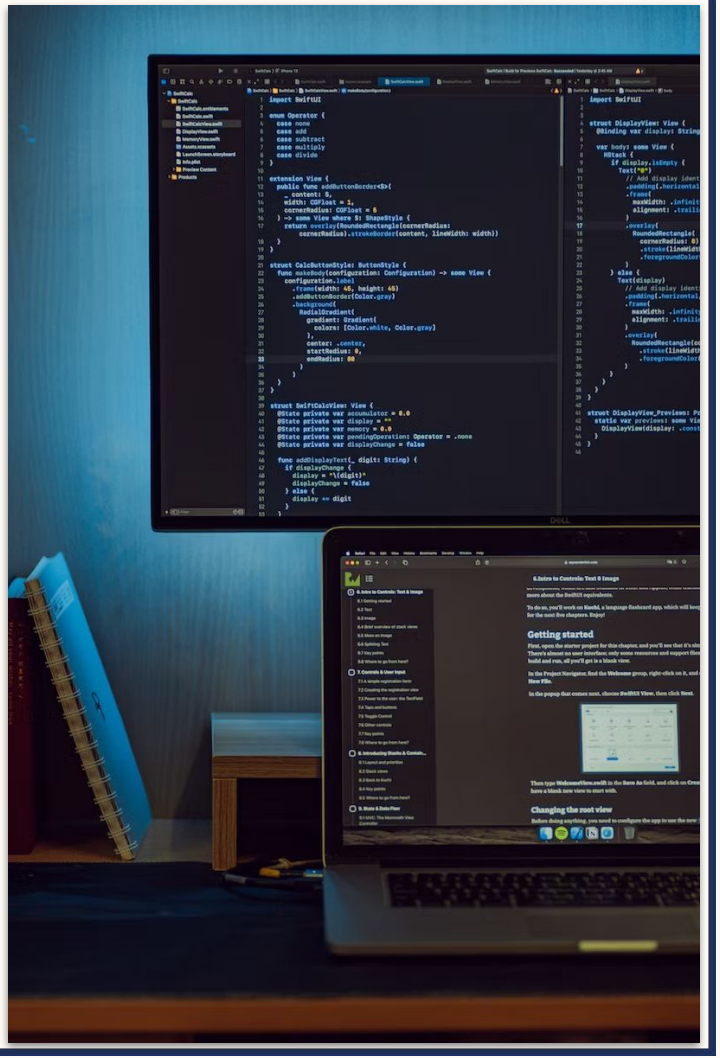
UFRN DCA

Cont;nue

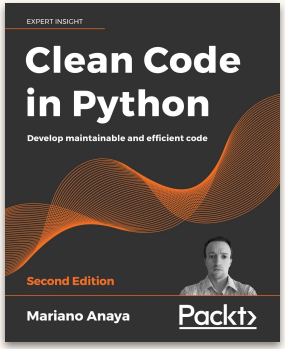
Clean Code Principles

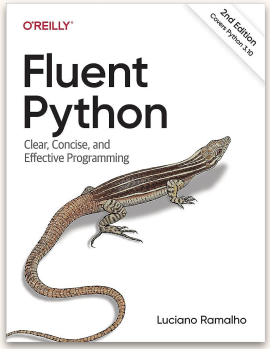
For Data Science & Machine Learning

DCA0305
ivanovitch.silva@ufrn.br



Agenda

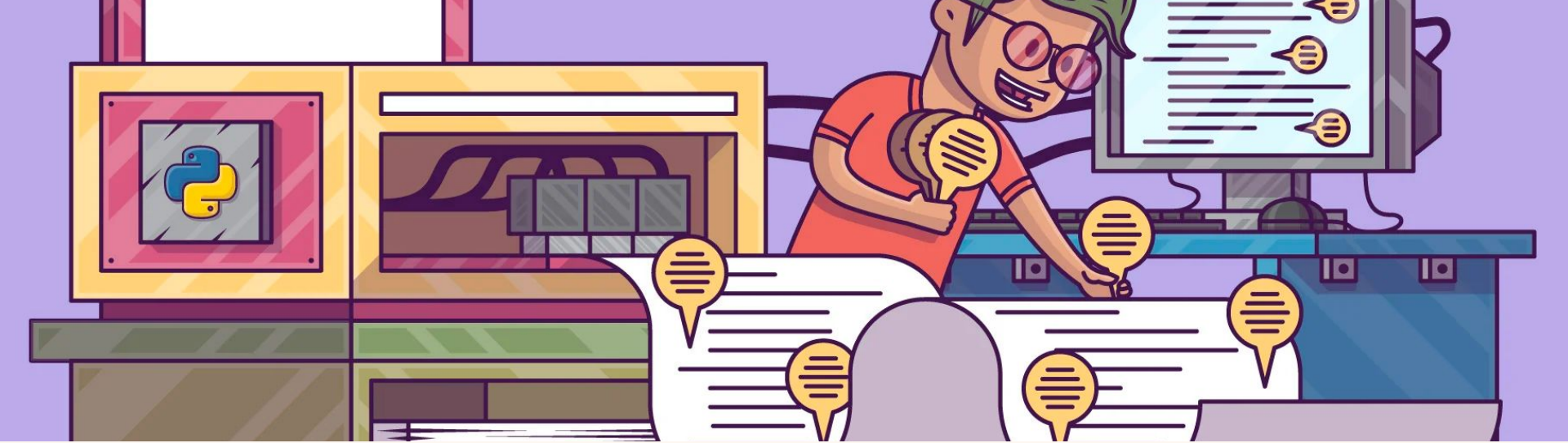




1. Documentation & Following PEP8
2. Production Ready Code
    - Handling Errors
    - Writing Tests and Logs

"Debugging is hard, testing is easy"

