

Sharing is Caring

sharing pytest fixtures

-

Brian Okken

Slides + Code

pythontest.com/pycascades-2023

Brian Okken

- Podcasts
Python Bytes / Test & Code



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TEST
&
CODE

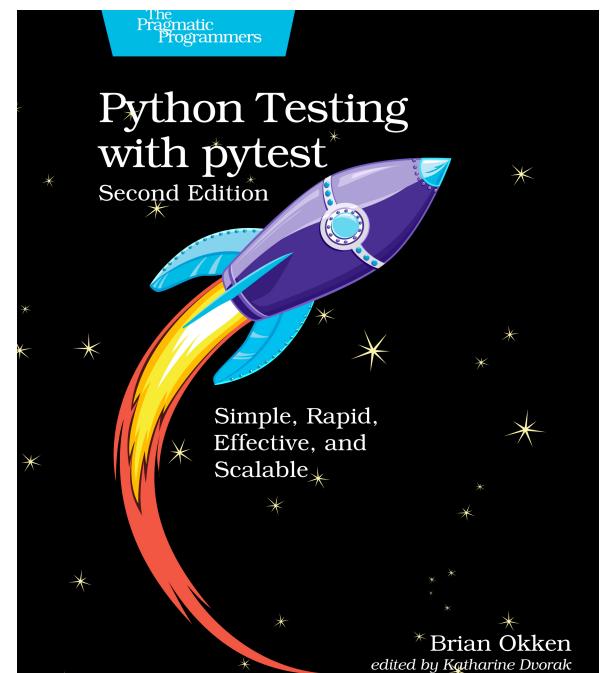
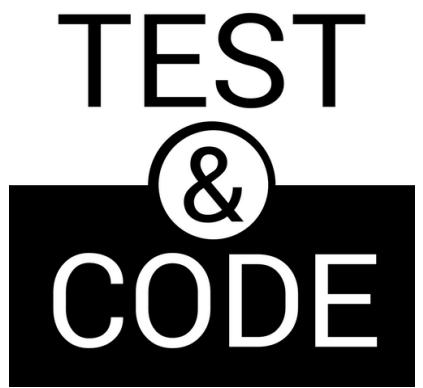
The logo for the Test & Code podcast features the word "TEST" in large black capital letters above a central ampersand symbol (&) which is enclosed in a white circle. Below the ampersand is the word "CODE" in large white capital letters on a black rectangular background.

Brian Okken

- Podcasts
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- Books
Python Testing with pytest



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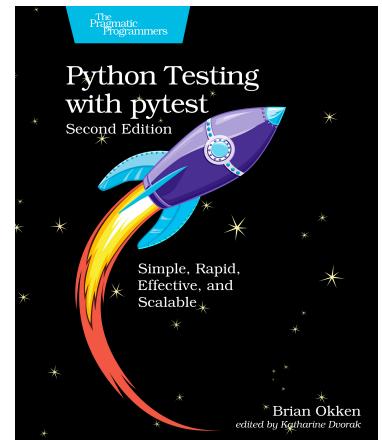
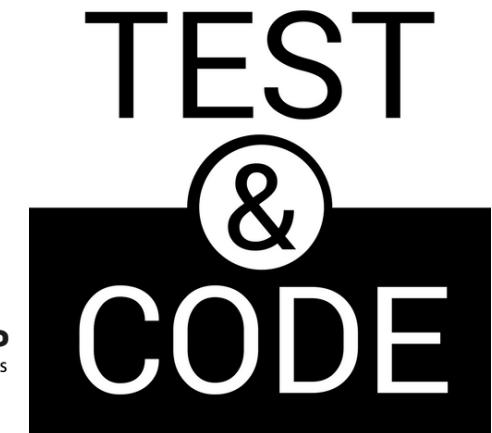


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Getting Started with pytest



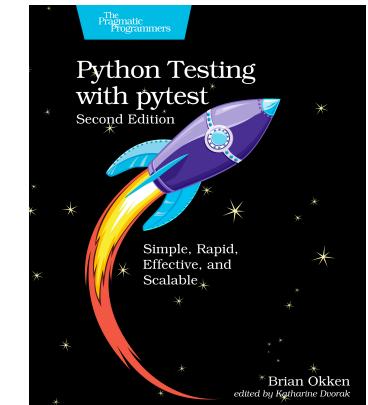
Python's most powerful
test framework

Brian Okken

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- Books
Python Testing with pytest
- Training
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pythontest.com/training
- Lead Software Engineer



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TEST
&
CODE

Getting Started with pytest



Python's most powerful
test framework



System level testing

Is what led me to pytest



Why?

multi-level pytest fixtures

- Setup: connect, reset, configure, ...
- Teardown: reset switches, check logs, ...
- Multiple Levels: session, module, function, ...



pytest fixtures are awesome

pytest is awesome

you are awesome

you're here, right?

