Introduction to Git and GitHub
Part 2

Kendra Oudyk (she/her)

Many parts of this presentation are inspired / based on these great resources

- Chacon, S., & Straub, B. (2014). *Pro git.* Springer Nature. Available at https://git-scm.com/book/en/v2
- The Carpentries. (2021). *Version Control with Git.* https://swcarpentry.github.io/git-novice/.

Land Acknowledgement

University of British Columbia, Point Grey Campus (**Vancouver**)

We would like to begin by acknowledging that the land on which we gather is the traditional, ancestral, and unceded territory of the **xwməθkwəy̓əm** (Musqueam) People.

University of British Columbia, Okanagan Campus (**Kelowna**)

We would like to begin by acknowledging that the land on which we gather is the unceded territory of the **Syilx** (Okanagan) Peoples.

Find out about the land where you live at https://native-land.ca/

These slides complement the **self-paced** materials on the Research Commons website

https://ubc-library-rc.github.io/intro-git/

Who am I?

- Multiple fields of study / research
  - BMus → MA → PhD (Neuroscience) → MLIS (Library Studies)

- I love teaching
  - Certified Carpentries instructor
  - Taught Git/GitHub >10x

- Also:
  - Disabled
  - Colour-grapheme synesthesia
  - I have a cat

Who are you?

- Subject areas
  - 1-5 words to explain what you study / research to a teenager

- Programming experience
  - Never / a few times
  - Monthly
  - Weekly
  - Daily

- What kinds of files do you edit in a text editor?
  - E.g., .txt, .md, .py, .r, .tex

Goals

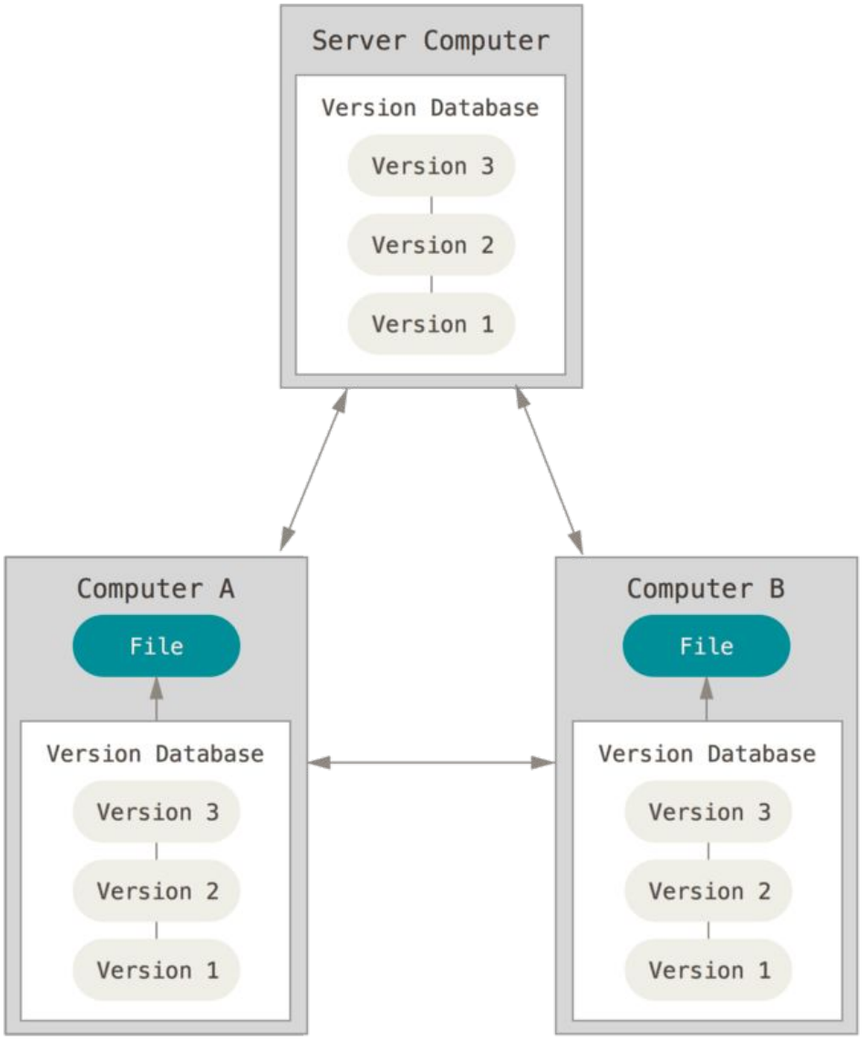
Part 1 (last week)

- **What is distributed version control?**
- **Why is Git useful?**
- **Track your own work with Git**

Part 2

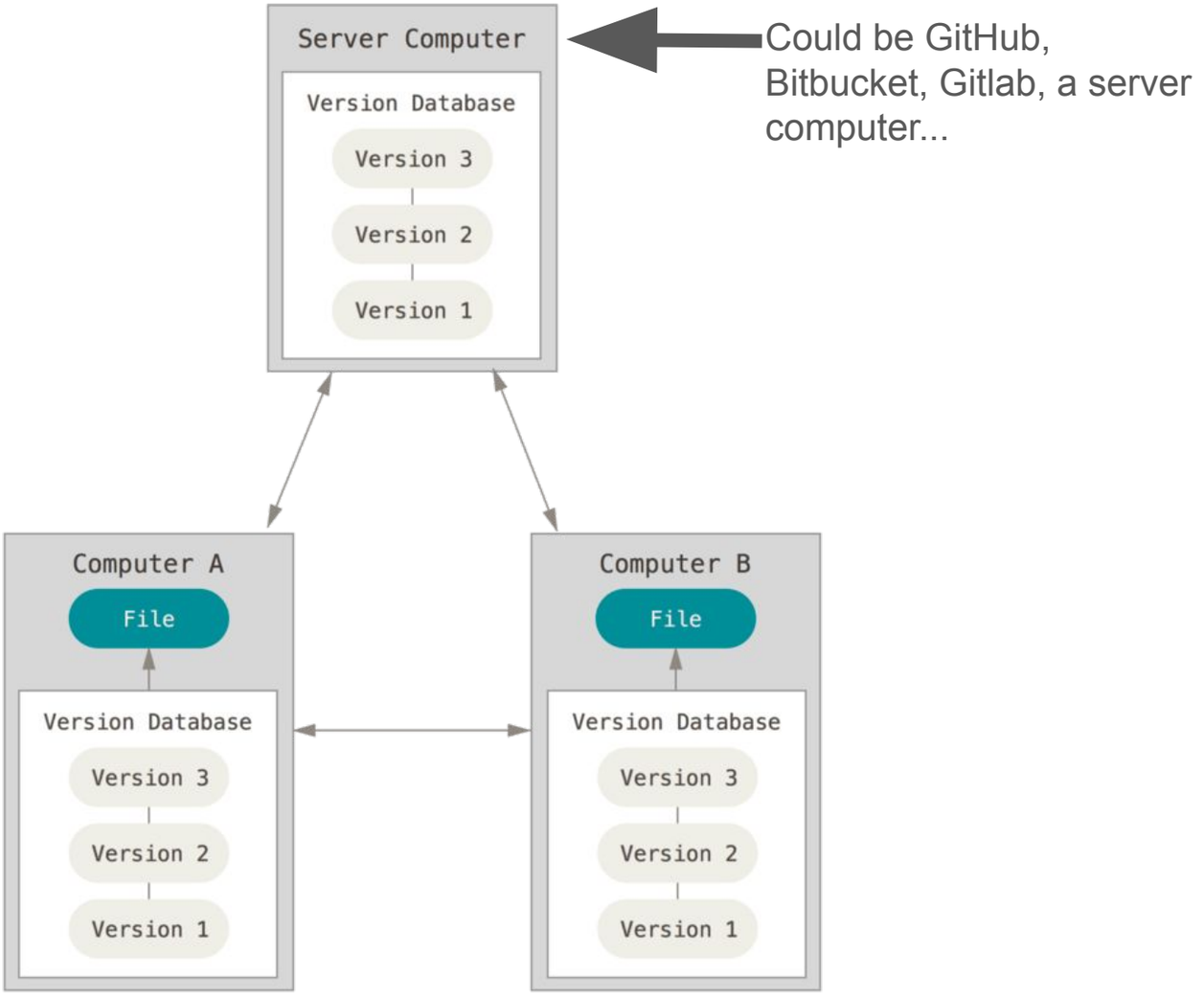
- Share your work on GitHub (simple / linear collaboration)
- Collaborate through GitHub (complex / nonlinear collaboration)
- Navigating GitHub
- Try it out!

