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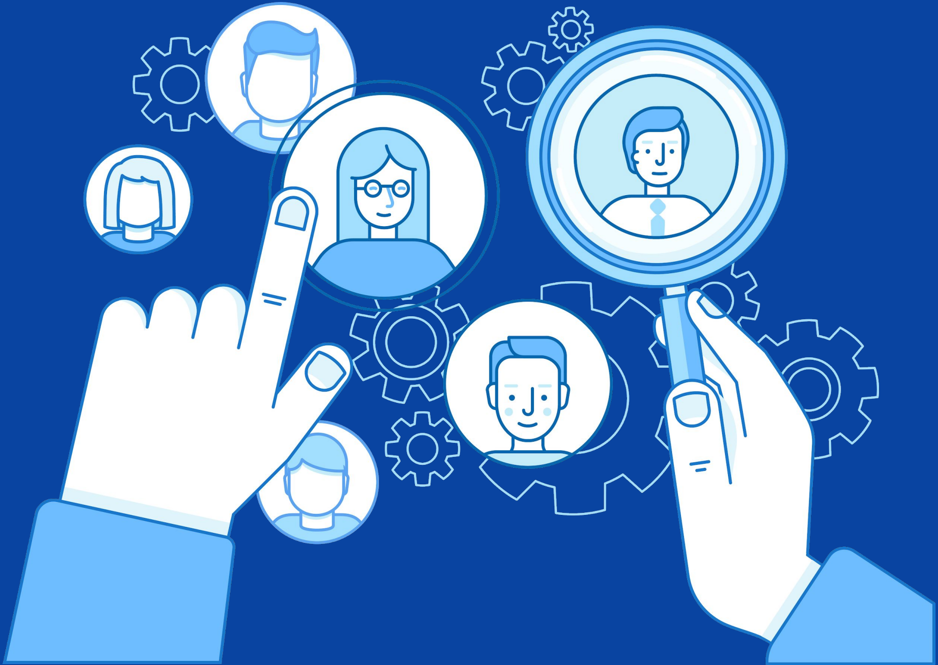
Python Course - Coding Standards



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Validation Tools

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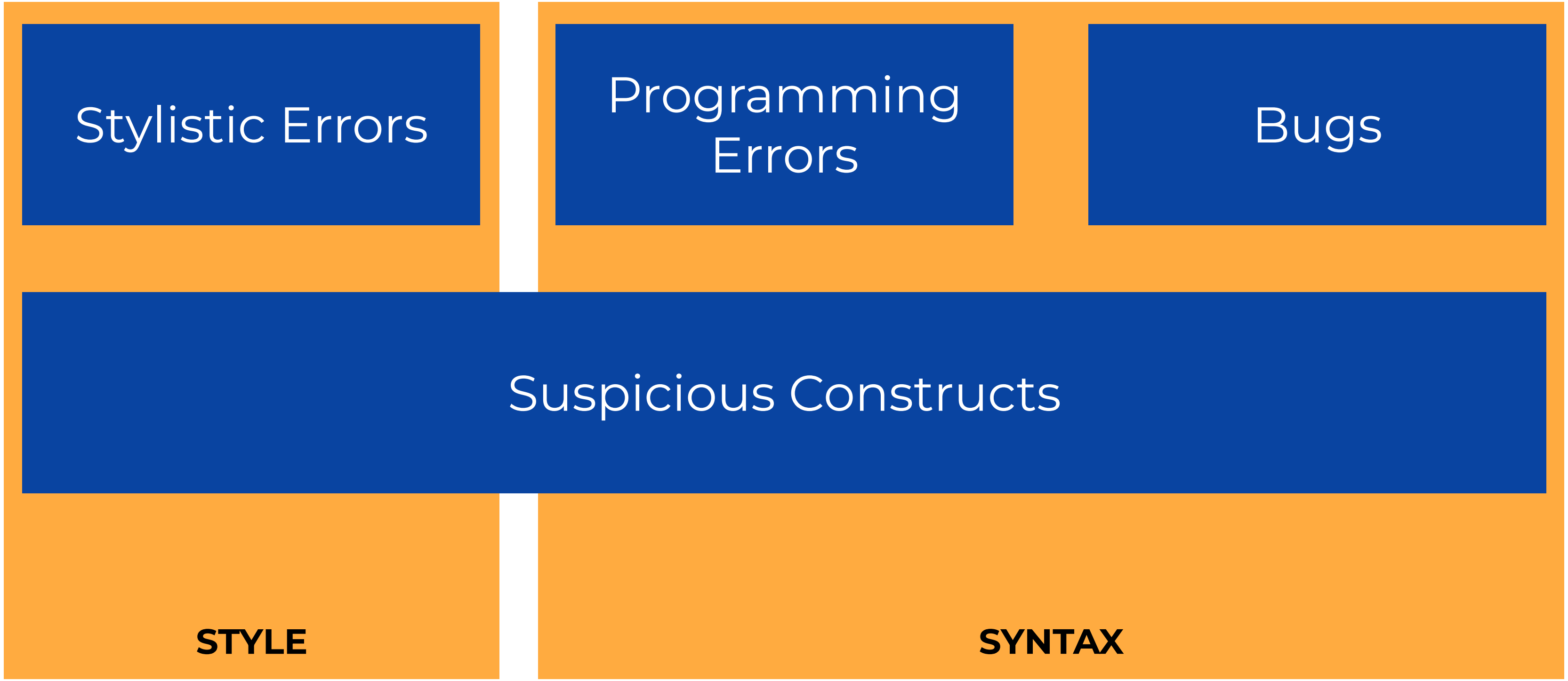
Linter