you will make
fixtures so awesome
you want to share them

Fixture crash course

typical example

```
import pytest

@pytest.fixture()
def db():
    ... # connect to db
    yield _db
    ... # disconnect
```

typical example

```
import pytest

@pytest.fixture()
def db():
    ... # connect to db
    yield _db
    ... # disconnect

def test_foo(db):
    ...
    result = db.action()
    ...

def test_bar(db):
    ...
    result = db.action()
    ...
```

but frankly

that's too useful for this talk

How about

colorful print statements

```
(venv) $ pytest -s test_example.py
===== test session starts =====
collected 1 item

test_example.py
test_colors: this should be red
test_colors: this should be green
test_colors: this should be yellow
test_colors: this should be blue
test_colors: this should be magenta
test_colors: this should be cyan
.

===== 1 passed in 0.00s =====
```

let's start with just one

```
(venv) $ pytest -s test_example_two.py
===== test session starts =====
collected 1 item

test_example_two.py
test_magenta: this should be magenta
.

===== 1 passed in 0.01s =====
```

Using the fixture

```
def test_magenta(magenta):
    print("")
    magenta("this should be magenta")
```

The fixture

```
import pytest
from functools import partial

MAGENTA = "\x1b[35m"
RESET = "\x1b[0m"
BOLD = "\x1b[1m"

def _color_print(color: str, func_name: str, text: str):
    print(f"{BOLD}{color}{func_name}: {text}{RESET}")

@pytest.fixture()
def magenta(request):
    return partial(_color_print, MAGENTA, request.node.name)
```

More colors

```
@pytest.fixture()
def red(request):
    return partial(_color_print, RED, request.node.name)

@pytest.fixture()
def green(request):
    return partial(_color_print, GREEN, request.node.name)

@pytest.fixture()
def yellow(request):
    return partial(_color_print, YELLOW, request.node.name)

@pytest.fixture()
def blue(request):
    return partial(_color_print, BLUE, request.node.name)

@pytest.fixture()
def magenta(request):
    return partial(_color_print, MAGENTA, request.node.name)

@pytest.fixture()
def cyan(request):
    return partial(_color_print, CYAN, request.node.name)
```

We can use them all!

```
def test_colors(red, green, yellow, blue, magenta, cyan):
    print("")
    red("this should be red")
    green("this should be green")
    yellow("this should be yellow")
    blue("this should be blue")
    magenta("this should be magenta")
    cyan("this should be cyan")
```

Several colors are nice

```
(venv) $ pytest -s test_example.py
===== test session starts =====
collected 1 item

test_example.py
test_colors: this should be red
test_colors: this should be green
test_colors: this should be yellow
test_colors: this should be blue
test_colors: this should be magenta
test_colors: this should be cyan
.

===== 1 passed in 0.00s =====
```

That was fun

But they can't be shared

Yet

They're in the test file

```
import pytest
from functools import partial

# Terminal color codes
RED = "\x1b[31m"
GREEN = "\x1b[32m"
YELLOW = "\x1b[33m"
BLUE = "\x1b[34m"
MAGENTA = "\x1b[35m"
CYAN = "\x1b[36m"
RESET = "\x1b[0m"
BOLD = "\x1b[1m"

def _color_print(color: str, func_name: str, text: str):
    print(f"{BOLD}{color}{func_name}: {text}{RESET}")

@pytest.fixture()
def red(request):
    return partial(_color_print, RED, request.node.name)

@pytest.fixture()
def green(request):
    return partial(_color_print, GREEN, request.node.name)

@pytest.fixture()
def yellow(request):
    return partial(_color_print, YELLOW, request.node.name)

@pytest.fixture()
def blue(request):
    return partial(_color_print, BLUE, request.node.name)

@pytest.fixture()
def magenta(request):
    return partial(_color_print, MAGENTA, request.node.name)

@pytest.fixture()
def cyan(request):
    return partial(_color_print, CYAN, request.node.name)

def test_colors(red, green, yellow, blue, magenta, cyan):
    print("")
    red("this should be red")
    green("this should be green")
    yellow("this should be yellow")
    blue("this should be blue")
    magenta("this should be magenta")
    cyan("this should be cyan")

def test_magenta(magenta):
    print("")
    magenta("this should be magenta")
```