Distributed version control

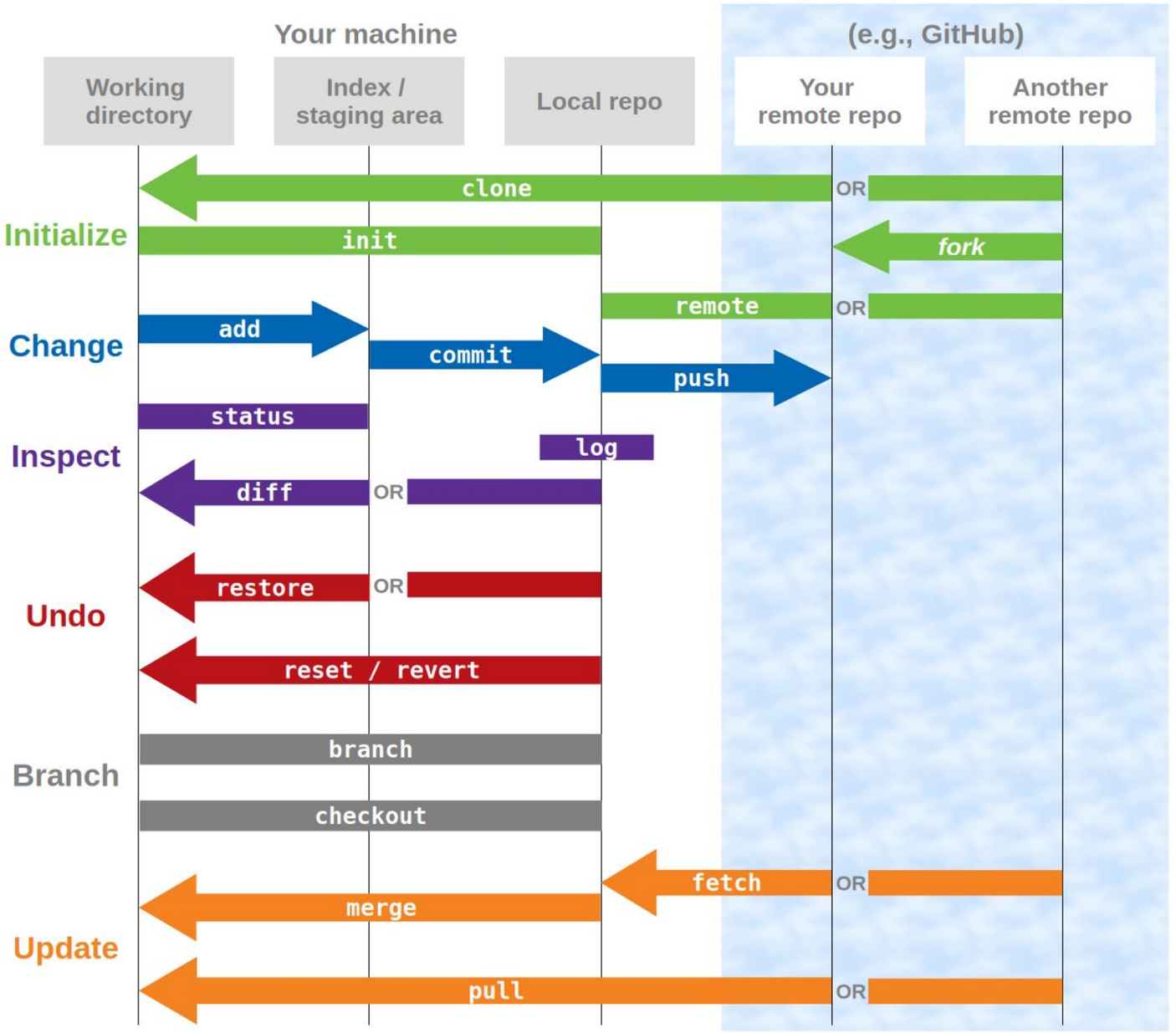


Git vs. GitHub

- Git is the "**language**" we use to do version control.
- GitHub **hosts** git repositories online.