"Far better an approximate answer to the right question, which is often vague, than an exact answer to the wrong question"



Documentation

Understand tricky bits, find your way, explain what parts do and why they're important.

- Line Level
- Function or Module Level
- Project Level

```
class MyClass:
    """
    This is a demonstration class.

    Attributes:
    attribute1 (type): Description of
attribute1
    """
    def __init__(self, attribute1):
        self.attribute1 = attribute
```

```
def add(a, b):
    """
    This function adds two numbers and returns the sum.

    Parameters:
    a (int or float): The first number
    b (int or float): The second number

    Returns:
    int or float: The sum of a and b
    """
    return a + b
```

```
# This is a line comment
print("Hello, World!") # This comment explains what the line does
```

Documentation

```
"""
This module provides utility functions for basic arithmetic
operations.

Functions:
- add(a, b): Returns the sum of a and b
- subtract(a, b): Returns the difference between a and b
"""

# rest of the code
```

Type Annotations

```python
from typing import List

def add(a: int, b: int) -> int:
    """
    This function adds two integers and returns the sum.

    Parameters:
    a (int): The first number
    b (int): The second number

    Returns:
    int: The sum of a and b
    """
    return a + b

def get_even_numbers(numbers: List[int]) -> List[int]:
    """
    Given a list of integers, return a list containing only the even numbers.

    Parameters:
    numbers (List[int]): A list of integers

    Returns:
    List[int]: A list of even integers
    """
    return [x for x in numbers if x % 2 == 0]
```

Annotations can also be added for class attributes and instance variables

```
class Point:
    x: float
    y: float

    def __init__(self, x: float, y: float) -> None:
        self.x = x
        self.y = y
```

Type Annotations

Contents

PEP 8 – Style Guide for Python Code

Author: Guido van Rossum <guido at python.org>, Barry Warsaw <barry at python.org>, Nick Coghlan <ncoghlan at gmail.com>

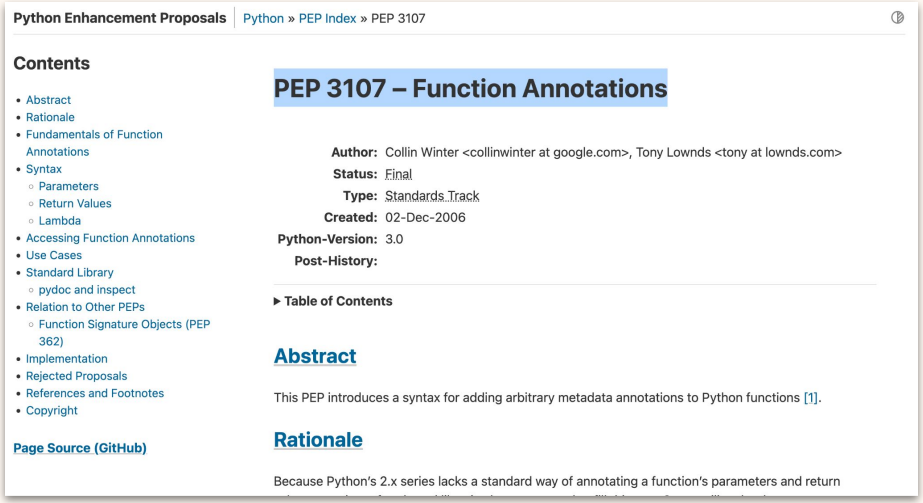
Status: Active
Type: Process
Created: 05-Jul-2001
Post-History: 05-Jul-2001, 01-Aug-2013

▶ **Table of Contents**

Introduction

This document gives coding conventions for the Python code comprising the standard library in the main Python distribution. Please see the companion informational PEP describing style guidelines for the C code in the C implementation of Python.

This document and PEP 257 (Docstring Conventions) were adapted from Guido's original Python Style Guide essay, with some additions from Barry's style guide [2].