We need to set them free

And put them in a conftest.py file

```
test_directory
└── conftest.py
└── test_example.py
└── test_example_two.py
```

confest.py

```
import pytest
from functools import partial

# Terminal color codes
RED = "\x1b[31m"
GREEN = "\x1b[32m"
YELLOW = "\x1b[33m"
BLUE = "\x1b[34m"
MAGENTA = "\x1b[35m"
CYAN = "\x1b[36m"
RESET = "\x1b[0m"
BOLD = "\x1b[1m"

def _color_print(color: str, func_name: str, text: str):
    print(f"{BOLD}{color}{func_name}: {text}{RESET}")

@pytest.fixture()
def red(request):
    return partial(_color_print, RED, request.node.name)

@pytest.fixture()
def green(request):
    return partial(_color_print, GREEN, request.node.name)

@pytest.fixture()
def yellow(request):
    return partial(_color_print, YELLOW, request.node.name)

@pytest.fixture()
def blue(request):
    return partial(_color_print, BLUE, request.node.name)

@pytest.fixture()
def magenta(request):
    return partial(_color_print, MAGENTA, request.node.name)

@pytest.fixture()
def cyan(request):
    return partial(_color_print, CYAN, request.node.name)
```

test_example.py

```
def test_colors(red, green, yellow, blue, magenta, cyan):
    print("")
    red("this should be red")
    green("this should be green")
    yellow("this should be yellow")
    blue("this should be blue")
    magenta("this should be magenta")
    cyan("this should be cyan")
```

test_example_two.py

```
def test_magenta(magenta):
    print("")
    magenta("this should be magenta")
```

Now sharing works

In the same directory

```
test_directory
├── conftest.py
└── test_example.py
    └── test_example_two.py
```

How about different directories?

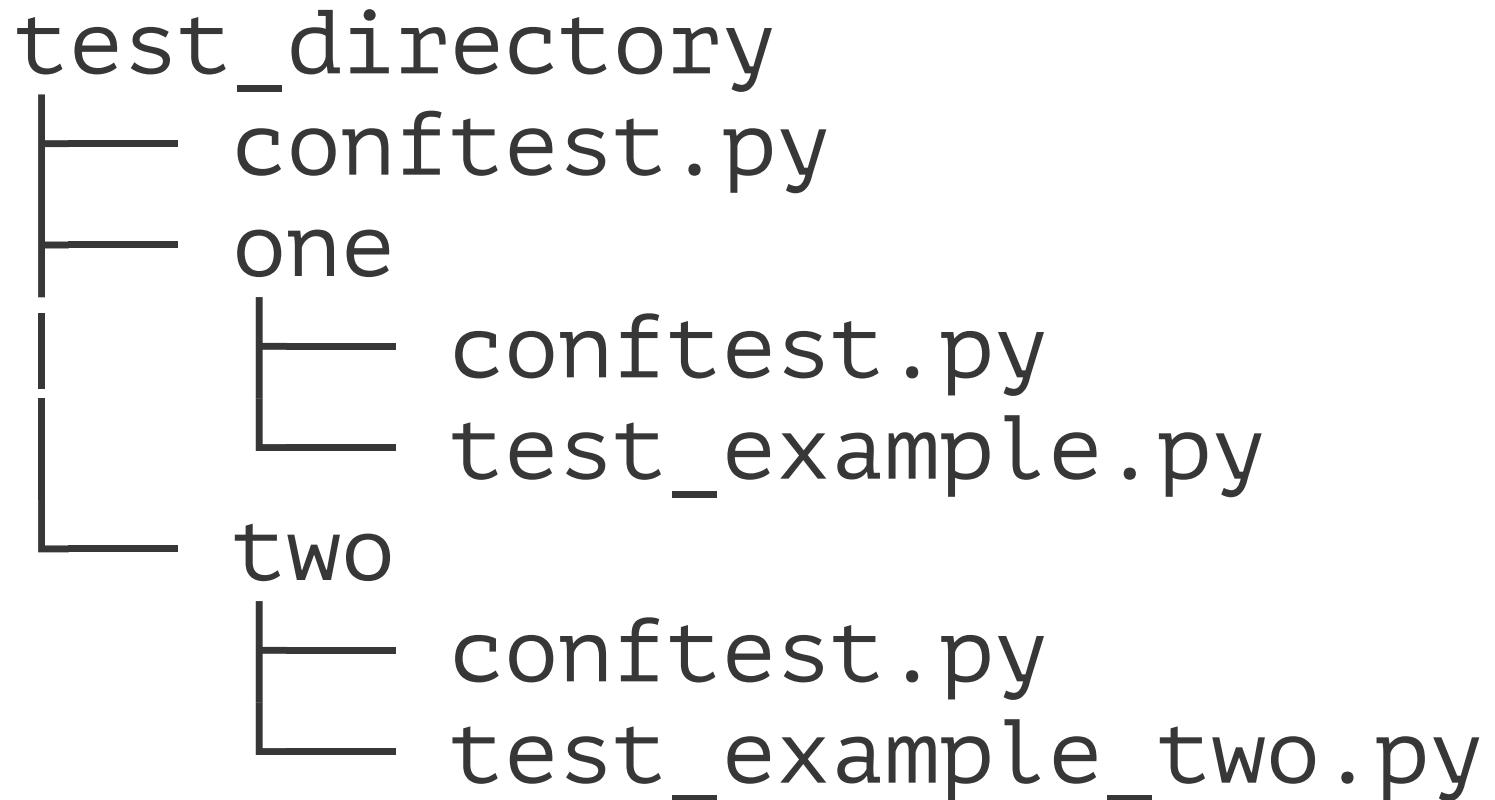
For tests in subdirectories

It's still fine

```
test_directory
├── conftest.py
└── one
    └── test_example.py
└── two
    └── test_example_two.py
```

Multiple conftest.py files

Still fine



How about sharing between projects?