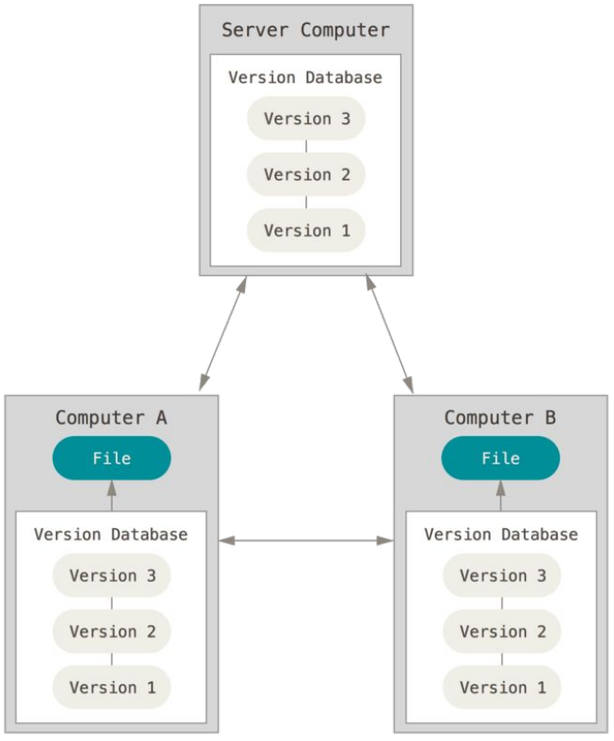


The commands we'll have covered **by the end of this lecture**

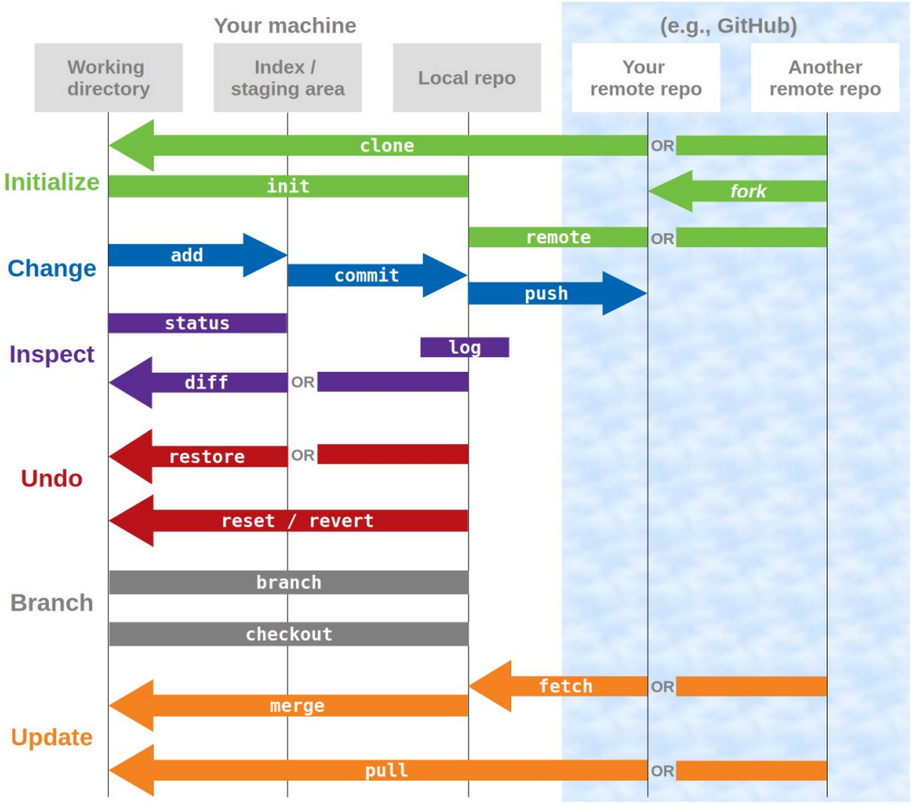


2 kinds of visualizations we'll use

Machines



Commands

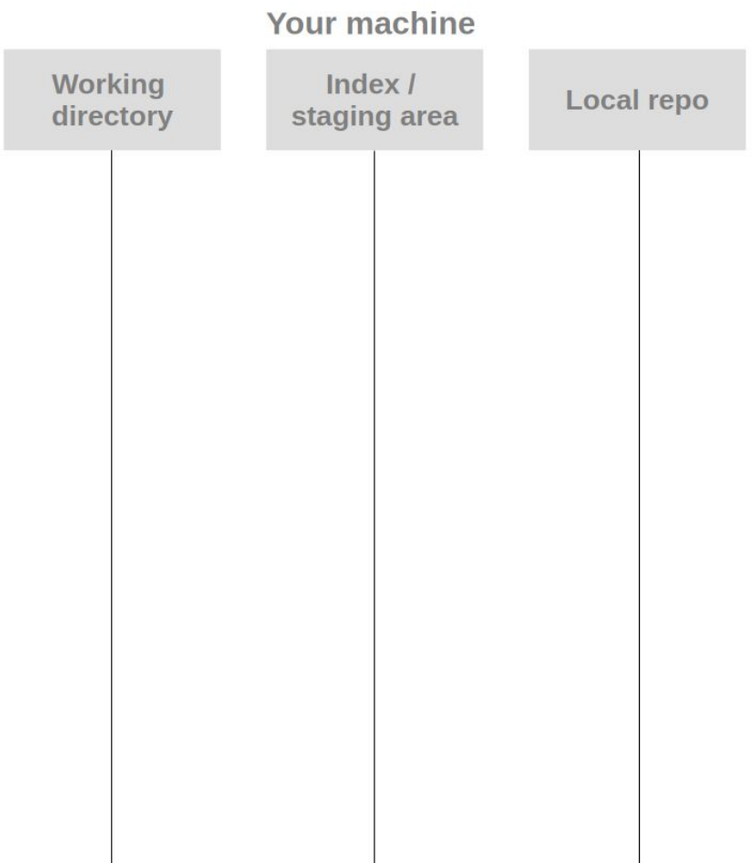


3 parts of a Git project

1. **Working directory**
   The version of the project that you're working on

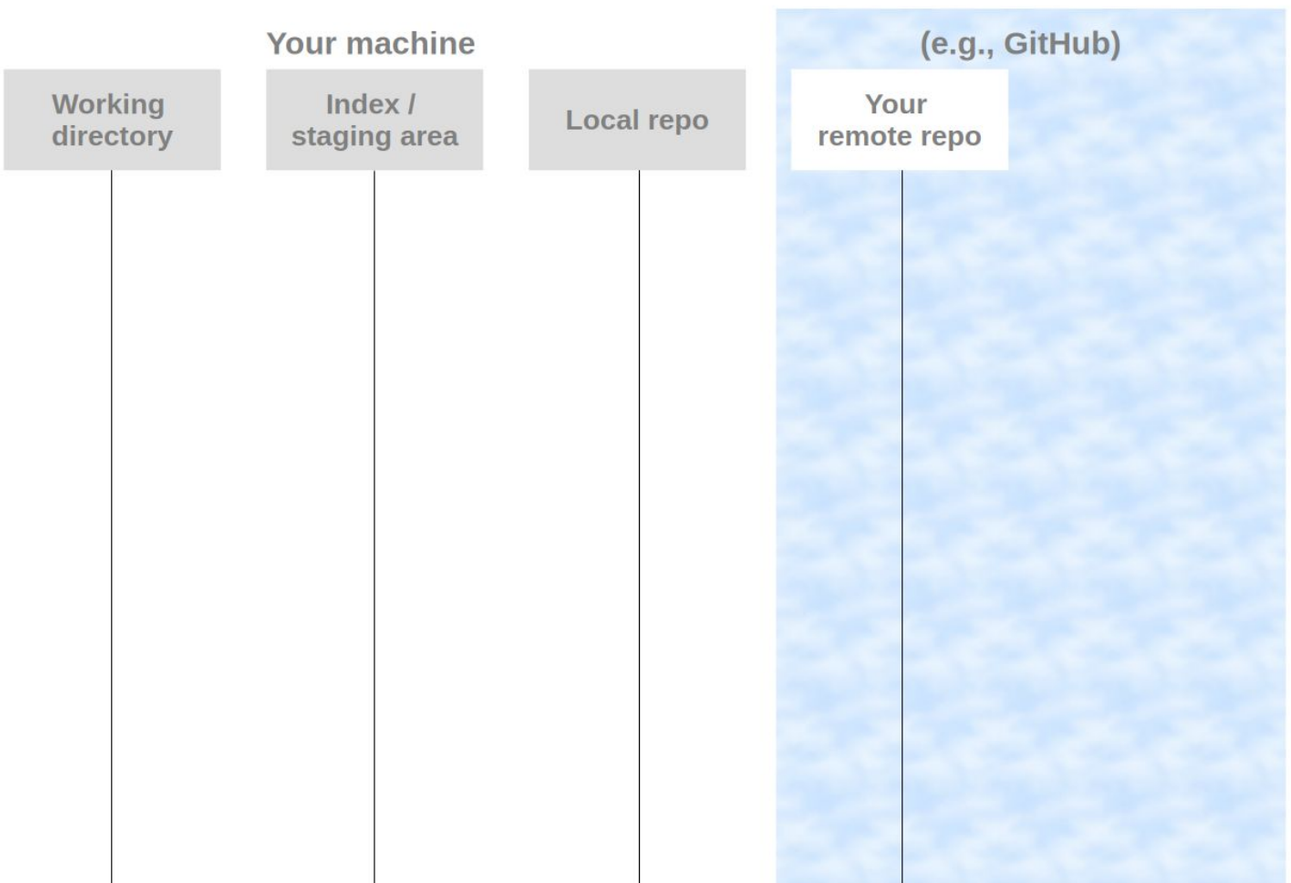
2. **Staging area / Index**
   What will be in your next snapshot

3. **Local repository (i.e., `.git/` folder)**
   Metadata and objects that make up the snapshots



Where’s GitHub?