Python Enhancement Proposals | Python » PEP Index » PEP 3107

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  - Function Signature Objects (PEP 362)
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- Rejected Proposals
- References and Footnotes
- Copyright

Page Source (GitHub)

PEP 3107 – Function Annotations

Author: Collin Winter <collinwinter at google.com>, Tony Lownds <tony at lownds.com>
Status: Final
Type: Standards Track
Created: 02-Dec-2006
Python-Version: 3.0
Post-History:

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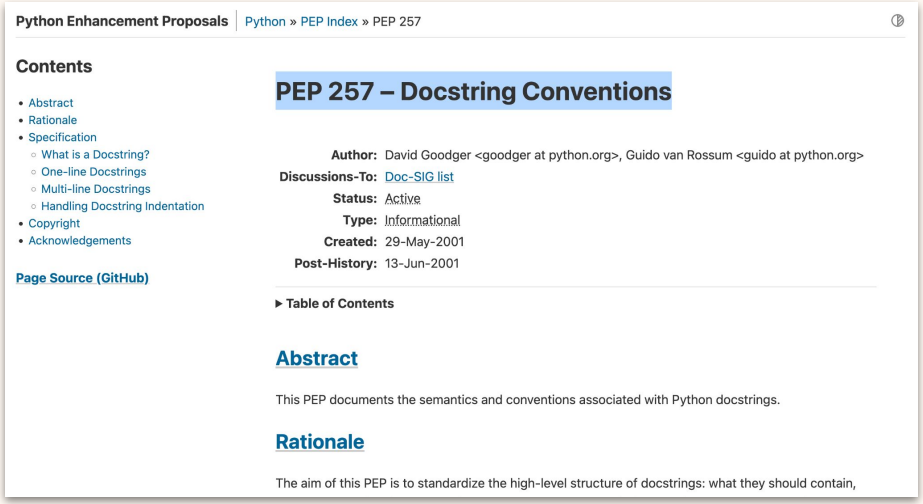
Abstract

This PEP introduces a syntax for adding arbitrary metadata annotations to Python functions [1].

Rationale

Because Python's 2.x series lacks a standard way of annotating a function's parameters and return



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Contents

- Abstract
- Rationale
- Specification
  - What is a Docstring?
  - One-line Docstrings
  - Multi-line Docstrings
  - Handling Docstring Indentation
- Copyright
- Acknowledgements

Page Source (GitHub)

PEP 257 – Docstring Conventions

Author: David Goodger <goodger at python.org>, Guido van Rossum <guido at python.org>
Discussions-To: Doc-SIG list
Status: Active
Type: Informational
Created: 29-May-2001
Post-History: 13-Jun-2001

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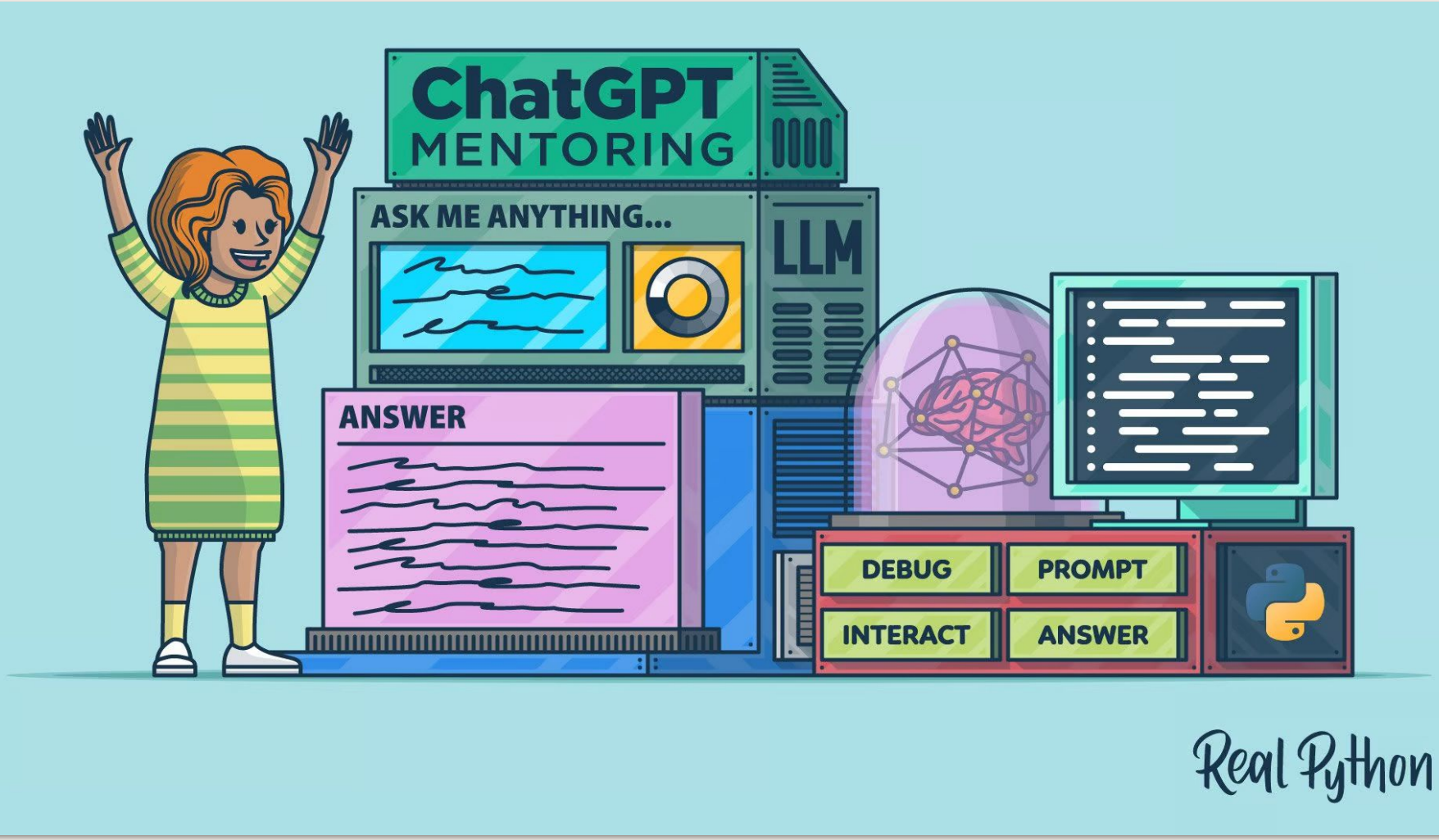
Abstract

