Software Version Control Best Practices

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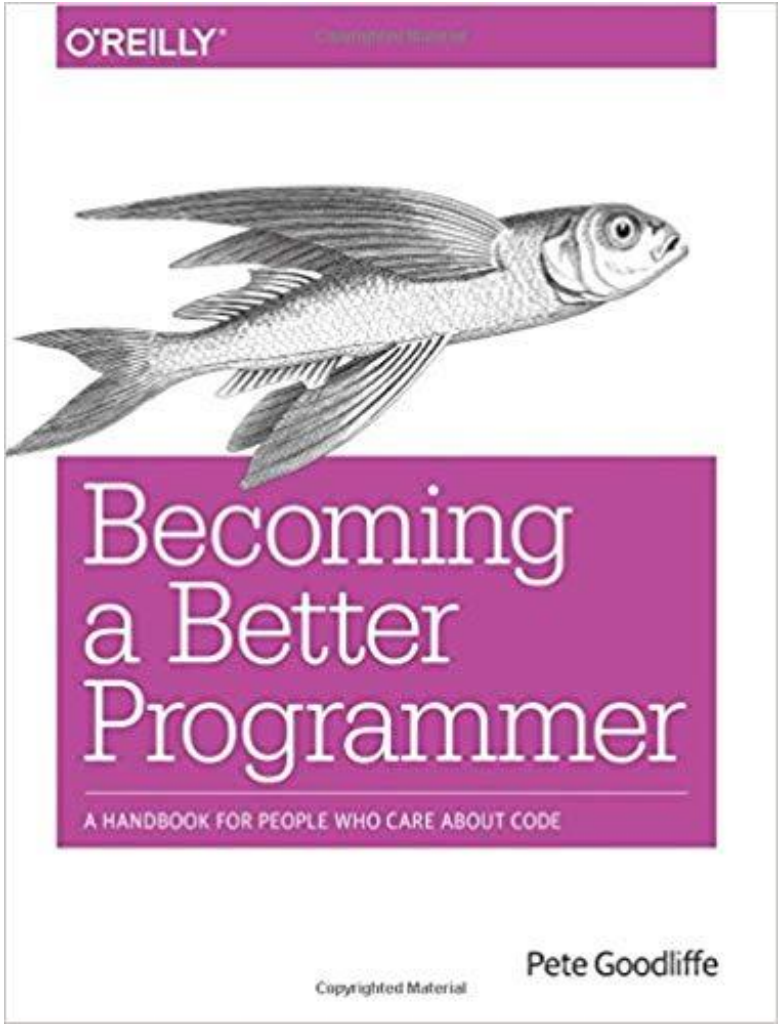