GitHub hosts the remote copy of your repository



Starting a git repo

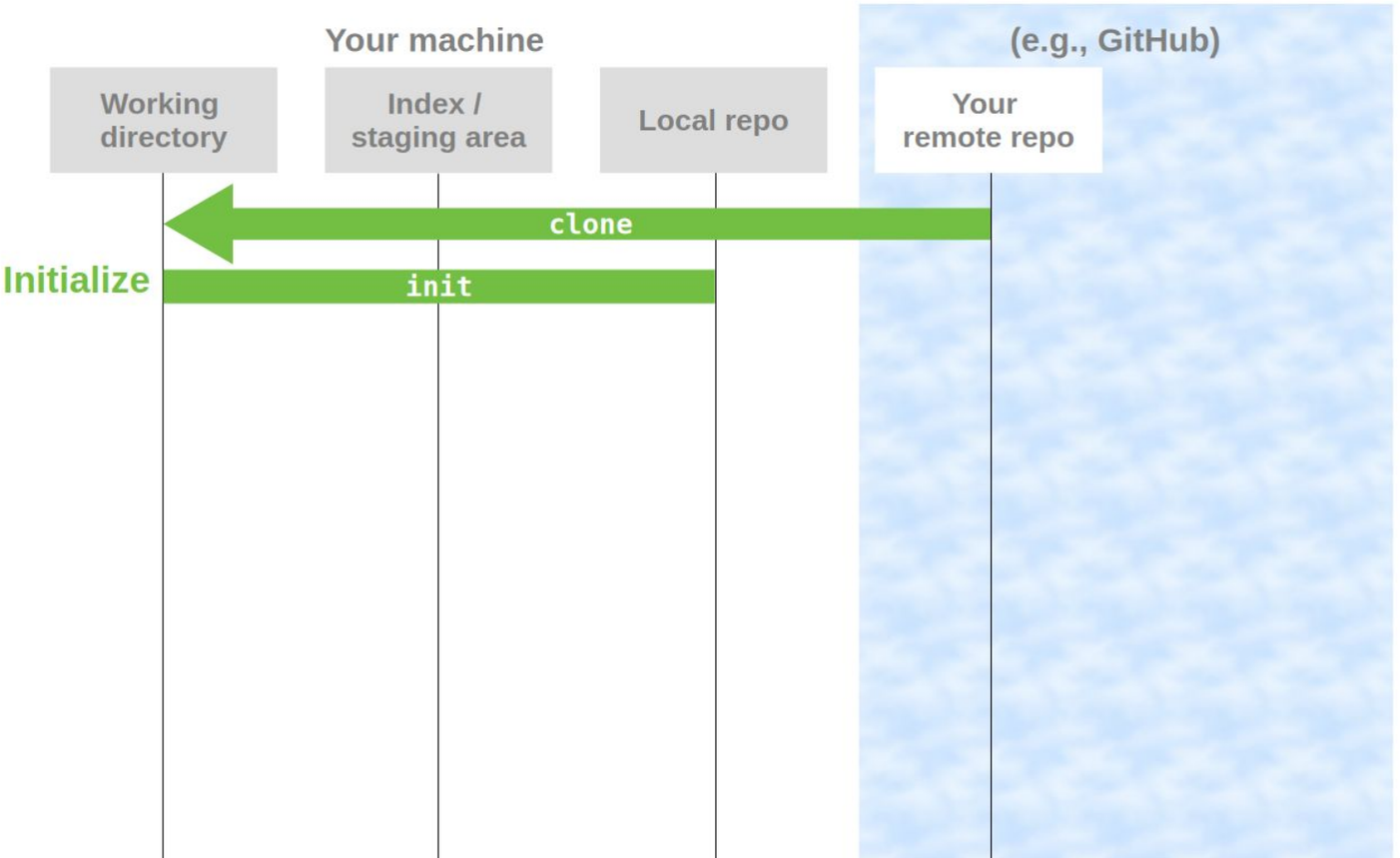
2 options

1. **Make an existing folder into a git repo**

   ```
   cd <directory>
   git init
   ```

2. **Clone an existing repo (e.g., from GitHub)**

   ```
   git clone <repo URL>
   ```

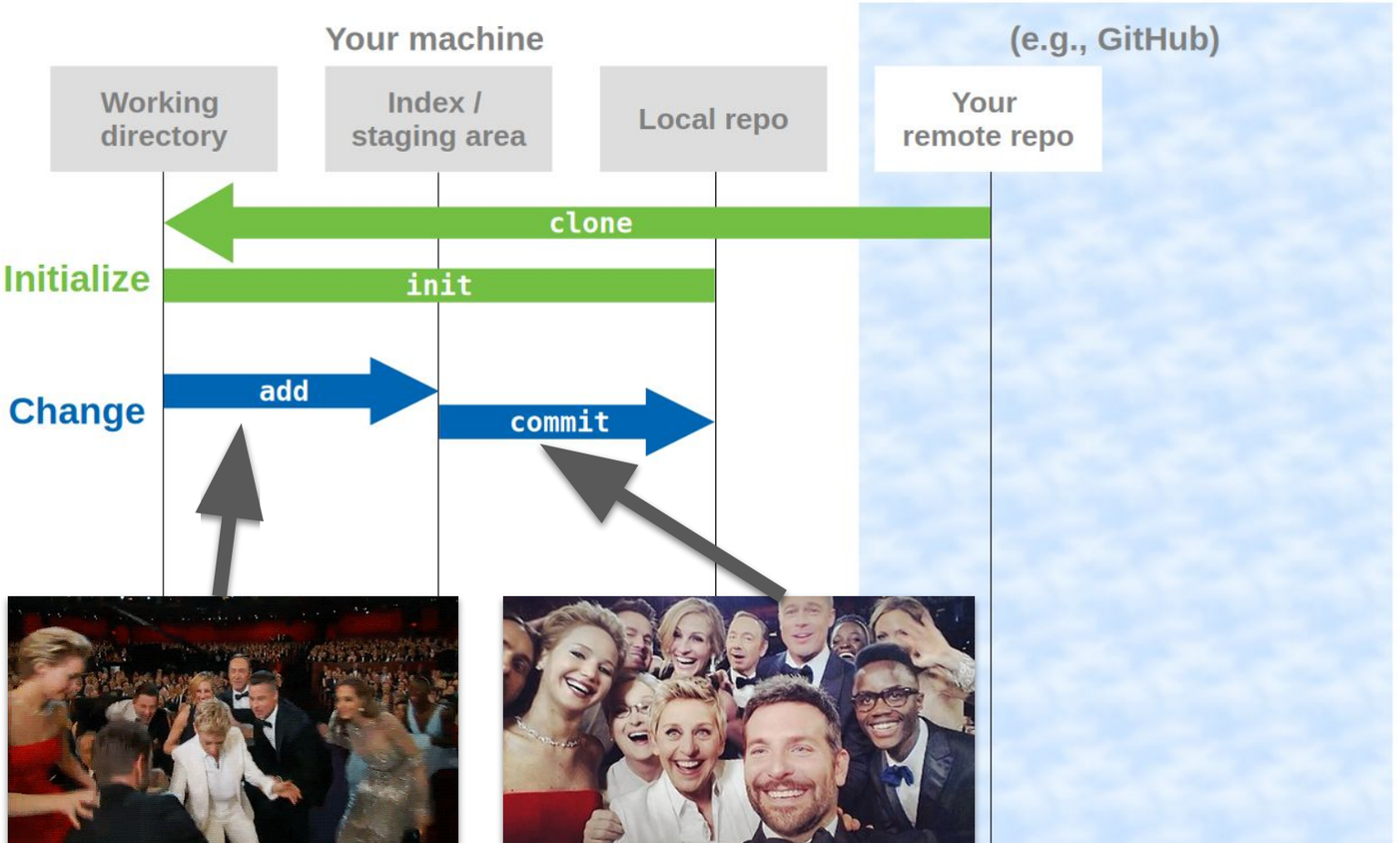


3-step basic workflow

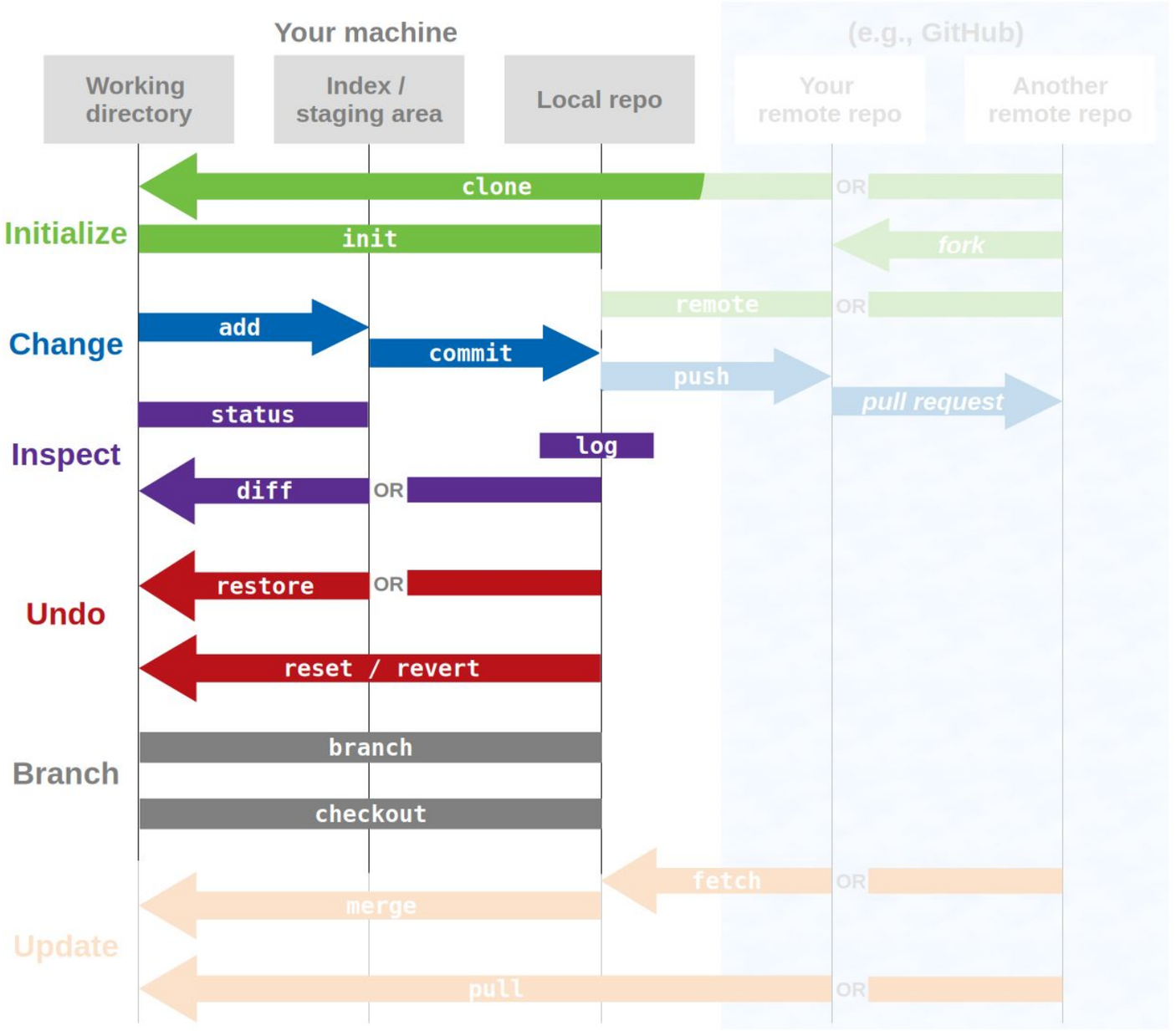
1. **Modify**
   Change a file in your working tree