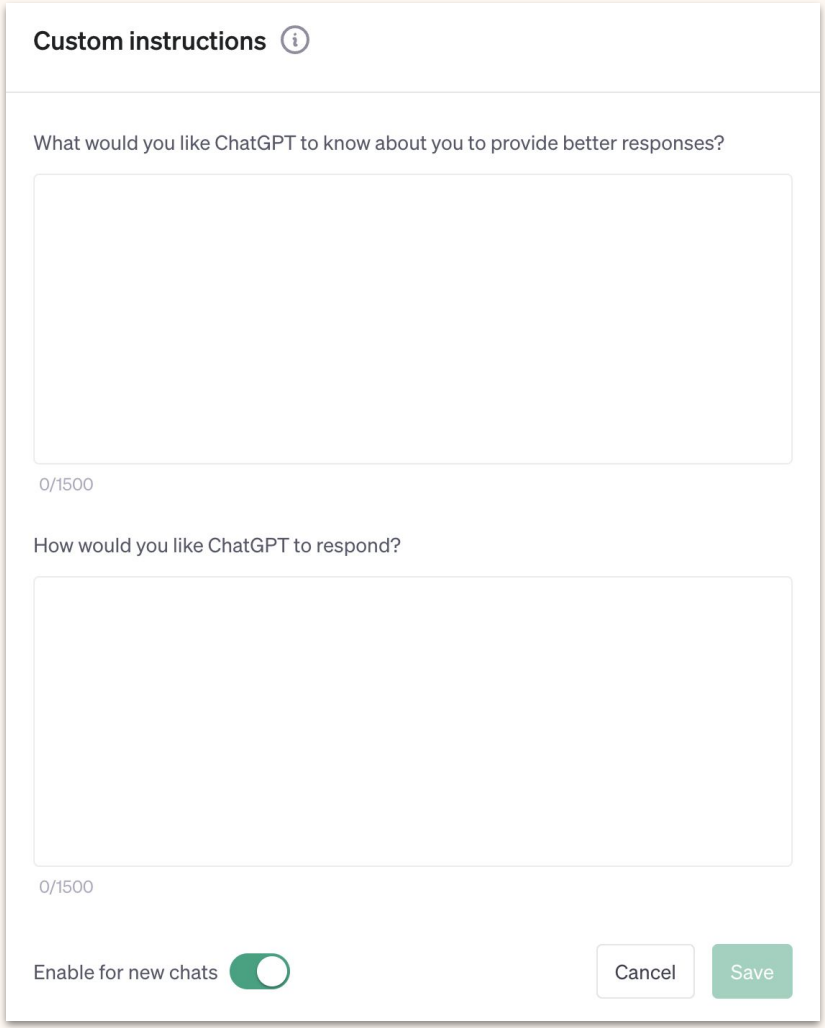
This PEP documents the semantics and conventions associated with Python docstrings.

Rationale

The aim of this PEP is to standardize the high-level structure of docstrings: what they should contain,

- PEP-3107: https://www.python.org/dev/peps/pep-3107/
- PEP-484: https://www.python.org/dev/peps/pep-0484/
- PEP-526: https://www.python.org/dev/peps/pep-0526/
- PEP-557: https://www.python.org/dev/peps/pep-0557/
- PEP-585: https://www.python.org/dev/peps/pep-0585/