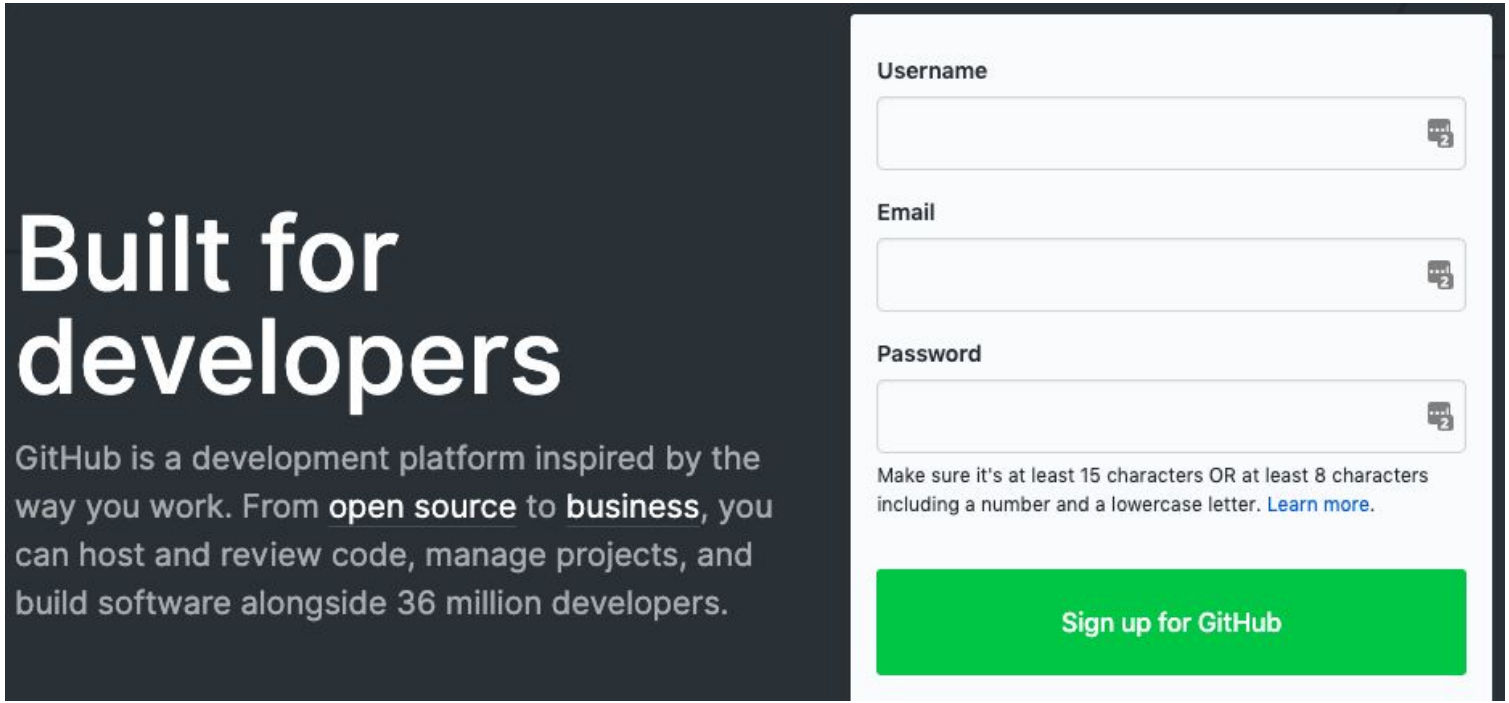
https://amzn.to/2I1YydH

Effective Version Control

Central Collaboration Hub
Feeds CI, Release Engineering, Code Audit systems
Facilitates Software Archaeology
Provides Backups
Fosters Rhythm and Cadence (i.e. Workflow)
Enables Concurrent Development Streams

Getting Started w/ GitHub

Use it or Lose it! https://github.com/



Getting Started w/ GitHub

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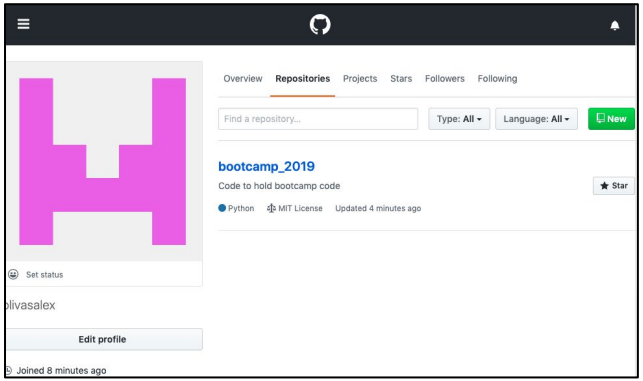
Add example code from yesterday.



Click on **NEW** to create a new repository.

$ git clone https://github.com/<username>/<repo_name>

$ git add <filename>

$ git commit -m 'initial commit'

$ git push

Effective Version Control

What to Store?

Two options

Store Everything

- Store **EVERY** file that's required to recreate your result.
- Source code, docs, build files, configuration files, assets, third party libs.
- Strive for 'turn-key' after checkout.