2. **Stage**
   `git add <filename>`

3. **Commit**
   `git commit -m "<short, informative commit message>"`



The commands covered **in part 1**



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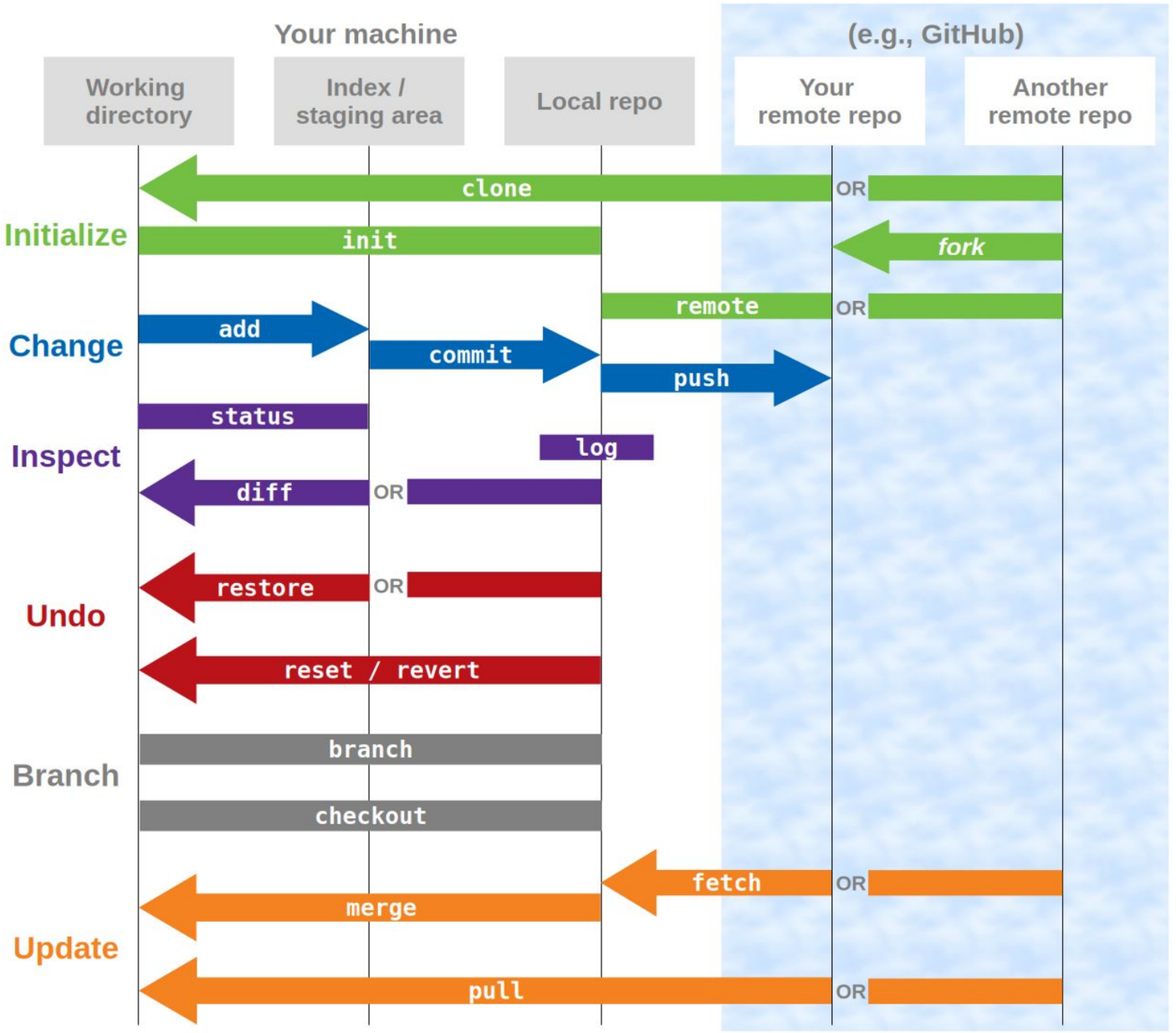
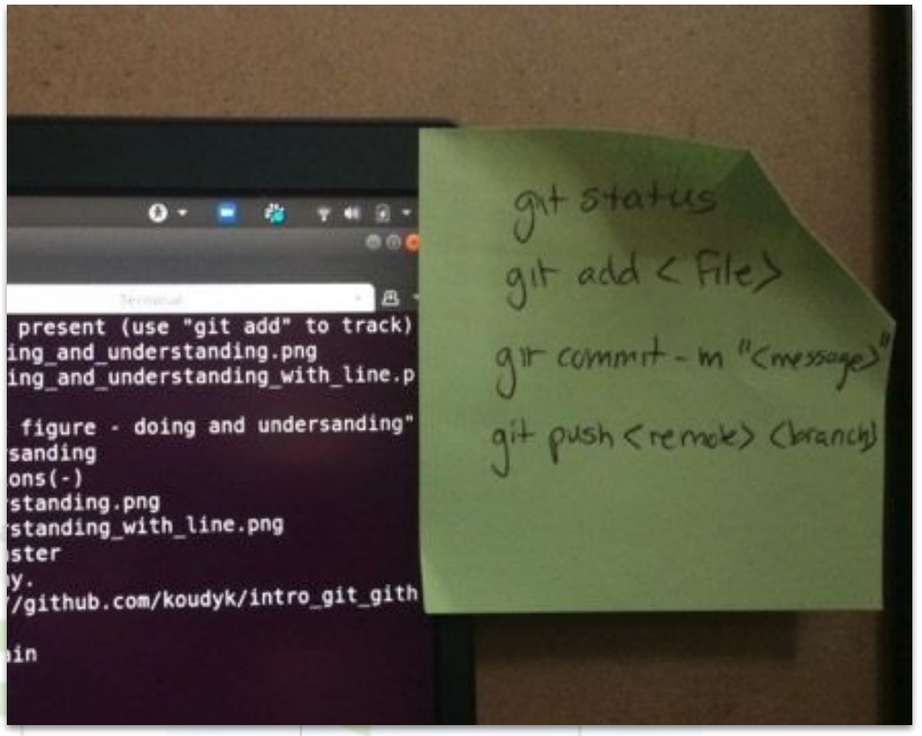


The commands **you might want to remember**



(Everything else you can look up when you need it)

Goals

Part 1 (last week)

- What is distributed version control?
- Why is Git useful?
- Track your own work with Git

Part 2

- **Share your work on GitHub (simple / linear collaboration)**
- Collaborate through GitHub (complex / nonlinear collaboration)
- Navigating GitHub
- Try it out!

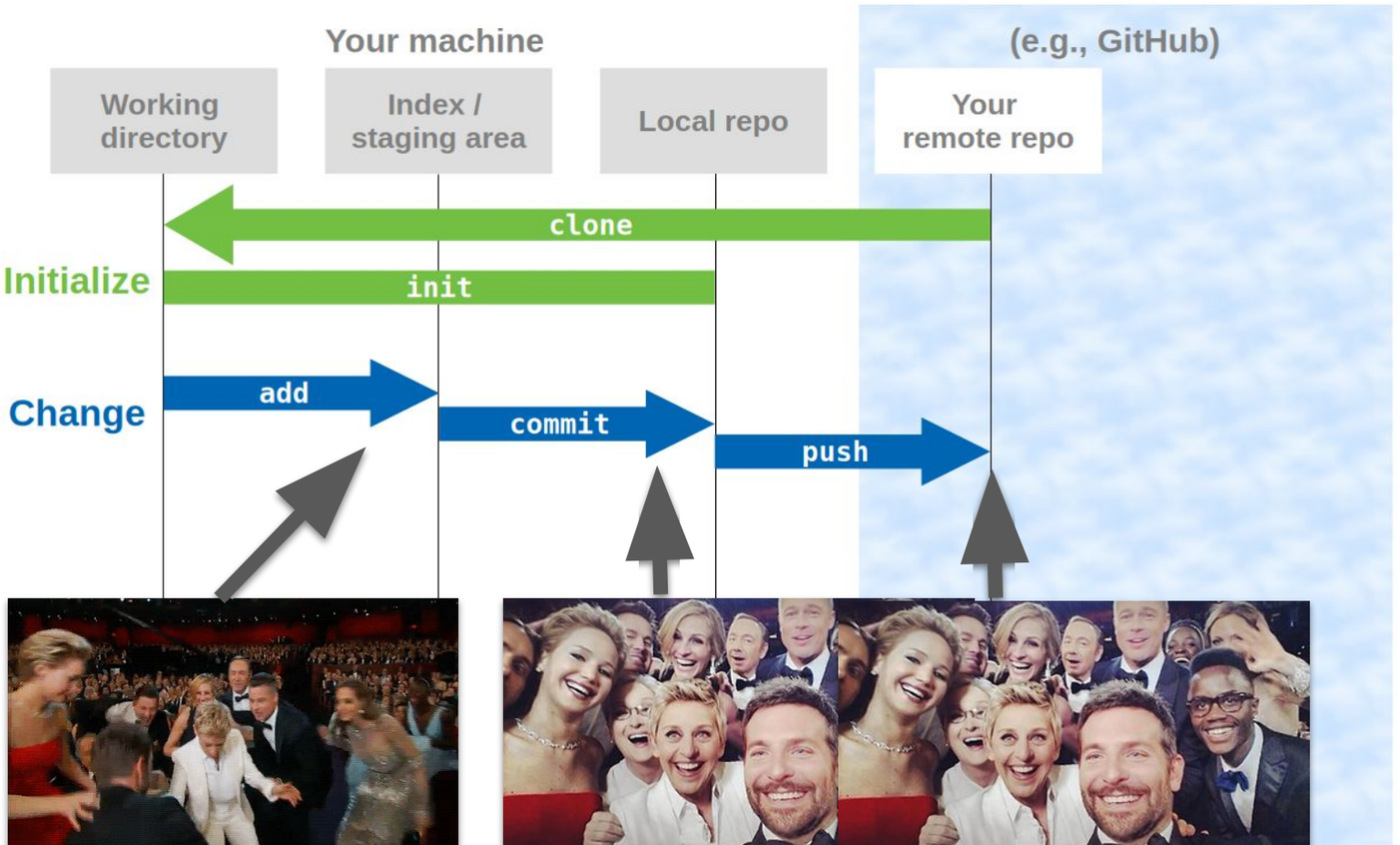
4-step basic workflow for tracking your work **and sharing it**

