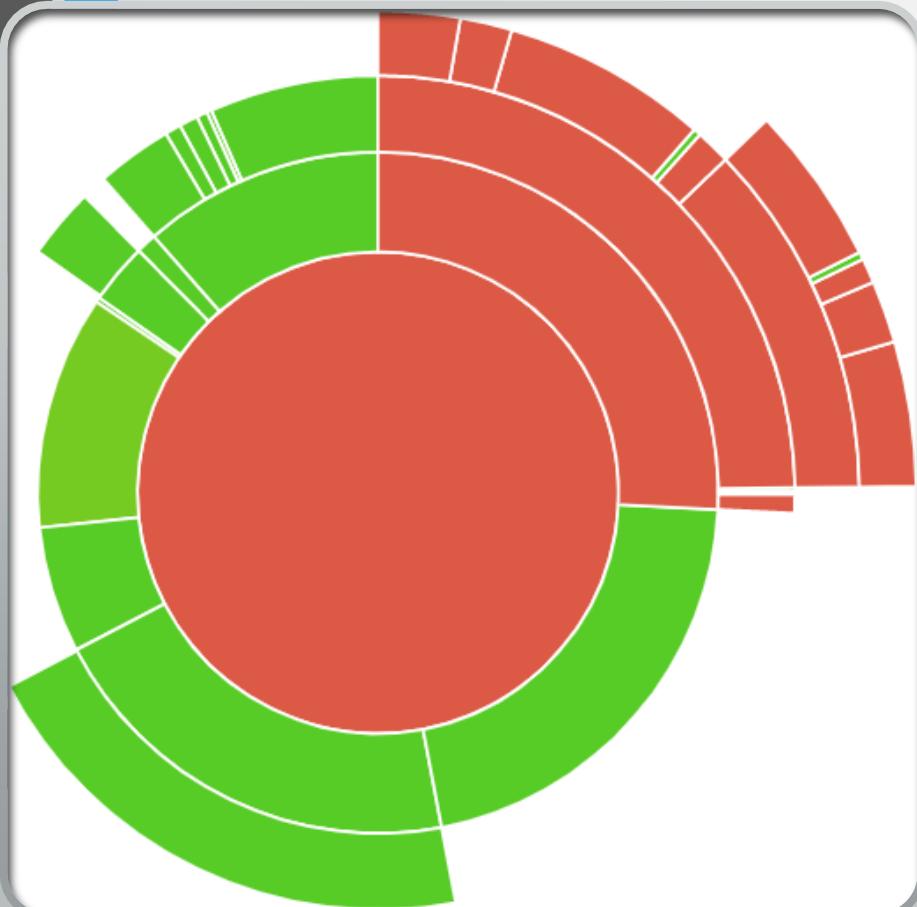
< 94.12% >



Code coverage: Where?




Code coverage: Where?



+115


+24

+91



[WIP #27] Added a details option that gives the details overview of an emulator iteration.

1313e 12 days ago dev a9c4a4d ✓ CI Passed



85.16%


< 20.93% >

(-2.55%)

+119


+8

+111



[WIP #27] Fixed that the options menu sometimes did not open in the center of the GUI.

1313e 13 days ago dev 04f1ac8



87.40%


< 9.68% >

0

+16


+1

+15



[WIP #27] Made some modifications to the way figures are saved.

1313e 14 days ago dev 60d677c ✓ CI Passed



87.71%


< 6.78% >

(-0.51%)

+25


+1

+24



[WIP #27] More improvements to the Projection GUI.

1313e 14 days ago dev 46ad99c ✓ CI Passed



88.21%


< 20.15% >

(-2.90%)

+159


+25

+134



[WIP #27] Changed the two main parts of the GUI to be dock widgets, allowing them to be moved by the user.

1313e 14 days ago dev 5e9f1a3



91.12%


< 4.00% >

0


+42

+2

+40



Enforce that PyQt5 is used.



92.04%

< 25.00% >

0



Improving your maintenance



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- Specify all your requirements with minimum versions;
- Aim for 100% code coverage.
- Use a CI service to automate most of the process...

Coverage TL;DR

1. `"pip install pytest-cov";`
2. Add arguments `"--cov --cov-report=term-missing"` to pytest (or to `"addopts"`);
3. Optionally add `"--cov-branch"` for branch coverage;
4. Activate repo on CodeCov to start monitoring coverage.