A **static code analysis tool** used to flag programming errors, bugs, **stylistic errors** or suspicious constructs.

Linter



Stylistic Errors

Programming Errors

Bugs

Suspicious Constructs

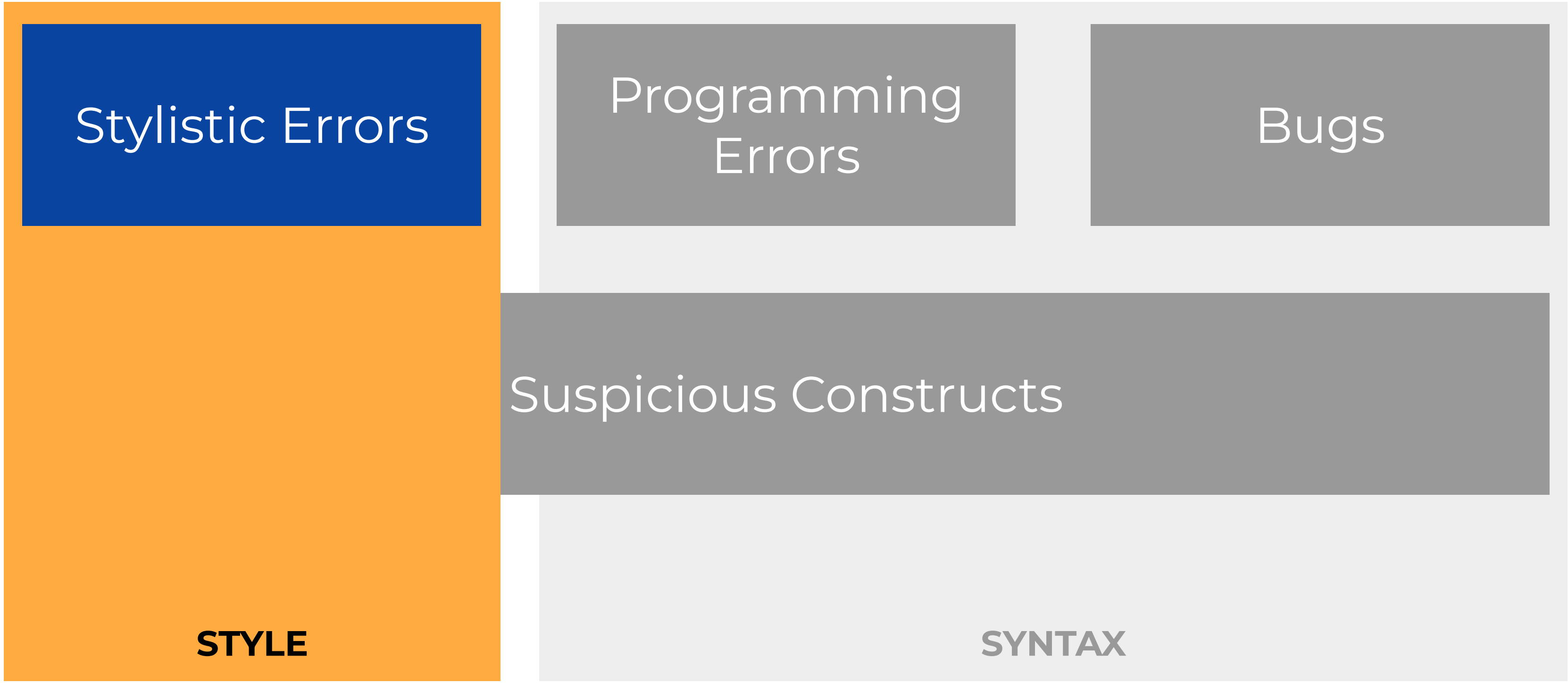
STYLE

SYNTAX

Tool: pycodestyle

Pycodestyle is a static code analysis tool used to check the code against **some of the PEP8** style conventions.