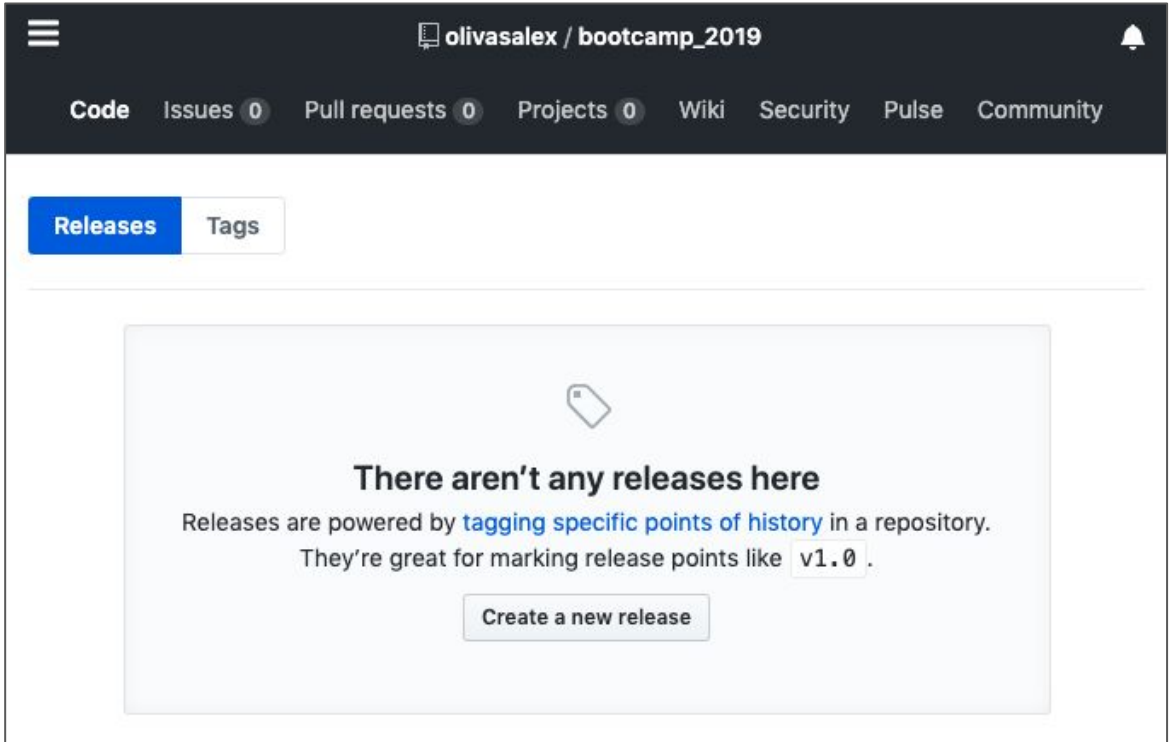
Store as Little as Possible

- Keep it slim and simple
- Exclude compiled code, cmake generated files, byte-compiled python, etc...
- No development tools or OS image

Do Both! They're not contradictory.

Effective Version Control

Making Releases - https://help.github.com/en/articles/creating-releases



Effective Version Control

Semantic Version Numbers - https://semver.org/

Given a version number MAJOR.MINOR.PATCH, increment the:

1. MAJOR version when you make incompatible API changes,
2. MINOR version when you add functionality in a backwards-compatible manner, and
3. PATCH version when you make backwards-compatible bug fixes.

Additional labels for pre-release and build metadata are available as extensions to the MAJOR.MINOR.PATCH format.

Effective Version Control

Repository Layout

Invest time in a clear, easy to navigate layout.

```
README.rst
LICENSE
setup.py
requirements.txt
sample/__init__.py
sample/core.py
sample/helpers.py
docs/conf.py
docs/index.rst
tests/test_basic.py
tests/test_advanced.py
```

For python projects prefer virtual environments

```
$ python3 -m venv my_virtual_env
$ source my_virtual_venv
$ pip install <some_lib>
$ pip freeze > requirements.txt
$ pip install -r requirements.txt
```

https://docs.python-guide.org/writing/structure/

Effective Version Control

Make Small, Atomic Commits
"Commit early, commit often."

