Code Versioning and Quality

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What to Expect

- Goal: to learn branching strategies, and the importance of code styling and quality.

- How: in the lab we will explore the use of git branches along with common python libraries for checking code quality.

Code Versioning and Branching

- We already know how to use git for version control
  - And Github as a central code repository (along with other nice features).

- Branching is how you might collaborate with other team members on the same codebase, without stepping on each other's toes
  - Many branching strategies, will be team-dependent.
  - Necessary when collaborating, not when working solo.

Branching

```
# script for doing stuff
```

test.py

main

Branching

```
# script for doing stuff
```

test.py

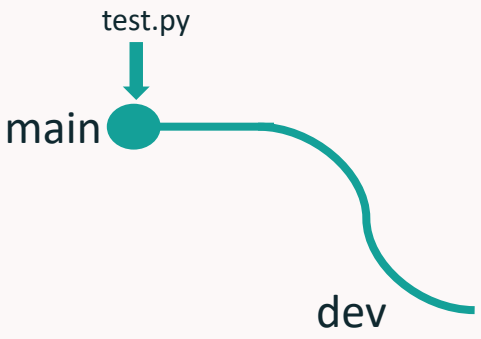
main

```
git commit –m ‘first commit’
```

Branching

script for doing stuff

```
git checkout -b dev
```



Branching

```
# script for doing stuff
```

test.py


```
# script for doing stuff

import pandas as pd
```

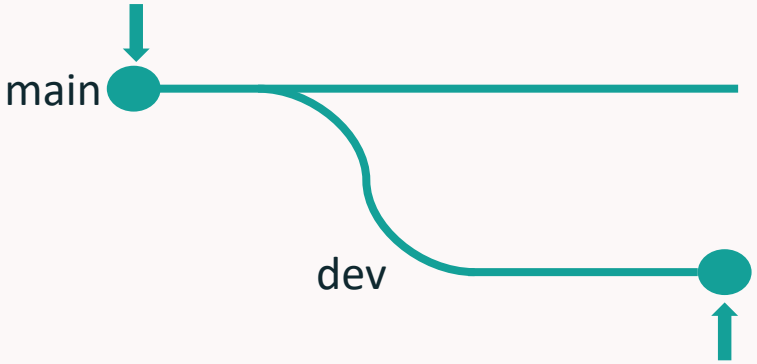
test.py

Branching

```
# script for doing stuff
```

test.py

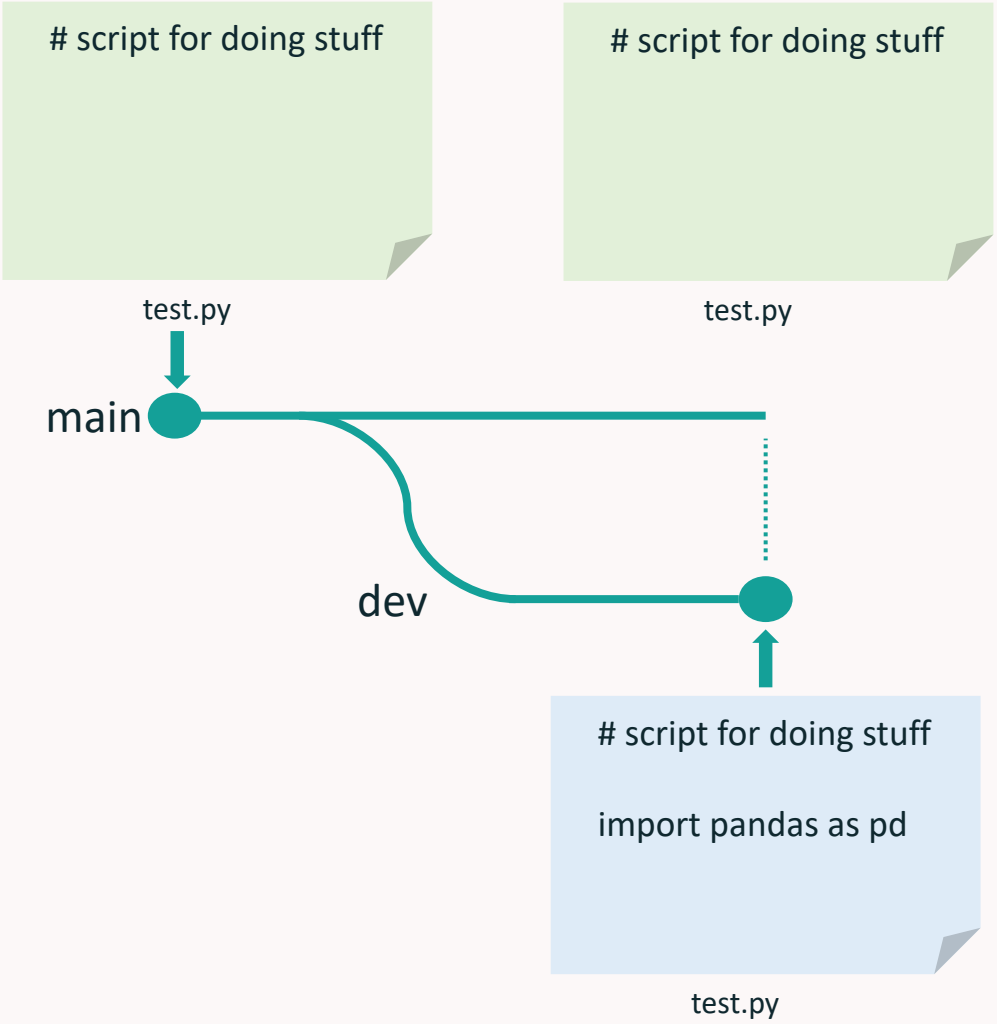
```
git commit –m ‘added library’
```



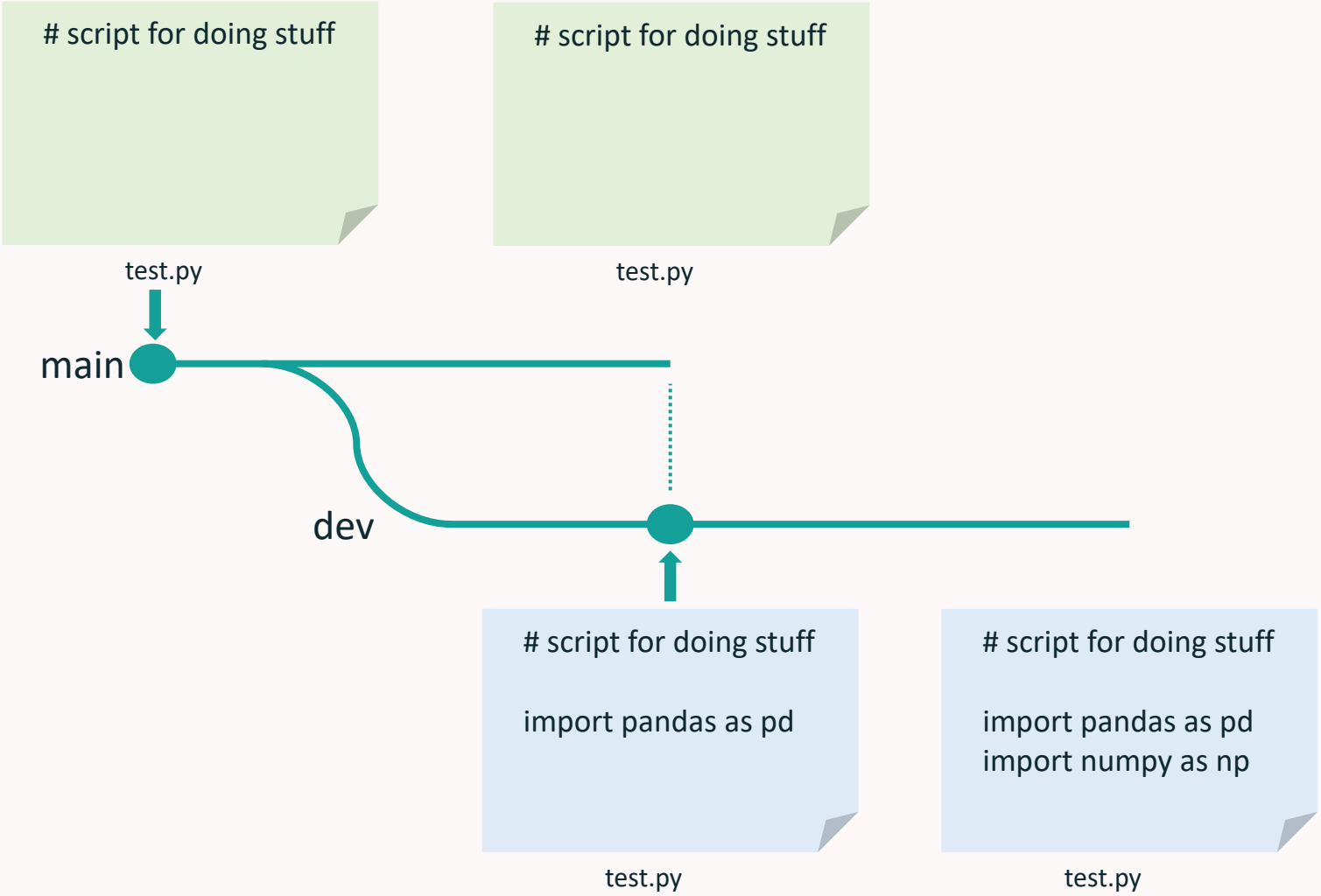

```
# script for doing stuff

import pandas as pd
```