Tool: pycodestyle



Stylistic Errors

Programming Errors

Bugs

Suspicious Constructs

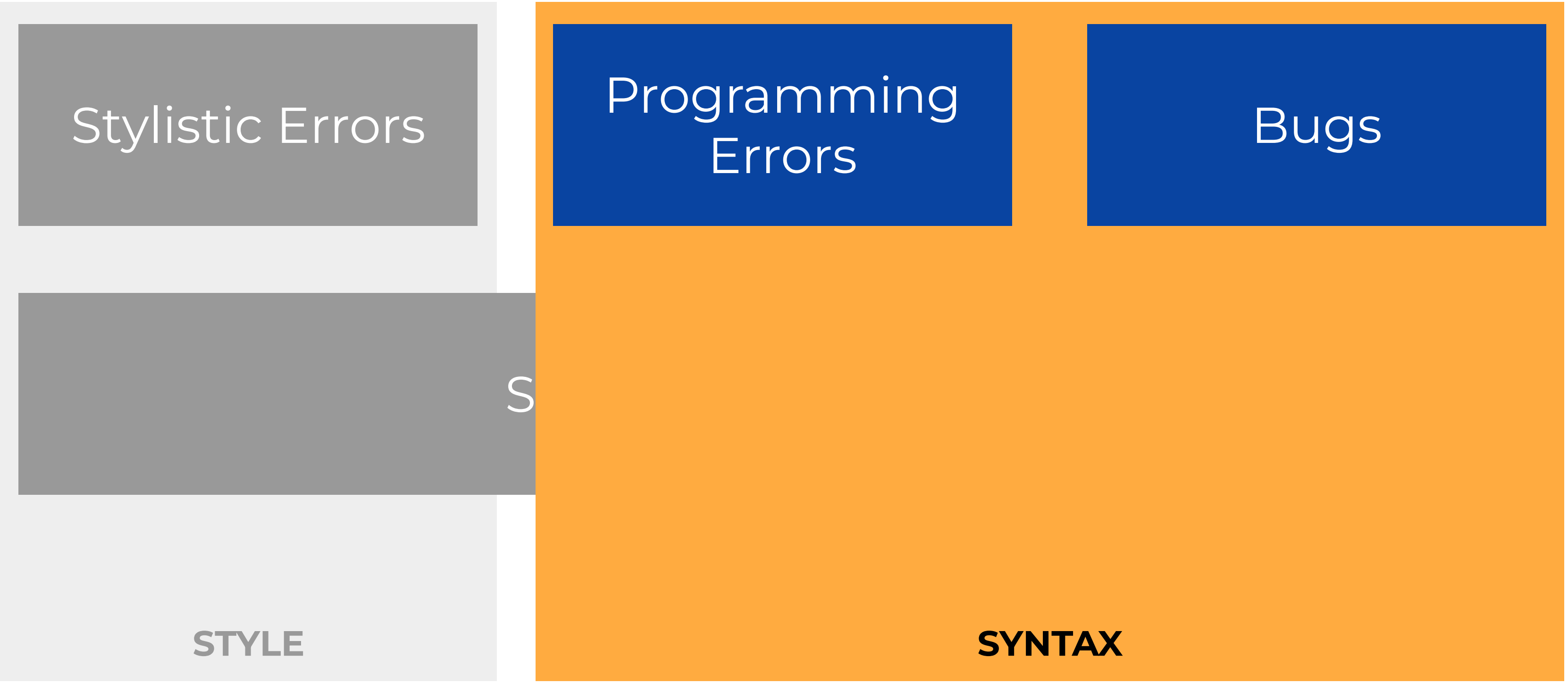
STYLE

SYNTAX

Tool: pyflakes

Pyflakes is a static code analysis tool used to check the code for **non-stylistic errors**.