This is where it gets fun

We're going to start here

```
test_directory
├── conftest.py
└── test_example.py
    └── test_example_two.py
```

And move to

test_directory

└── conftest.py

└── test_example.py

└── test_example_two.py

pytest-crayons

└── LICENSE

└── README.md

└── examples

 └── test_example.py

 └── test_example_two.py

└── pyproject.toml

└── pytest_crayons.py

└── tests

 └── conftest.py

 └── test_colors.py

└── tox.ini

Yes. We're going to talk about ...

Packaging

and
building a
pytest plugin

packaging pytest plugins

Trust me
it's not that bad

So how do we get from here to there?

```
test_directory
├── conftest.py
└── test_example.py
└── test_example_two.py
```

```
pytest-crayons
├── LICENSE
├── README.md
└── examples
    ├── test_example.py
    └── test_example_two.py
├── pyproject.toml
├── pytest_crayons.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

test_directory -> pytest-crayons

test_directory

```
├── conftest.py  
└── test_example.py  
    └── test_example_two.py
```

pytest-crayons

```
├── LICENSE  
├── README.md  
└── examples  
    ├── test_example.py  
    └── test_example_two.py  
├── pyproject.toml  
├── pytest_crayons.py  
└── tests  
    ├── conftest.py  
    └── test_colors.py  
tox.ini
```

Fixtures: conftest.py -> pytest_crayons.py

```
test_directory
├── conftest.py
└── test_example.py
    └── test_example_two.py
```

```
pytest-crayons
├── LICENSE
├── README.md
├── examples
│   ├── test_example.py
│   └── test_example_two.py
├── pyproject.toml
└── pytest_crayons.py
    ├── tests
    │   ├── conftest.py
    │   └── test_colors.py
    └── tox.ini
```

src is also an option

```
test_directory
├── conftest.py
└── test_example.py
    └── test_example_two.py
```

```
pytest-crayons
├── LICENSE
├── README.md
├── examples
│   ├── test_example.py
│   └── test_example_two.py
├── pyproject.toml
└── src
    └── pytest_colors.py
└── tests
    ├── conftest.py
    └── test_colors.py
└── tox.ini
```

or you can get fancy

```
test_directory
├── conftest.py
└── test_example.py
    └── test_example_two.py
```

```
pytest-crayons
├── LICENSE
├── README.md
├── examples
│   ├── test_example.py
│   └── test_example_two.py
├── pyproject.toml
└── src
    └── pytest_colors
        ├── __init__.py
        └── plugin.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

But let's stick with `pytest_crayons.py`

```
test_directory  
└── conftest.py  
└── test_example.py  
└── test_example_two.py
```

```
pytest-crayons  
├── LICENSE  
├── README.md  
├── examples  
│   └── test_example.py  
│   └── test_example_two.py  
├── pyproject.toml  
└── pytest_crayons.py  
tests  
└── conftest.py  
└── test_colors.py  
tox.ini
```

examples -> examples

```
test_directory
├── conftest.py
└── test_example.py
└── test_example_two.py
```

```
pytest-crayons
├── LICENSE
├── README.md
└── examples
    ├── test_example.py
    └── test_example_two.py
├── pyproject.toml
├── pytest_crayons.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

existing stuff

```
test_directory
├── conftest.py
└── test_example.py
└── test_example_two.py
```

```
pytest-crayons
├── LICENSE
├── README.md
└── examples
    ├── test_example.py
    └── test_example_two.py
├── pyproject.toml
└── pytest_crayons.py
tests
└── conftest.py
    └── test_colors.py
tox.ini
```

New stuff

```
test_directory
├── conftest.py
└── test_example.py
    └── test_example_two.py
```

```
pytest-crayons
├── LICENSE
├── README.md
├── examples
│   ├── test_example.py
│   └── test_example_two.py
├── pyproject.toml
├── pytest_crayons.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

LICENSE

pytest-crayons

```
├── LICENSE
├── README.md
├── examples
│   ├── test_example.py
│   └── test_example_two.py
├── pyproject.toml
├── pytest_crayons.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

The MIT License (MIT)

Copyright (c) 2023, Brian Okken

Permission is hereby granted, . . .

. . .

README.md

```
pytest-crayons
├── LICENSE
├── README.md
├── examples
│   ├── test_example.py
│   └── test_example_two.py
├── pyproject.toml
├── pytest_crayons.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

```
# pytest-crayons
... < what it does >
... < why you should use it >

## Installation
... < how to install it >

## Usage
... < code sample >
... < how to use it >
```

pyproject.toml

```
pytest-crayons
├── LICENSE
├── README.md
├── examples
│   ├── test_example.py
│   └── test_example_two.py
└── pyproject.toml
├── pytest_crayons.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

Let's come back to that

more tests and tox

pytest-crayons