ChatGPT
MENTORING
ASK ME ANYTHING...
LLM
ANSWER
DEBUG
PROMPT
INTERACT
ANSWER
Real Python

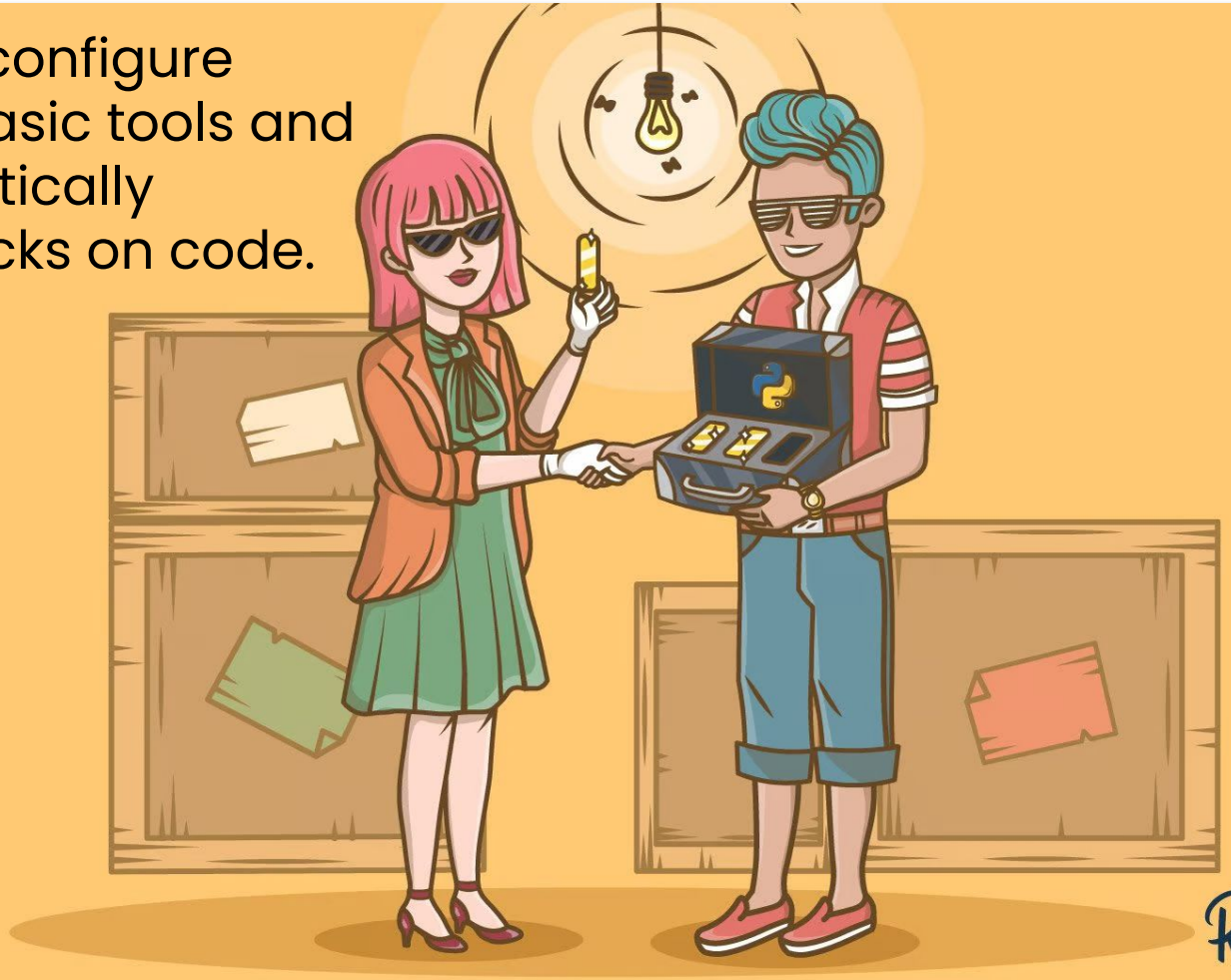


I am a data science professor for a University in Brazil. I teach technical ML and DL courses for students at undergraduate level in computer engineering. Most students attending my course are already familiar with basic ML terms and techniques and they attend my course to deep dive in technical concepts.

Respond in professional tone, deep dive into concepts, do not use too many filter words, always be straight to the point, and always at the beginning of your response you must have a abstract in exactly 3 sentences. At the end of your response you must suggest what other topics student must read as an optional reading to get more insight into the topic.

How to configure some basic tools and automatically run checks on code.

#tooling



Real Python

https://realpython.com/python-code-quality

Linter	Category	Description
Pylint	Logical & Stylistic	Checks for errors, tries to enforce a coding standard, looks for code smells
PyFlakes	Logical	Analyzes programs and detects various errors
pycodestyle	Stylistic	Checks against some of the style conventions in PEP 8
pydocstyle	Stylistic	Checks compliance with Python docstring conventions
Bandit	Logical	Analyzes code to find common security issues
MyPy	Logical	Checks for optionally-enforced static types
autopep8	Stylistic	Automatically formats Python code to conform to the PEP 8 style guide
nbQA	Logical & Stylistic	Linting and formatting Jupyter Notebooks with any command-line tool

Tool	Category	Description
Mccabe	Analytical	Checks McCabe complexity
Radon	Analytical	Analyzes code for various metrics (lines of code, complexity, and so on)
Black	Formatter	Formats Python code without compromise
Isort	Formatter	Formats imports by sorting alphabetically and separating into sections

PyCQA

Type / to search

Overview | Repositories 28 | Projects 1 | Packages | People 35

https://github.com/PyCQA

Python Code Quality Authority

Organization for code quality tools (and plugins) for the Python programming language

580 followers | Everywhere | http://meta.pycqa.org | code-quality@python.org

Follow

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meta Public

Documentation about how the PyCQA organization works

Python 24 23

Repositories

Find a repository... | Type | Language | Sort

flake8 Public

flake8 is a python tool that glues together pycodestyle, pyflakes, mccabe, and third-party plugins to check the style and quality of some python code.