Tool: pyflakes



Stylistic Errors

S

STYLE

Programming Errors

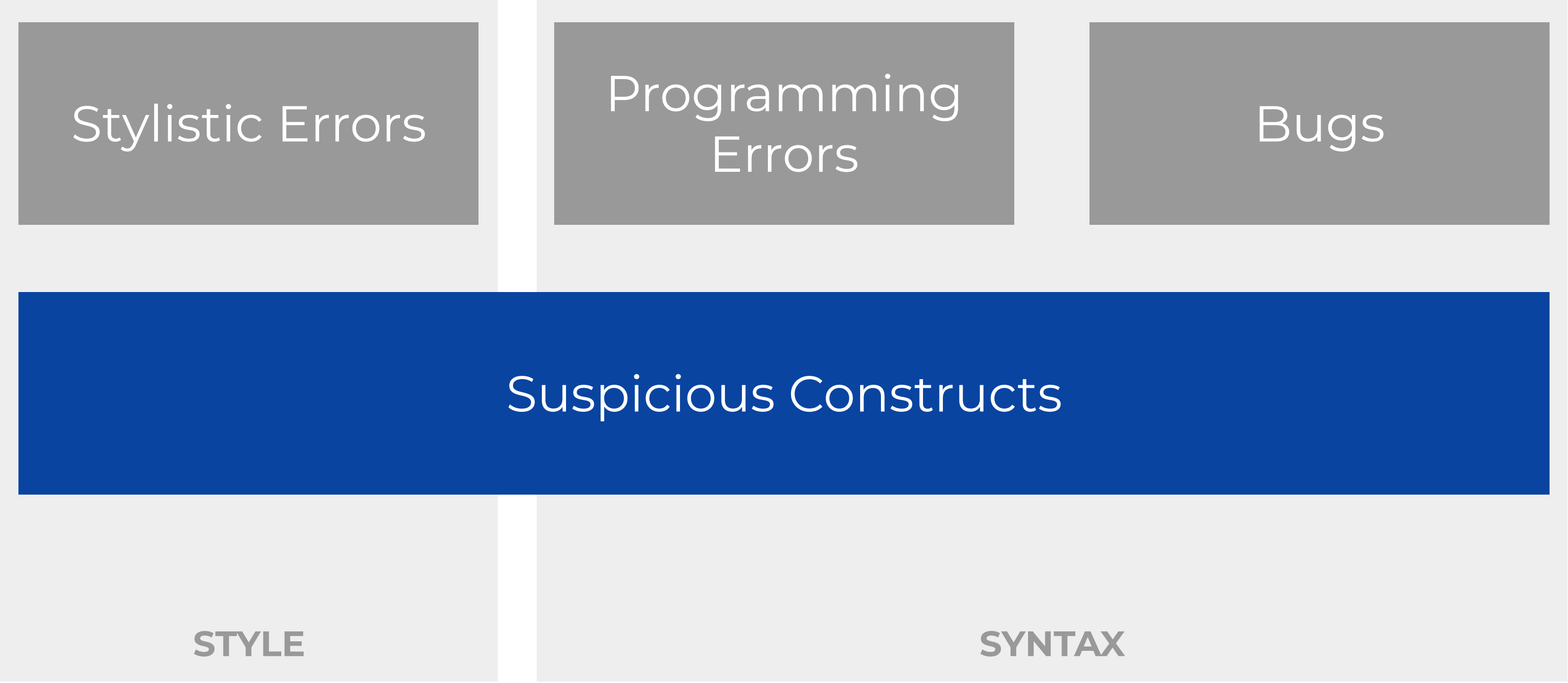
Bugs

SYNTAX

Tool: McCabe

McCabe is a static code analysis tool used to check the code for methods and functions **exceedingly complex**.