```
├── LICENSE
├── README.md
├── examples
│   ├── test_example.py
│   └── test_example_two.py
├── pyproject.toml
├── pytest_crayons.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

pyproject.toml

```
pytest-crayons
├── LICENSE
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└── pyproject.toml
├── pytest_crayons.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

Now might be
a good time for a
deep breath

pyproject.toml

```
[project]
name = "pytest-crayons"
description = "A pytest plugin for colorful print statements"
version = "0.0.4"
authors = [{name = "Brian Okken"}]
requires-python = ">=3.7"
readme = "README.md"
license = {file = "LICENSE"}
dependencies = ["pytest"]
classifiers =
    "License :: OSI Approved :: MIT License",
    "Framework :: Pytest"
]

[project.urls]
Home = "https://github.com/okken/pytest-crayons"

[project.entry-points.pytest11]
pytest_crayons = "pytest_crayons"

[build-system]
requires = ["flit_core >=3.2,<4"]
build-backend = "flit_core.buildapi"

[tool.flit.module]
name = "pytest_crayons"
```

Project

```
[project]
name = "pytest-crayons"
description = "A pytest plugin for colorful print statements"
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Project

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readme = "README.md"
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dependencies = ["pytest"]
classifiers = [
    "License :: OSI Approved :: MIT License",
    "Framework :: Pytest"
]
```

Classifiers

```
classifiers = [  
    "License :: OSI Approved :: MIT License",  
    "Framework :: Pytest"  
]
```

- These need to be exact matches
- Look them up at pypi.org/classifiers/

Meta

License: MIT License

Author: Brian Okken

Requires: Python >=3.7

Maintainers



[okken](#)

Classifiers

Framework

- [Pytest](#)

License

- [OSI Approved :: MIT License](#)
-

Shows up on left sidebar of
PyPI

URL

```
[project]
name = "pytest-crayons"
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requires-python = ">=3.7"
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]

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[build-system]
requires = ["flit_core >=3.2,<4"]
build-backend = "flit_core.buildapi"

[tool.flit.module]
name = "pytest_crayons"
```

URL

```
[project.urls]  
Home = "https://github.com/okken/pytest-crayons"
```

pytest entry point

```
[project]
name = "pytest-crayons"
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[project.urls]
Home = "https://github.com/okken/pytest-crayons"

[project.entry-points.pytest11]
pytest_crayons = "pytest_crayons"

[build-system]
requires = ["flit_core >=3.2,<4"]
build-backend = "flit_core.buildapi"

[tool.flit.module]
name = "pytest_crayons"
```

pytest entry point

```
[project.entry-points.pytest11]  
pytest_crayons = "pytest_crayons"
```

pytest entry point

```
[project.entry-points.pytest11]  
pytest_crayons = "pytest_crayons"
```

Supposedly it's:

```
plugin_name = "module"
```

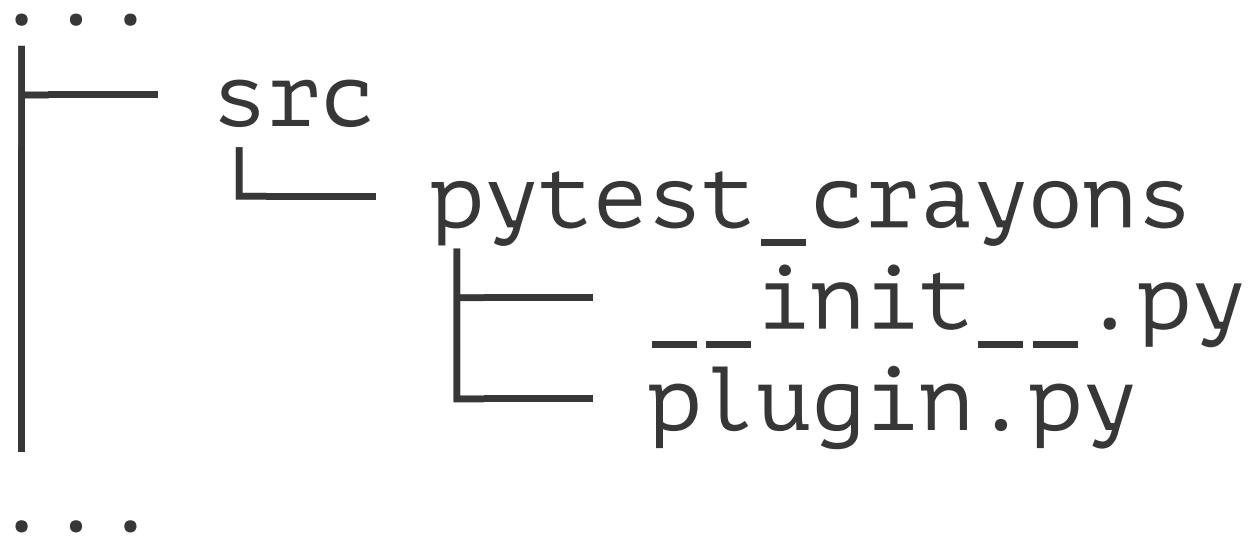
pytest entry point