1. **Modify**
   Change a file in your working tree

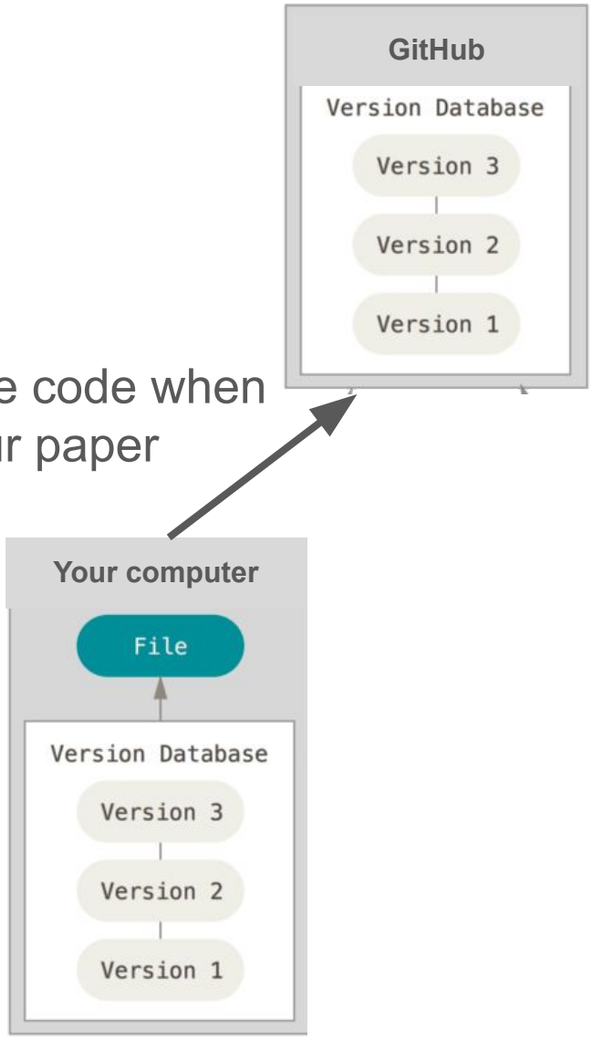
2. **Stage**
   `git add <filename>`

3. **Commit**
   `git commit -m "<short, informative commit message>"`

4. **Push**
   `git push <remote> <branch>`



Sharing your work



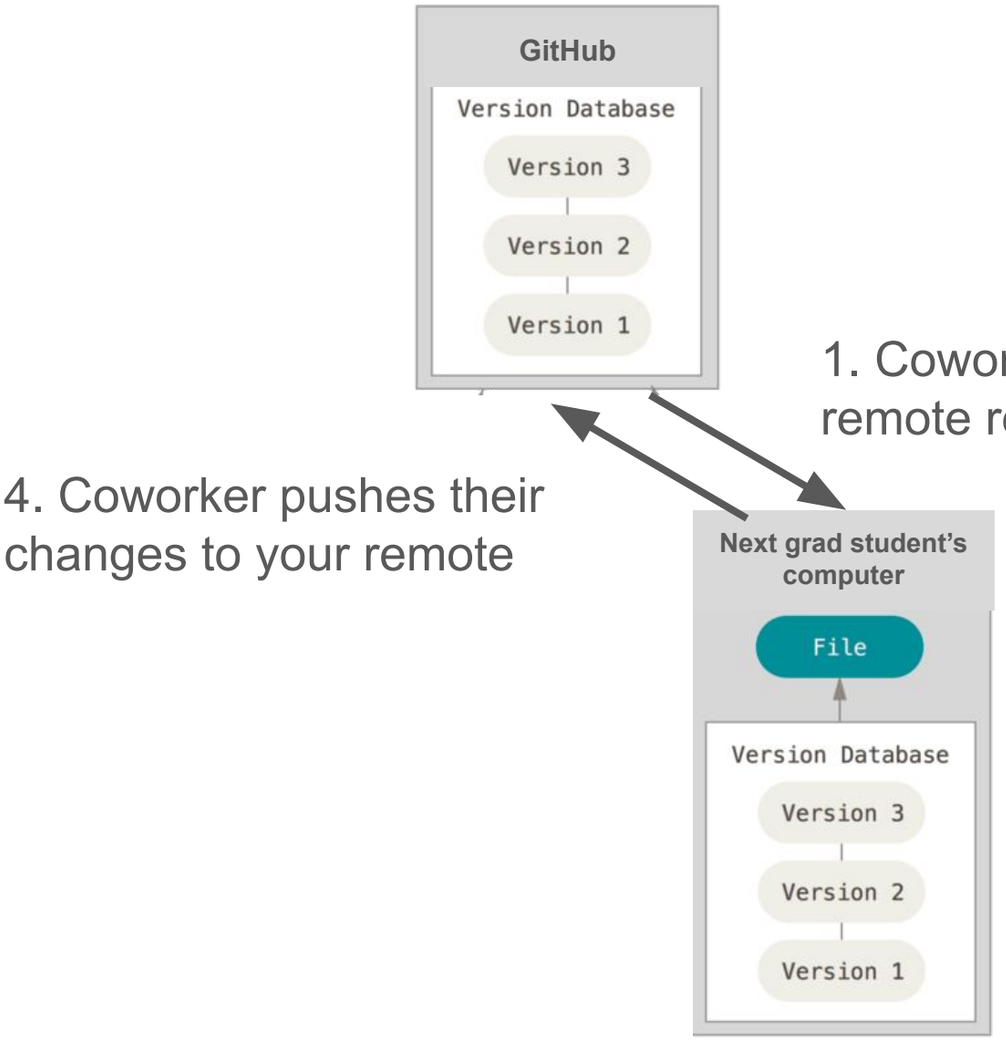
3. You share the code when you publish your paper