Python 2,989 296 25 2 Updated yesterday

autoflake Public

Removes unused imports and unused variables as reported by pyflakes

Python 802 MIT 77 37 (2 issues need help) 3 Updated 2 days ago

People

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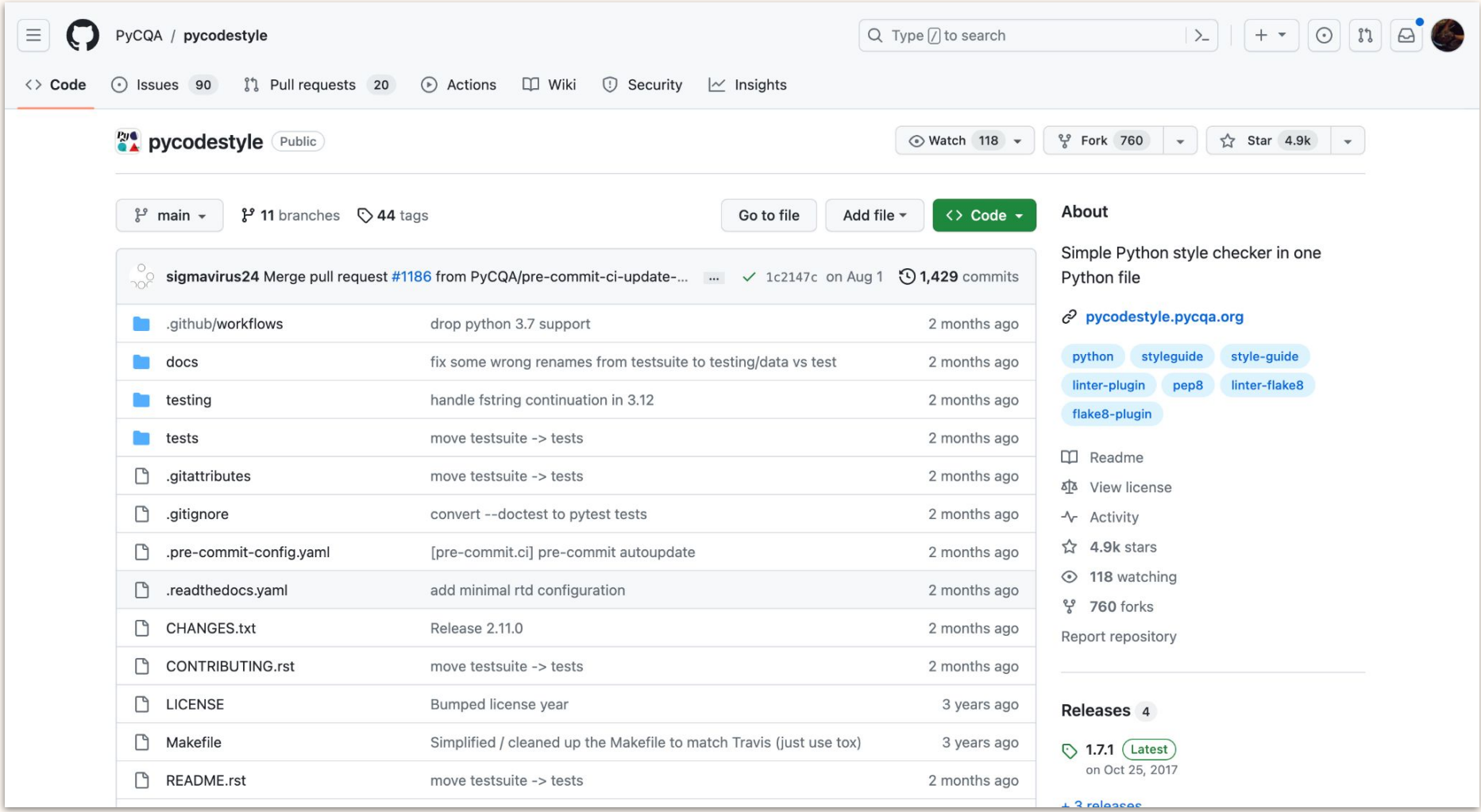
PyCQA / pycodestyle
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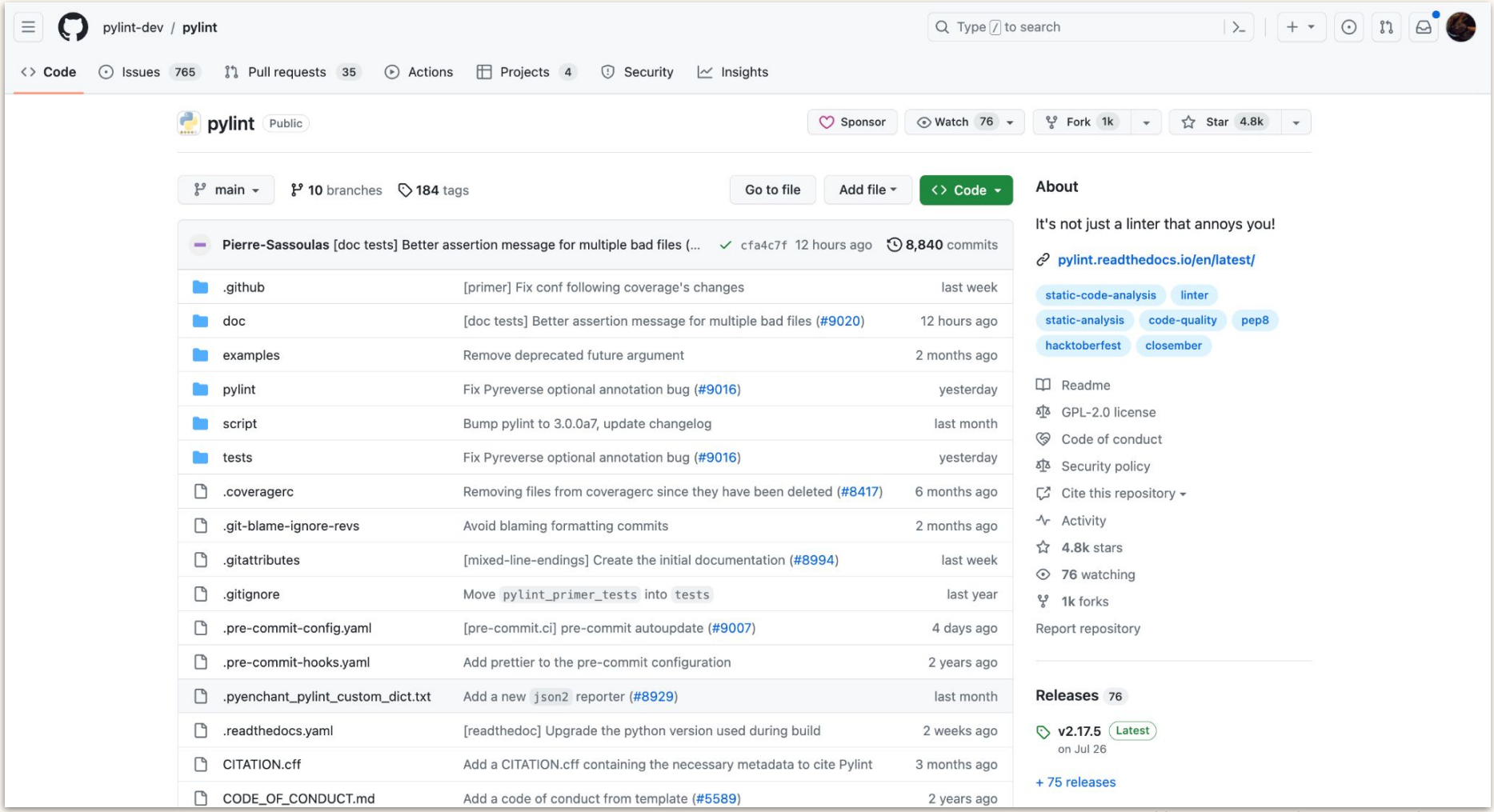
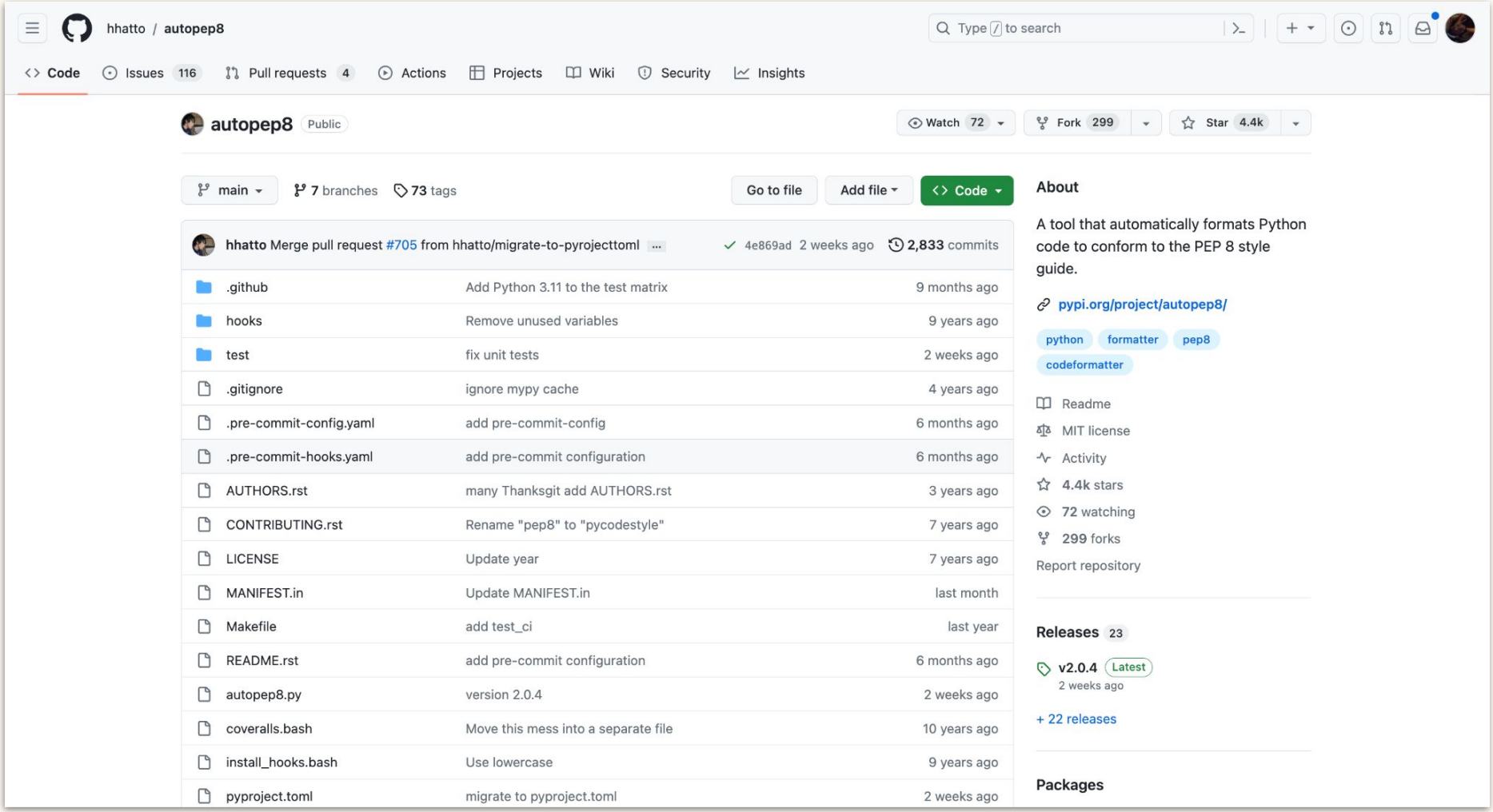
Code
Issues 90
Pull requests 20
Actions
Wiki
Security
Insights
pycodestyle
Public
Watch 118
Fork 760
Star 4.9k
main
11 branches
44 tags
Go to file
Add file
Code
sigmavirus24 Merge pull request #1186 from PyCQA/pre-commit-ci-update-...
1c2147c on Aug 1
1,429 commits
.github/workflows drop python 3.7 support 2 months ago
docs fix some wrong renames from testsuite to testing/data vs test 2 months ago
testing handle fstring continuation in 3.12 2 months ago
tests move testsuite -> tests 2 months ago
.gitattributes move testsuite -> tests 2 months ago
.gitignore convert --doctest to pytest tests 2 months ago