```
[project.entry-points.pytest11]
pytest_crays = "pytest_crays"
```

Plugin name	Module name
• <code>pytest_crayons</code> or	
• <code>pytest-crayons</code> or	
• <code>crayons</code>	

If we have package.module

```
[project.entry-points.pytest11]  
pytest_crayons = "pytest_crayons.plugin"
```



But we didn't

```
[project.entry-points.pytest11]  
pytest_crayons = "pytest_crayons"
```

```
...  
├── pytest_crayons.py  
...  
...
```

Build system

```
[project]
name = "pytest-crayons"
description = "A pytest plugin for colorful print statements"
version = "0.0.4"
authors = [{name = "Brian Okken"}]
requires-python = ">=3.7"
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Home = "https://github.com/okken/pytest-crayons"

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pytest_crayons = "pytest_crayons"

[build-system]
requires = ["flit_core >=3.2,<4"]
build-backend = "flit_core.buildapi"

[tool.flit.module]
name = "pytest_crayons"
```

Build system

```
[build-system]
requires = ["flit_core >=3.2,<4"]
build-backend = "flit_core.buildapi"
```

Module

```
[project]
name = "pytest-crayons"
description = "A pytest plugin for colorful print statements"
version = "0.0.4"
authors = [{name = "Brian Okken"}]
requires-python = ">=3.7"
readme = "README.md"
license = {file = "LICENSE"}
dependencies = ["pytest"]
classifiers =
    "License :: OSI Approved :: MIT License",
    "Framework :: Pytest"
]

[project.urls]
Home = "https://github.com/okken/pytest-crayons"

[project.entry-points.pytest11]
pytest_crayons = "pytest_crayons"

[build-system]
requires = ["flit_core >=3.2,<4"]
build-backend = "flit_core.buildapi"

[tool.flit.module]
name = "pytest_crayons"
```

Module

```
[tool.flit.module]  
name = "pytest_crayons"
```

Module

```
[tool.flit.module]  
name = "pytest_crayons"
```

```
[project]  
name = "pytest-crayons"
```

Module

```
[tool.flit.module]  
name = "pytest_crayons"
```

```
[project]  
name = "pytest-crayons"
```

```
...  
├── pytest_crayons.py  
...  
...
```

Flit based pyproject.toml

```
[project]
name = "pytest-crayons"
description = "A pytest plugin for colorful print statements"
version = "0.0.4"
authors = [{name = "Brian Okken"}]
requires-python = ">=3.7"
readme = "README.md"
license = {file = "LICENSE"}
dependencies = ["pytest"]
classifiers =
    "License :: OSI Approved :: MIT License",
    "Framework :: Pytest"
]

[project.urls]
Home = "https://github.com/okken/pytest-crayons"

[project.entry-points.pytest11]
pytest_crayons = "pytest_crayons"

[build-system]
requires = ["flit_core >=3.2,<4"]
build-backend = "flit_core.buildapi"

[tool.flit.module]
name = "pytest_crayons"
```

Flit specific

```
[project]
name = "pytest-crayons"
description = "A pytest plugin for colorful print statements"
version = "0.0.4"
authors = [{name = "Brian Okken"}]
requires-python = ">=3.7"
readme = "README.md"
license = {file = "LICENSE"}
dependencies = ["pytest"]
classifiers =
    "License :: OSI Approved :: MIT License",
    "Framework :: Pytest"
]

[project.urls]
Home = "https://github.com/okken/pytest-crayons"

[project.entry-points.pytest11]
pytest_crayons = "pytest_crayons"

[build-system]
requires = ["flit_core >=3.2,<4"]
build-backend = "flit_core.buildapi"

[tool.flit.module]
name = "pytest_crayons"
```

flit

```
[build-system]
requires = ["flit_core >=3.2,<4"]
build-backend = "flit_core.buildapi"

[tool.flit.module]
name = "pytest_crayons"
```

hatch

```
[build-system]
requires = ["hatchling"]
build-backend = "hatchling.build"
```

setuptools

```
[build-system]
requires = ["setuptools"]
build-backend = "setuptools.build_meta"
```

That wasn't too bad, was it?

Guess what?

We can share our code now

Seriously

We could just push to a git repo now

A screenshot of a GitHub repository page for 'okken/pytest-crayons'. The page shows a recent commit by 'okken' refactoring various files. The commit details are as follows:

File	Message	Time Ago
.github	refactor	12 hours ago
docs	refactor	12 hours ago
examples	refactor	12 hours ago
tests	refactor	12 hours ago
.coveragerc	refactor	12 hours ago
.gitignore	Initial commit	last month
LICENSE	initial commit	last month
README.md	refactor	12 hours ago
pyproject.toml	refactor	12 hours ago
pytest_crayons.py	refactor	12 hours ago
tox.ini	refactor	12 hours ago

We can
install directly from git