test.py

Branching


script for doing stuff
test.py
script for doing stuff
test.py
main
dev
# script for doing stuff
import pandas as pd
test.py

Branching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test.py
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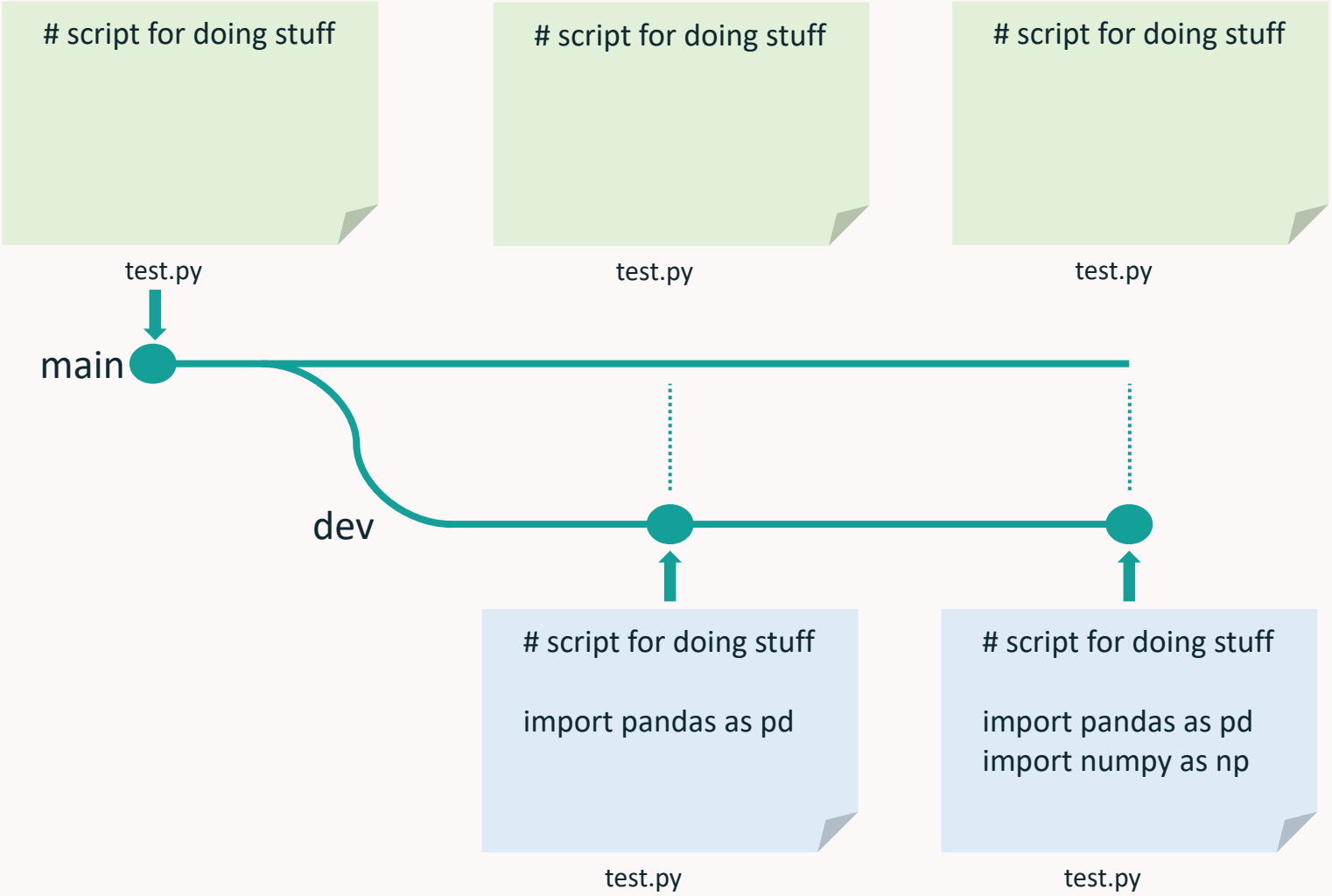
# script for doing stuff
import pandas as pd
test.py
# script for doing stuff
import pandas as pd
import numpy as np
test.py