Tool: McCabe



Stylistic Errors

Programming Errors

Bugs

Suspicious Constructs

STYLE

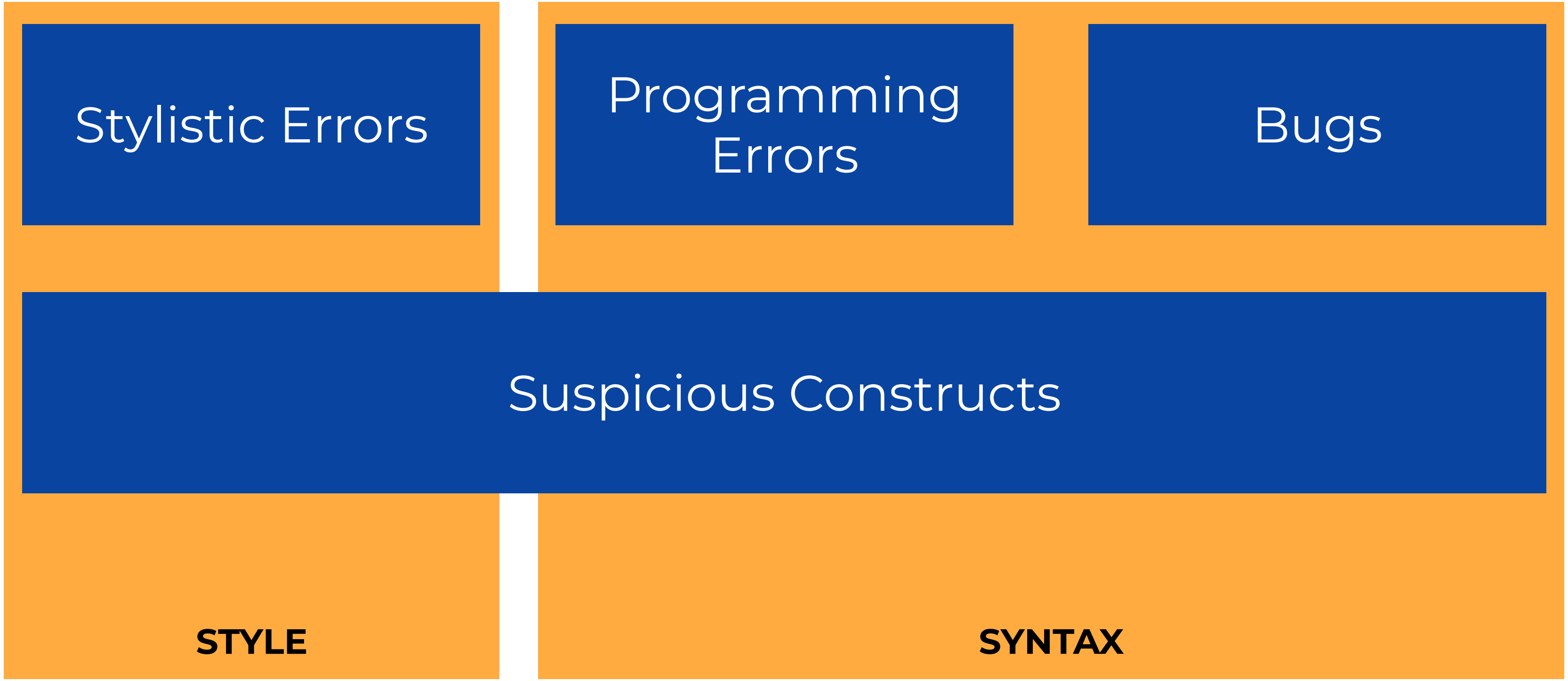
SYNTAX

Flake8

Flake8

Flake8 is a linter that wraps together pycodestyle, pyflakes and McCabe complexity checker.