```
$ pip install git+https://github.com/okken/pytest-crayons.git
```

Even usable with requirements.txt

```
...  
pytest  
git+https://github.com/okken/pytest-crayons.git  
tox  
...
```

We haven't even built the wheel yet

pip install builds the wheel

```
$ pip install git+https://github.com/okken/pytest-crayons.git
Collecting ...
  Cloning ...
    Running command git clone ...
      Resolved ...
        Installing build dependencies ... done
        Getting requirements to build wheel ... done
        Preparing metadata (pyproject.toml) ... done
      Building wheels for collected packages: pytest-crayons
        Building wheel for pytest-crayons (pyproject.toml) ... done
          Created wheel for pytest-crayons: ...
        Successfully built pytest-crayons
      Installing collected packages: pytest-crayons
        Successfully installed pytest-crayons-0.0.4
```

So hopefully the build works

Maybe we should test packaging

Look! Some tests

```
pytest-crayons
├── LICENSE
├── README.md
├── examples
│   ├── test_example.py
│   └── test_example_two.py
├── pyproject.toml
├── pytest_crayons.py
└── tests
    ├── conftest.py
    └── test_colors.py
tox.ini
```

- tox for testing packaging
 - and running our tests
 - on multiple platforms
- pytester for testing plugin functionality

Let's start with tox

```
...  
└── tests  
    ├── conftest.py  
    └── test_colors.py  
└── tox.ini
```

tox.ini

```
[tox]
envlist = py37, py38, py39, py310, py311, py312
skip_missing_interpreters = true
isolated_build = True

[testenv]
commands = pytest
description = Run pytest

[pytest]
testpaths =
    examples
    tests
```

Running tox

For example

```
$ pip install tox  
$ tox -e py310
```

or all environments

```
$ tox
```

- creates a virtual environment
- builds a wheel
- installs all dependencies
- installs your code
- runs the tests

tox example

```
[code] $ tox -q -e py311
=====
 test session starts =====
collected 4 items

examples/test_example.py .
examples/test_example_two.py ..
tests/test_colors.py .

=====
 4 passed in 0.05s =====
py311: OK (2.02=setup[1.74]+cmd[0.28] seconds)
congratulations :) (2.07 seconds)
```

tests

```
...  
|   └── examples  
|       └── test_example.py  
|       └── test_example_two.py  
  
...  
|   └── tests  
|       └── conftest.py  
|       └── test_colors.py  
└── tox.ini
```

tests/conftest.py

```
pytest_plugins = "pytester"
```

tests/test_colors.py

```
def test_colors_get_printed(pytester):
    pytester.copy_example("examples/test_example.py")
    pytester.makepyfile(__init__ = "")
    result = pytester.runpytest("-s")
    result.assert_outcomes(passed=1)
    bold, reset = '\x1b[1m', '\x1b[0m'
    result.stdout.fnmatch_lines(
        [
            f"*{bold}\x1b[31mtest_colors: this should be red{reset}",
            f"*{bold}\x1b[32mtest_colors: this should be green{reset}",
            f"*{bold}\x1b[33mtest_colors: this should be yellow{reset}",
            f"*{bold}\x1b[34mtest_colors: this should be blue{reset}",
            f"*{bold}\x1b[35mtest_colors: this should be magenta{reset}",
            f"*{bold}\x1b[36mtest_colors: this should be cyan{reset}",
        ],
    )

```

We're testing a lot

- We're testing
 - the examples using the fixtures
 - the actual output
 - including the color ASCII codes
 - the packaging: building, installing, and dependencies
 - on multiple versions of Python

ahhh. confidence.

Is it ready for PyPI?

Actually, yes.

We won't go through those details

But essentially it's:

- Register with both test.pypi.org / pypi.org
- Build
- Publish to TestPyPI / PyPI:

Build

- flit build
- hatch build
- python -m build
 - requires pip install build

Publish

First to TestPyPI, then PyPI

- `flit publish`
- `hatch publish`
- `twine upload dist/*`

A screenshot of a web browser displaying the PyPI project page for `pytest-crayons`. The page has a dark blue header with a navigation bar containing links for Help, Sponsors, Log in, and Register. A search bar is located at the top right. The main title is `pytest-crayons 0.0.4`, with a green button labeled "Latest version". Below the title, there is a code block with the command `pip install pytest-crayons` and a copy icon. To the right, it says "Released: about 12 hours ago". The page content includes a brief description: "A pytest plugin for colorful print statements". On the left, a sidebar titled "Navigation" lists "Project description" (which is highlighted in blue), "Release history", and "Download files". Below this is a section titled "Project links" with a "Home" link. The main content area is titled "Project description" and contains the heading "pytest-crayons" and a description: "A pytest plugin for colorful print statements.". It also features sections for "Installation" (with the command `pip install pytest-crayons`) and "Usage".

Absolutely don't want PyPI?

Preventing PyPI upload