Branching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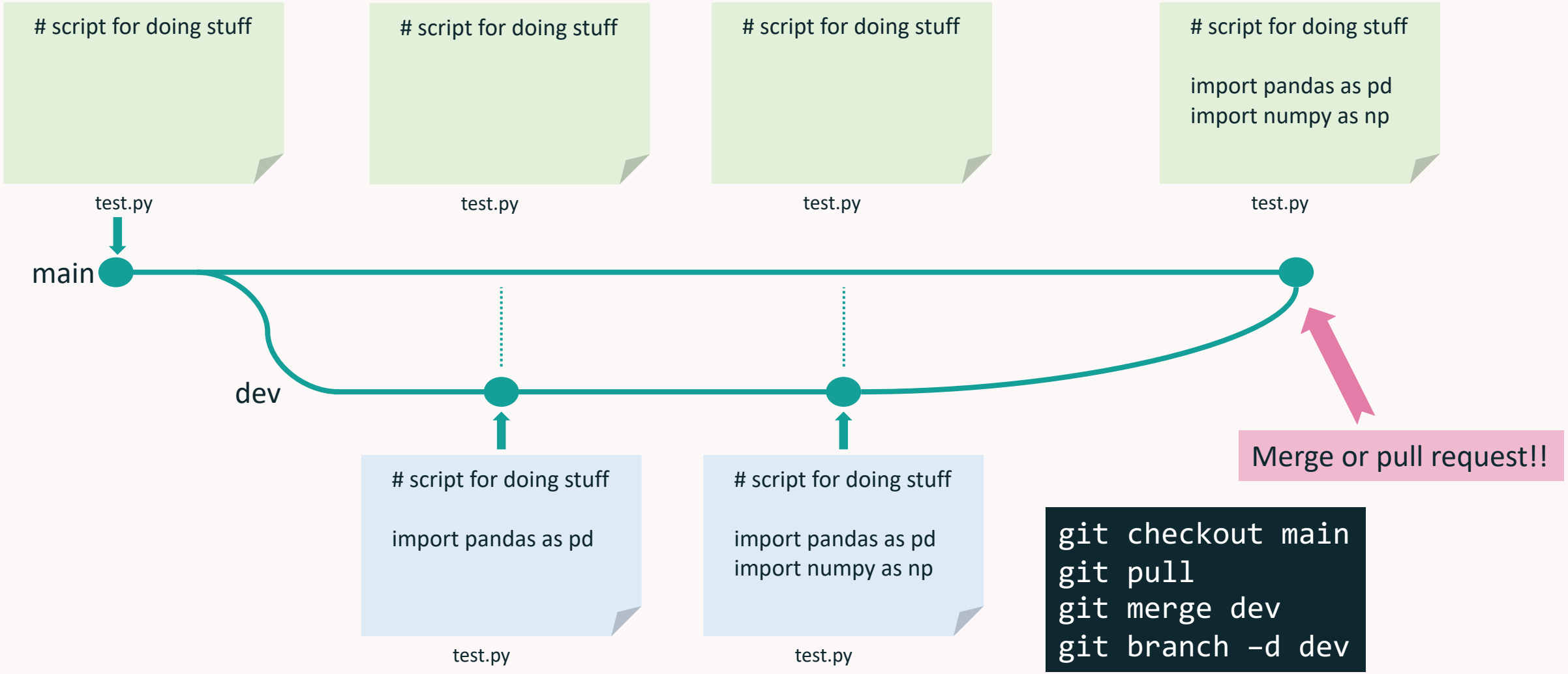
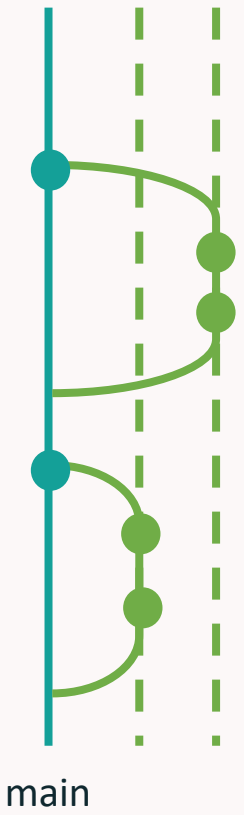
Branching