Flake8



Stylistic Errors

Programming Errors

Bugs

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STYLE

SYNTAX

Flake8

```
$ pip install flake8
```

Flake8

playground.py

```
a=2
b = 1

def sum(a,b):
     return a + b

print(sum(a,b))
```

```
$ flake8 playground.py
...
```

Flake8

playground.py

```
a=2
b = 1

def sum(a,b):
    return a + b

print(sum(a,b))
```

```
playground.py:1:2: E225 missing
whitespace around operator

playground.py:4:1: E302 expected
2 blank lines, found 1

playground.py:4:10: E231 missing
whitespace after ','
```

Flake8

playground.py

```
a=2
b = 1

def sum(a,b):
     return a + b

print(sum(a,b))
```

```
playground.py:5:6: E111 indentation
is not a multiple of 4

playground.py:5:6: E117
over-indented

playground.py:7:1: E305 expected 2
blank lines after class or function
definition, found 1

playground.py:7:12: E231 missing
whitespace after ','
```

Flake8

playground.py

```python
a = 2
b = 1


def sum(a, b):
    return a + b


print(sum(a, b))
```

```
$ flake8 playground.py
$
```

Flake8 # noqa

playground.py

```
a=2
b = 1

def sum(a,b): # noqa
     return a + b # noqa

print(sum(a,b)) # noqa
```

```
$ flake8 playground.py
playground.py:1:2: E225 missing
whitespace around operator
$
```

Flake8 Options: Ignore Error Codes

playground.py

```python
a = 2
b = 1


def sum(a,b):
    return a + b


print(sum(a,b))
```

```
$ flake8 playground.py --ignore=E231
$
```

Flake8 Options: Choose Error Codes

playground.py

```
a=2
b = 1

def sum(a, b):
     return a + b

print(sum(a, b))
```

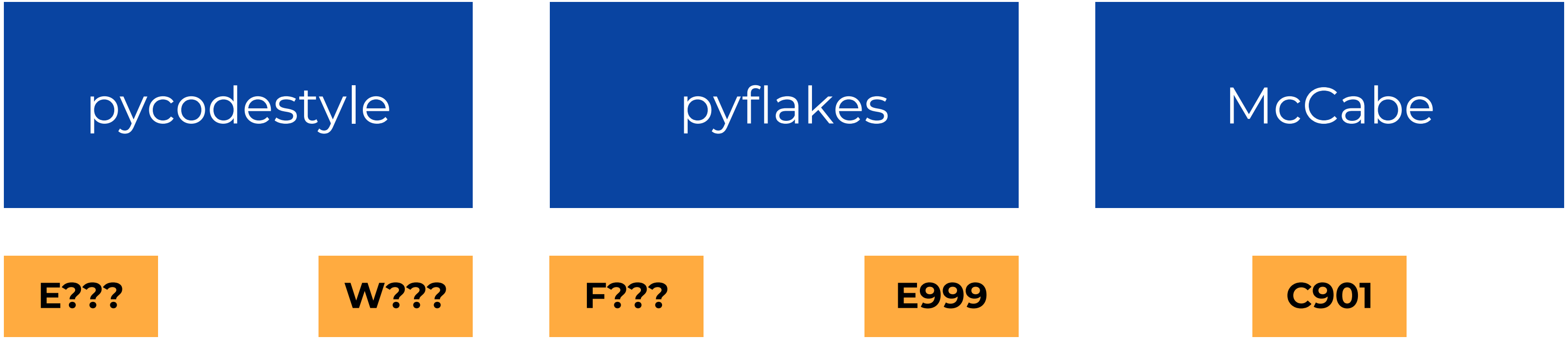
```
$ flake8 playground.py --select=E231
$
```

Flake8 Options: Exclude Directories

```
$ flake8 . --exclude=env
...
```

Flake8 Error Codes

https://flake8.pycqa.org/en/latest/user/error-codes.html



pycodestyle

pyflakes

McCabe

E???

W???

F???

E999

C901

Other Tools & Linters

Other Tools

Flake8 provides a bare minimum with the most unanimously accepted recommendations.