- Make the commits small enough that they don't break the code. What constitutes "broken" code? - Doesn't compile. Tests don't pass.
- **DO NOT** commit something that covers more than one change: "git commit -m 'Refactor and critical bugfix' " BAD
- **DO NOT** wait until the end of the day or week to commit.
- **DO NOT** mix functional changes with whitespace cleanups.
- **DO** write good commit messages.
    - Good commit message: "Fixes issue #123: Use std::shared_ptr to avoid memory leaks. See C++ Coding Standards for more information."
    - Bad commit message: "blerg"

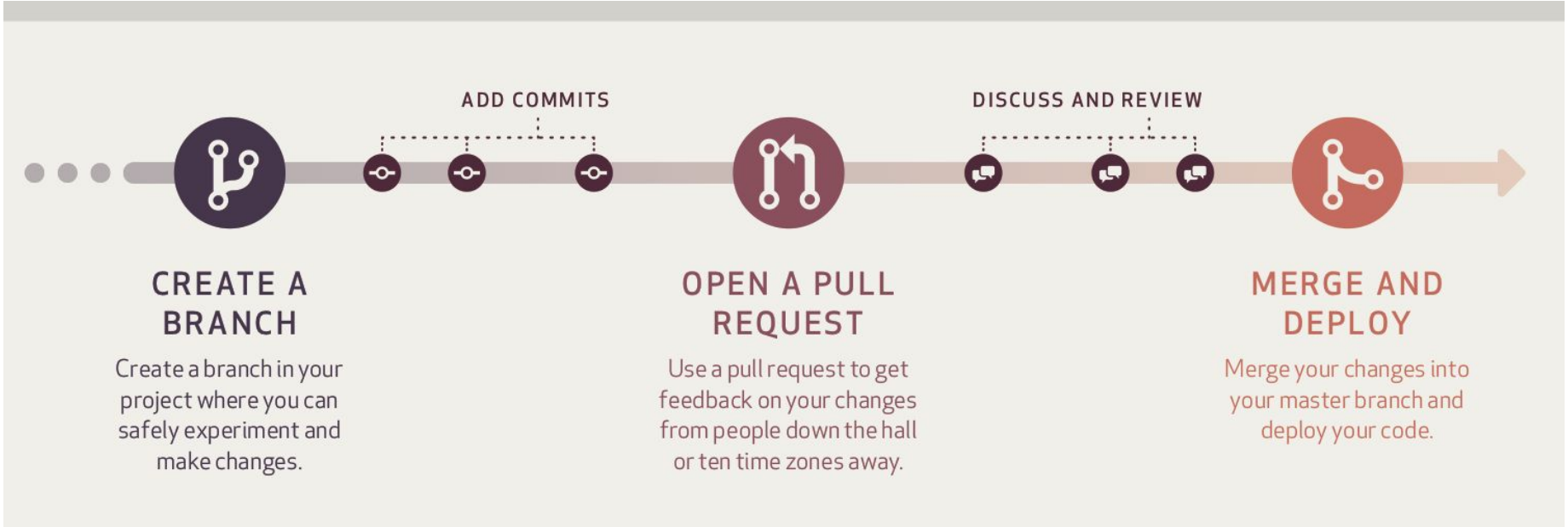
Effective Version Control

Make Quality Commits - **Don't break the build!!!**

1. Make change
2. Test that it builds against master/trunk
3. Ensure all the tests pass.
4. Check it in w/ a **great, informative** commit message.
5. Check your continuous integration (CI) system.

Effective Version Control

https://guides.github.com/introduction/flow/



The Zen of Python : “In[1] import this”

```
Beautiful is better than ugly.
Explicit is better than implicit.
Simple is better than complex.
Complex is better than complicated.
Flat is better than nested.
Sparse is better than dense.
Readability counts.
Special cases aren't special enough to break the rules.
Although practicality beats purity.
Errors should never pass silently.
Unless explicitly silenced.
In the face of ambiguity, refuse the temptation to guess.
There should be one-- and preferably only one --obvious way to do it.
Although that way may not be obvious at first unless you're Dutch.
Now is better than never.
Although never is often better than *right* now.
If the implementation is hard to explain, it's a bad idea.
If the implementation is easy to explain, it may be a good idea.
Namespaces are one honking great idea -- let's do more of those!
```