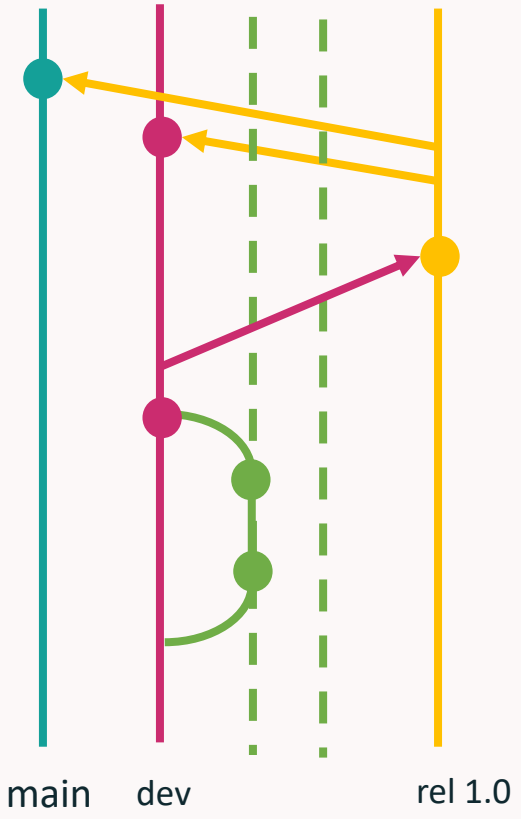

```
git checkout main
git pull
git merge dev
git branch -d dev
```

Branching Strategies



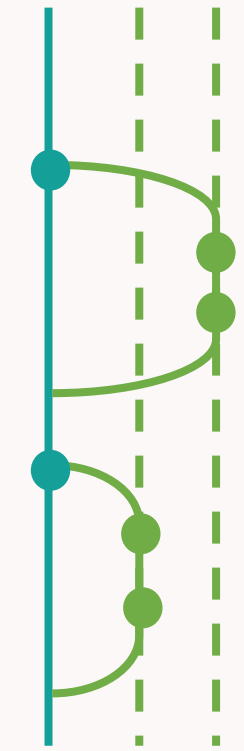
Github Flow

Trunk-based Development



GitFlow

Branching Strategies



- Feature branches off the main branch
  - You, as the DS, may work off of your own branch
- Merge or use pull request to merge to main branch
- Main branch is the “production” branch
- Bug can be introduced into production code since there is no separate “development” or “release” branch

Github Flow

Trunk-based Development

GitFlow

Branching Strategies

- No branches
- Frequent pushes to main branch (trunk)
- True CI/CD
- Only for very experienced devs