Some of the features must be added with plugins:

pep8-naming

NAMING CONVENTIONS

flake8-docstrings

DOCSTRINGS

flake8-isort

IMPORTS ORDER

Other Linters

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There are other linters that provide different flavours of linting.

PyLint

MyPy

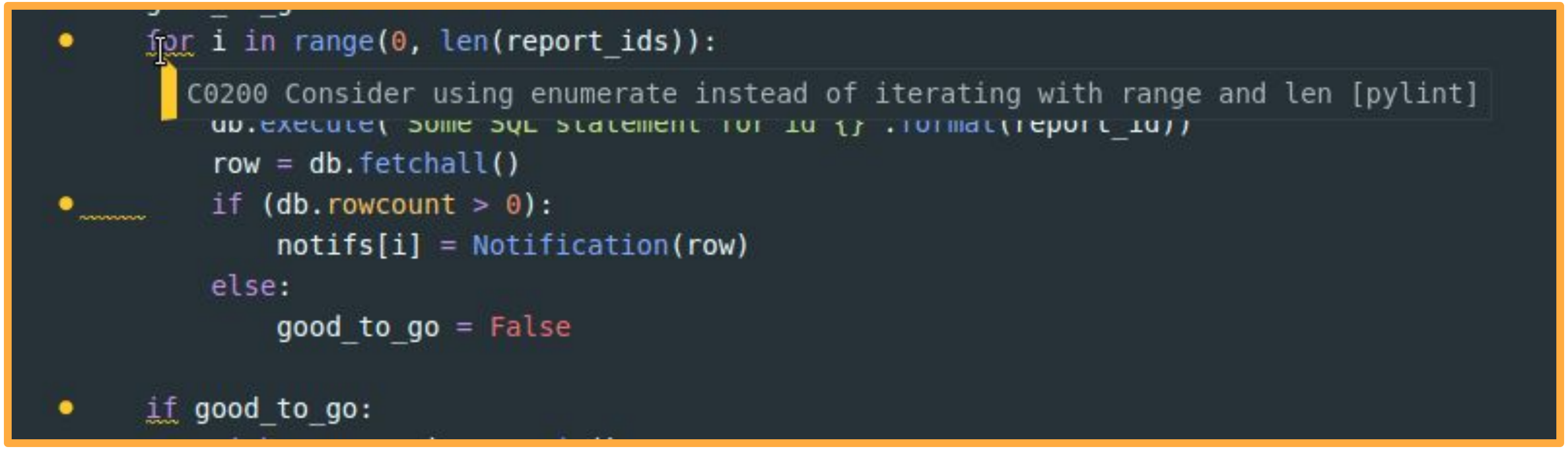
Black

Linter in the Editor

- ☑ **PyDev**
- ☑ **PyCharm**
- ☑ **Sublime**
- ☑ **Visual Studio Code**
- ☑ **Atom**

Adding a linter to our editor will let us detect errors while we work.

Linter in the Editor



```
    for i in range(0, len(report_ids)):
     C0200 Consider using enumerate instead of iterating with range and len [pylint]
        db.execute("Some SQL statement for id {}".format(report_id))
        row = db.fetchall()
        if (db.rowcount > 0):
            notifs[i] = Notification(row)
        else:
            good_to_go = False

    if good_to_go:
```

We learned …

- That we can automate the detection of errors, both syntactic and stylistic, with a software called Lint.
- That there is a package called Flake8 that gathers together some tools for error detection.
- That we can customize which errors we want to detect.
- That we can integrate these tools into our editor to detect the errors earlier.

Documentation

Documentation

- Coding standards
  https://en.wikipedia.org/wiki/The_Elements_of_Programming_Style
- Python Style Recommendations
  https://www.python.org/dev/peps/pep-0008/
  https://www.python.org/dev/peps/pep-0257/
- Tools and linters
  https://flake8.pycqa.org/en/latest/
  https://pycodestyle.pycqa.org/en/latest/
  https://pypi.org/project/pyflakes/
  https://github.com/PyCQA/mccabe
- Editors
  https://code.visualstudio.com/docs/python/linting
  https://atom.io/packages/linter-flake8
  https://www.pydev.org/manual_adv_pylint.html

THANK YOU

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