```
classifiers = [  
    "License :: OSI Approved :: MIT License",  
    "Framework :: Pytest",  
    "Private :: Do Not Upload"  
]
```

PyPI will always reject packages with classifiers beginning with
"Private ::". - pypi.org/classifiers

Learned this from Brett Cannon

We covered

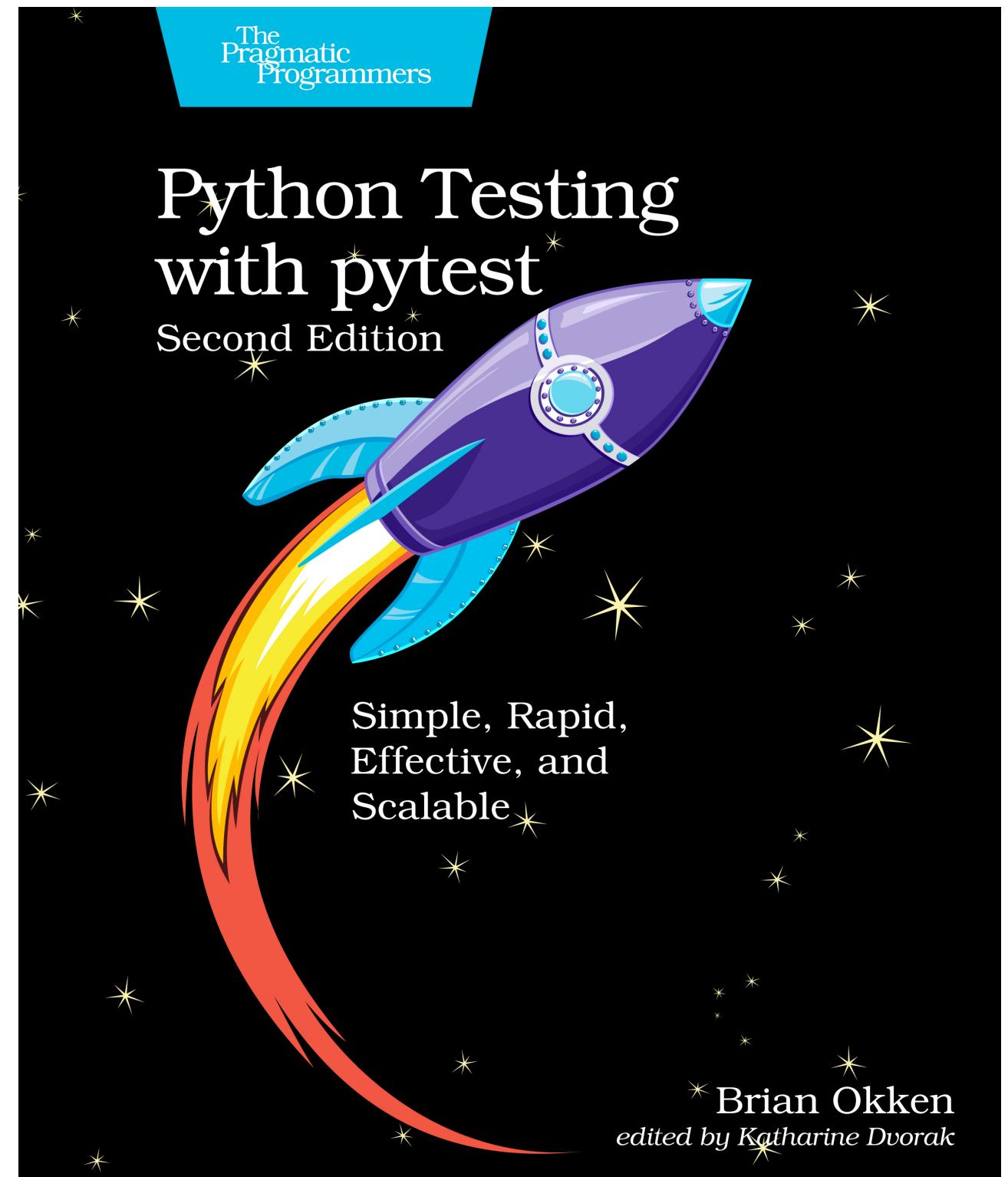
- pytest fixtures
- conftest.py for sharing fixtures
- creating a pytest plugin
- packaging with flit, hatch, setuptools
- sharing via git repository
- tox for testing packaging
 - on multiple Python versions
 - testing functionality with pytester
 - uploading to PyPI

Not too bad, was it?

If you want to know more about
building and testing fixtures and plugins

See:

- Ch 3 for fixtures
- Ch 15 for building plugins
- Ch 11 includes
 - tox
 - GitHub Actions



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