.pre-commit-config.yaml [pre-commit.ci] pre-commit autoupdate 2 months ago
.readthedocs.yaml add minimal rtd configuration 2 months ago
CHANGES.txt Release 2.11.0 2 months ago
CONTRIBUTING.rst move testsuite -> tests 2 months ago
LICENSE Bumped license year 3 years ago
Makefile Simplified / cleaned up the Makefile to match Travis (just use tox) 3 years ago
README.rst move testsuite -> tests 2 months ago
About
Simple Python style checker in one Python file
pycodestyle.pycqa.org
python
styleguide
style-guide
linter-plugin
pep8
linter-flake8
flake8-plugin
Readme
View license
Activity
4.9k stars
118 watching
760 forks
Report repository
Releases 4
1.7.1 Latest
on Oct 25, 2017



https://github.com/pylint-dev/pylint



https://github.com/hhatto/autopep8

https://code.visualstudio.com/docs/python/linting

Linting Python in Visual Studio Code

Edit

Linting highlights syntactical and stylistic problems in your Python source code, which often helps you identify and correct subtle programming errors or unconventional coding practices that can lead to errors. For example, linting detects use of an uninitialized or undefined variable, calls to undefined functions, missing parentheses, and even more subtle issues such as attempting to redefine built-in types or functions. Linting is distinct from Formatting because linting analyzes how the code runs and detects errors whereas formatting only restructures how code **appears**.

> **Note**: Stylistic and syntactical code detection is enabled by the Language Server. To enable third-party linters for additional problem detection, you can enable them by using the **Python: Select Linter** command and selecting the appropriate linter.

Choose a linter

Install the linting tool of your choice from the VS Code Marketplace.

Microsoft publishes the following linting extensions:

Linter	Extension
Pylint	https://marketplace.visualstudio.com/items?itemName=ms-python.pylint
flake8	https://marketplace.visualstudio.com/items?itemName=ms-python.flake8
mypy	https://marketplace.visualstudio.com/items?itemName=ms-python.mypy-type-checker