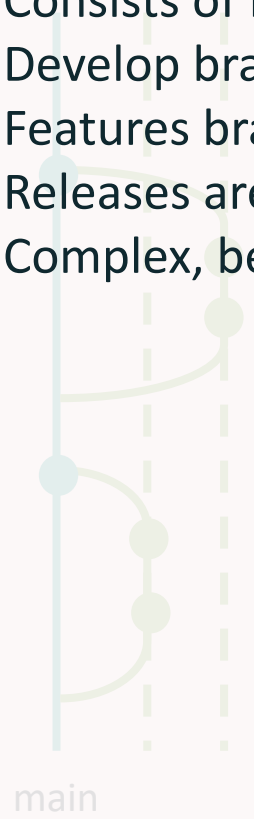
Github Flow

Trunk-based Development

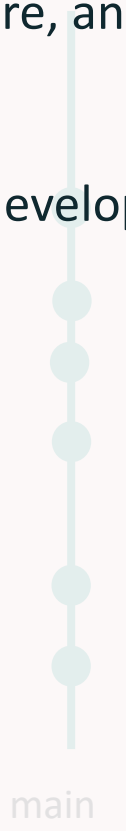
GitFlow

Branching Strategies

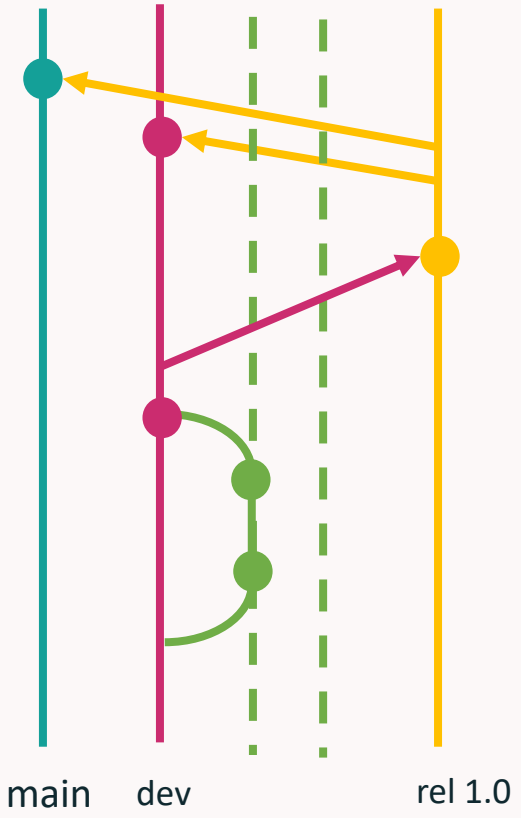
- Consists of Main, Develop, Release, Feature, and Hotfix branches
- Develop branches off of Main
- Features branch off of develop
- Releases are prepared and merged with develop and main
- Complex, best for very large teams



Github Flow



Trunk-based Development



GitFlow

Branching Demo

Code Styling

- Code styling is team-dependent
  - (Python Enhancement Proposal) PEP 8 is commonly used

```
# Correct:
spam(ham[1], {eggs: 2})
```

```
# Wrong:
spam( ham[ 1 ], { eggs: 2 } )
```

Screenshots from https://peps.python.org/pep-0008/

```
# Correct:

# Aligned with opening delimiter.
foo = long_function_name(var_one, var_two,
                         var_three, var_four)

# Add 4 spaces (an extra level of indentation) to distinguish arguments from the rest.
def long_function_name(
        var_one, var_two, var_three,
        var_four):
    print(var_one)

# Hanging indents should add a level.
foo = long_function_name(
    var_one, var_two,
    var_three, var_four)
```

```
# Wrong:

# Arguments on first line forbidden when not using vertical alignment.
foo = long_function_name(var_one, var_two,
    var_three, var_four)

# Further indentation required as indentation is not distinguishable.
def long_function_name(
    var_one, var_two, var_three,
    var_four):
    print(var_one)
```

Linting

- Linting: check code for errors (both programmatic and style)
  - There are many linters to choose from: pylint, flake8, pycodestyle, and others
  - Use linters within your IDE (pycharm, VSCode)
  - Configure with a pyproject.toml file

```
pip install pylint

pylint file.py
```

pyproject.toml

```
[tool.pylint.messages_control]
disable = [
"missing-final-newline",
"missing-function-docstring”,
. . .
]
```

Code Formatting

- Formatters: will format your code for you
  - isort – sorts your imports
  - Autopep8 – PEP 8 auto-formatting
  - Black – opinionated formatter

```
pip install black isort

black file.py

isort file.py
```

pyproject.toml

```
[tool.pylint.messages_control]
disable = [
"missing-final-newline",
"missing-function-docstring”,
. . .
]

[tool.black]
line-length = 100
target-version = ['py39']
skip-string-normalization = true

[tool.isort]
length_sort = true
```

Unit Tests

- Unit tests are a way of testing small independent pieces/units of code
  - You may have seen these in previous courses
  - Differ from regression and integration tests
- As a DS you may want to test:
  - Data types
  - Data exists
  - Data in proper range
  - Edge cases for functions (missing values, wrong types, etc.)
- pytest is commonly used
- Tools like deepchecks might be a good alternative to writing your own tests
- More on this later when we talk about CI/CD/CT

Linting and Formatting Demo

Branching and Code Quality Lab