1. You write code to run an analysis for your paper

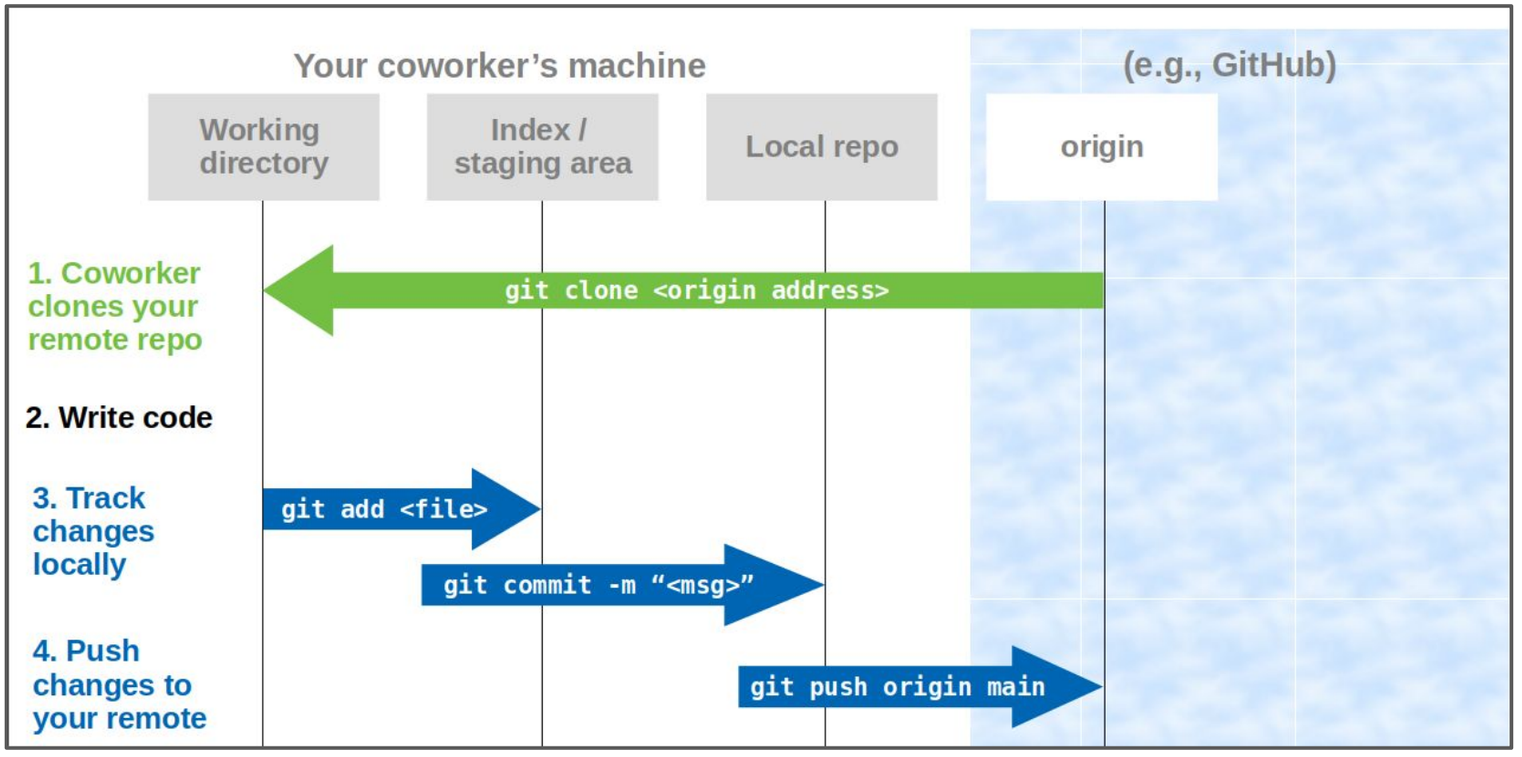
2. You track your work locally

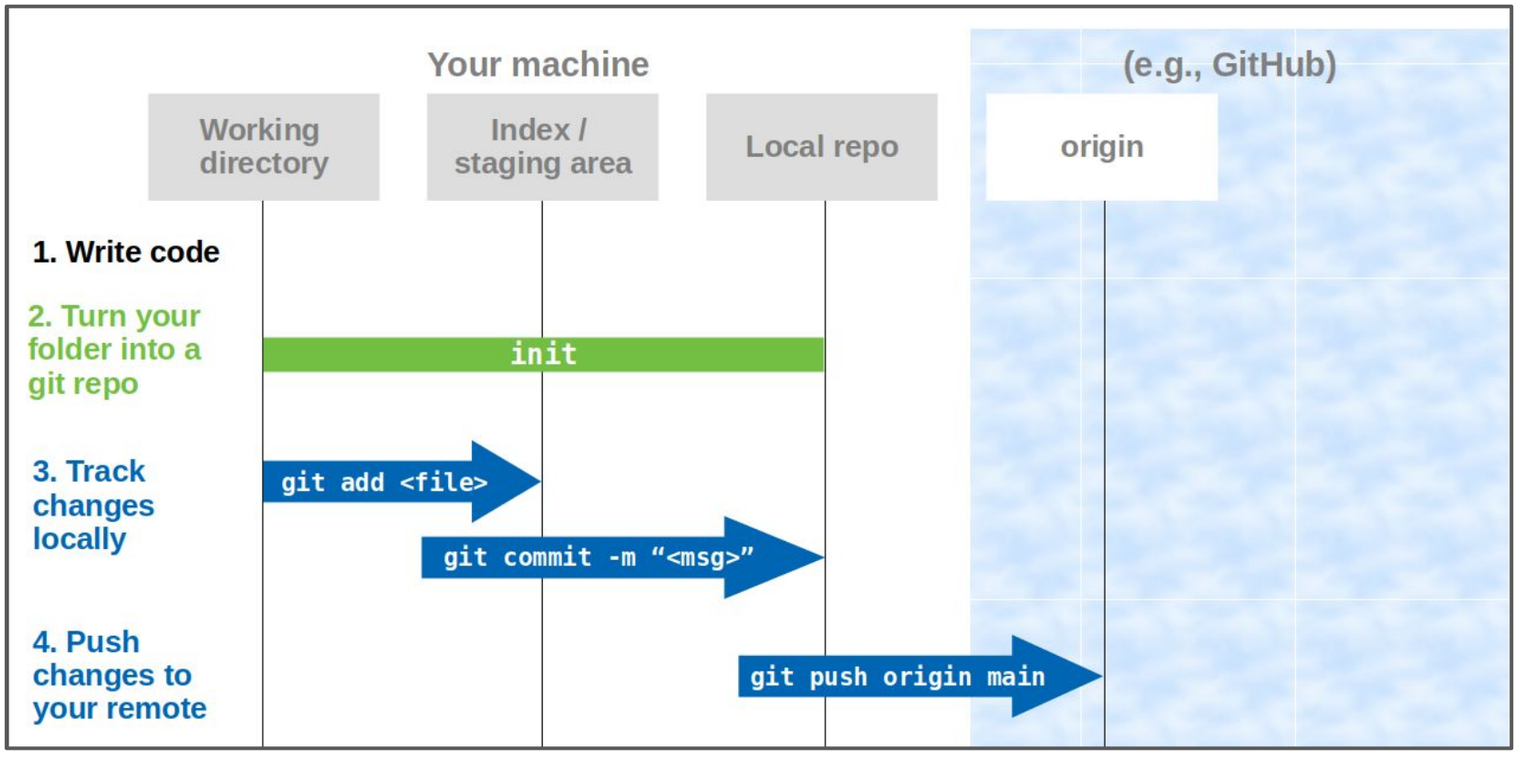
Sharing your work

The next grad student in your lab needs to use your code



Sharing your work





Git commands for sharing your work

- Show your remote repos
  `git remote -v`

- Push commits to a remote repo
  `git push <remote name> <branch>`

Goals

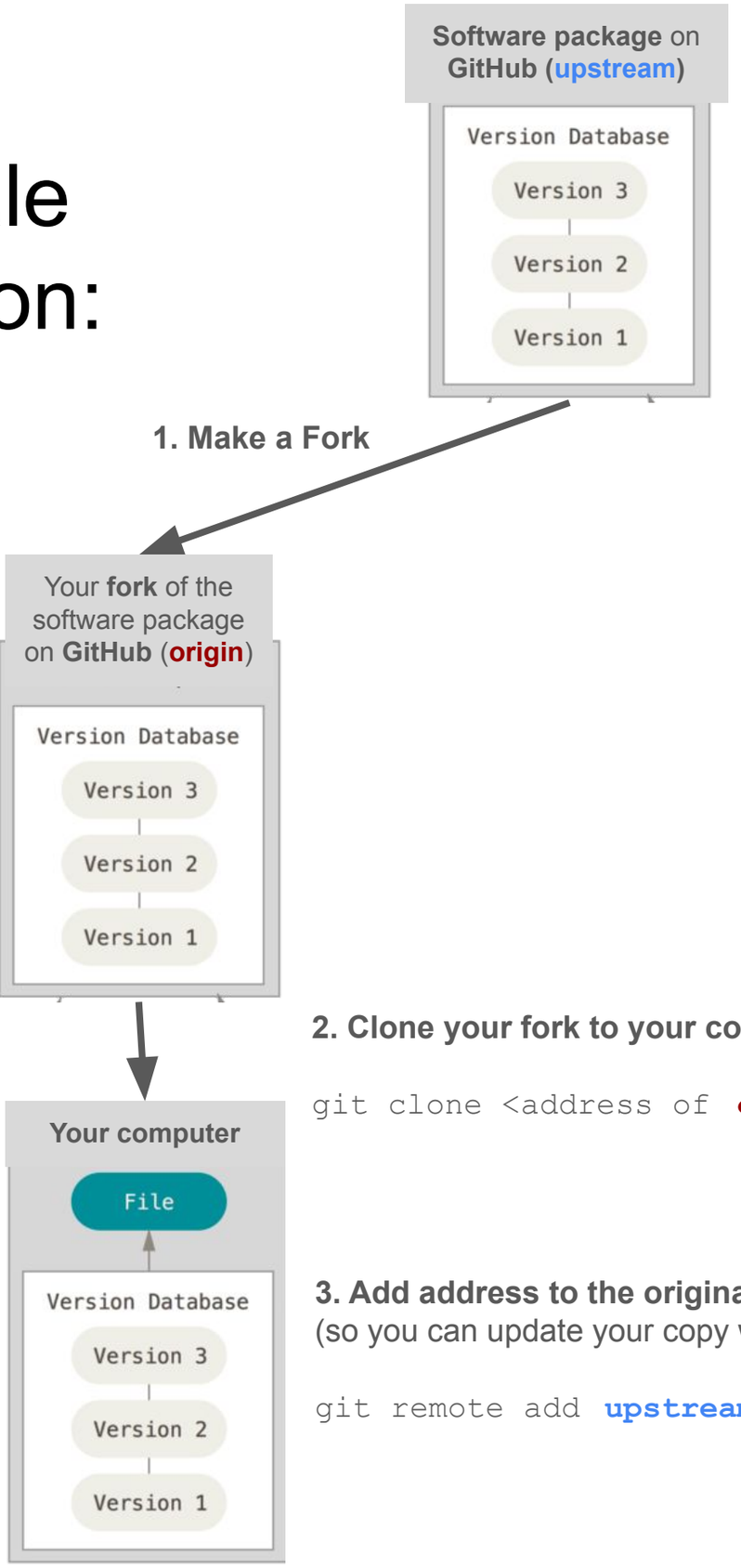
Part 1 (last week)

- What is distributed version control?
- Why is Git useful?
- Track your own work with Git

Part 2

- Share your work on GitHub (simple / linear collaboration)
- **Collaborate through GitHub (complex / nonlinear collaboration)**
- Navigating GitHub
- Try it out!

Larger-scale collaboration: **Setup**



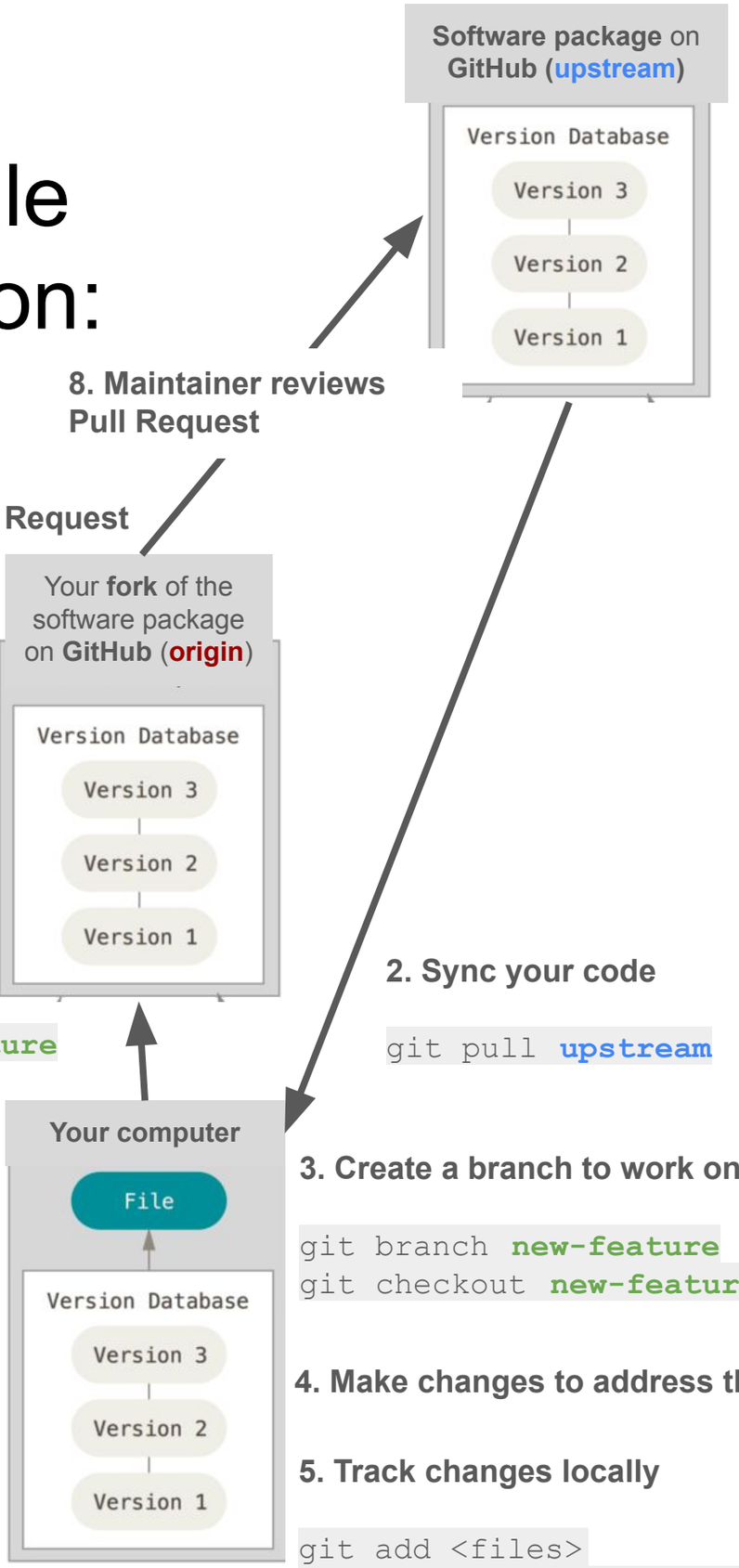
2. Clone your fork to your computer

```
git clone <address of origin>
```

3. Add address to the original repo
(so you can update your copy with others' changes)

```
git remote add upstream <address of upstream>
```

Larger-scale collaboration: **Workflow**



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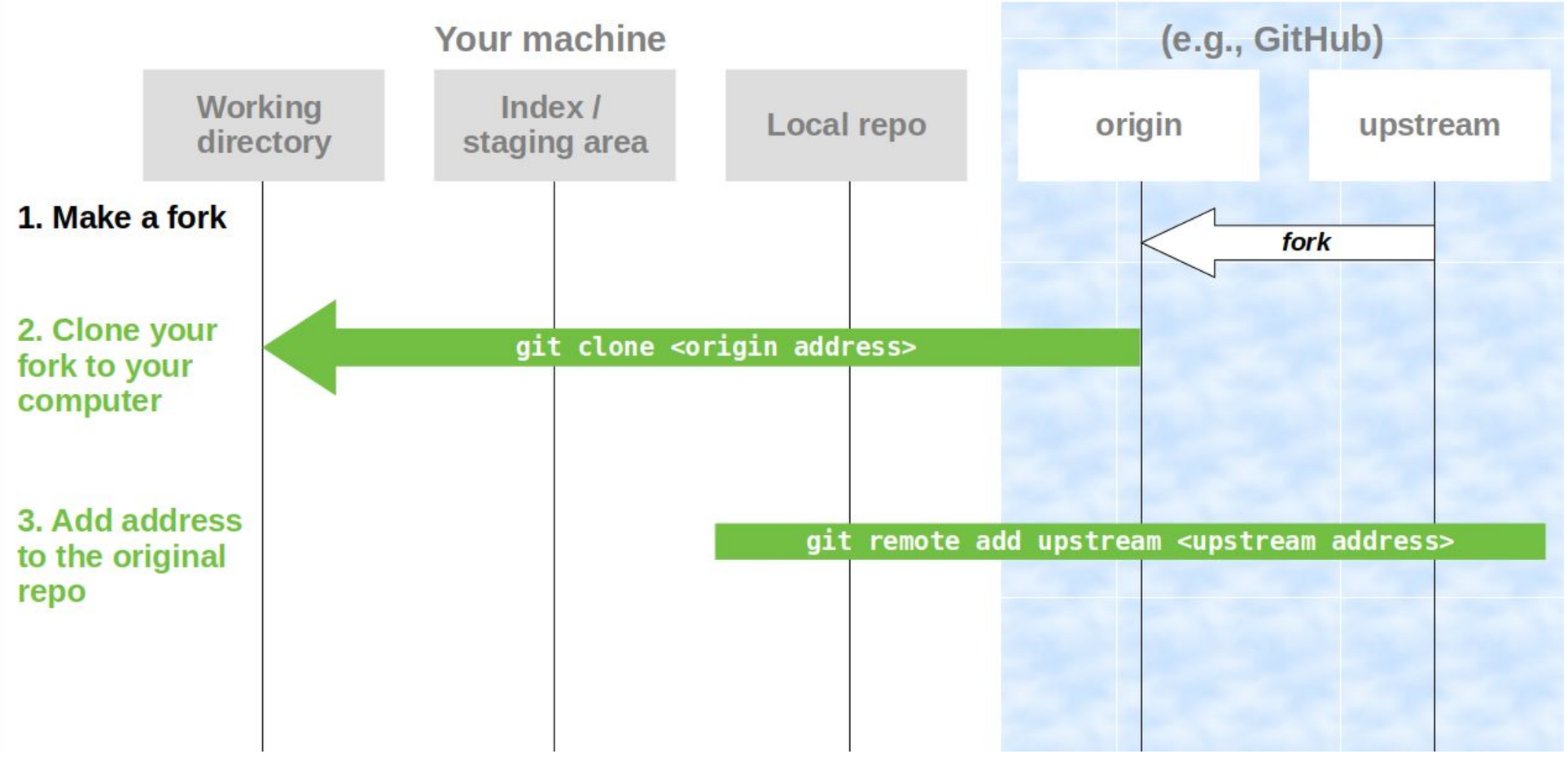
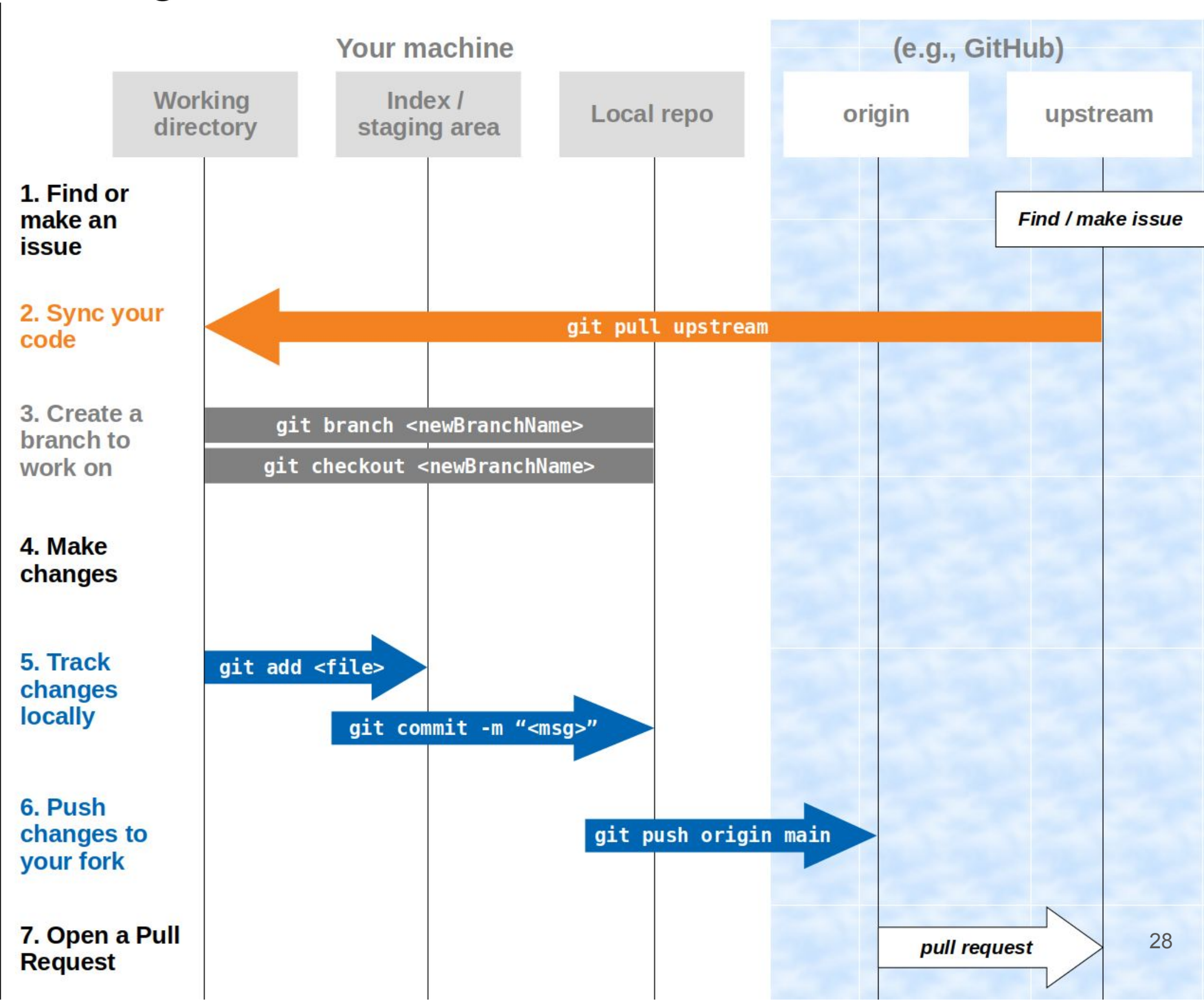
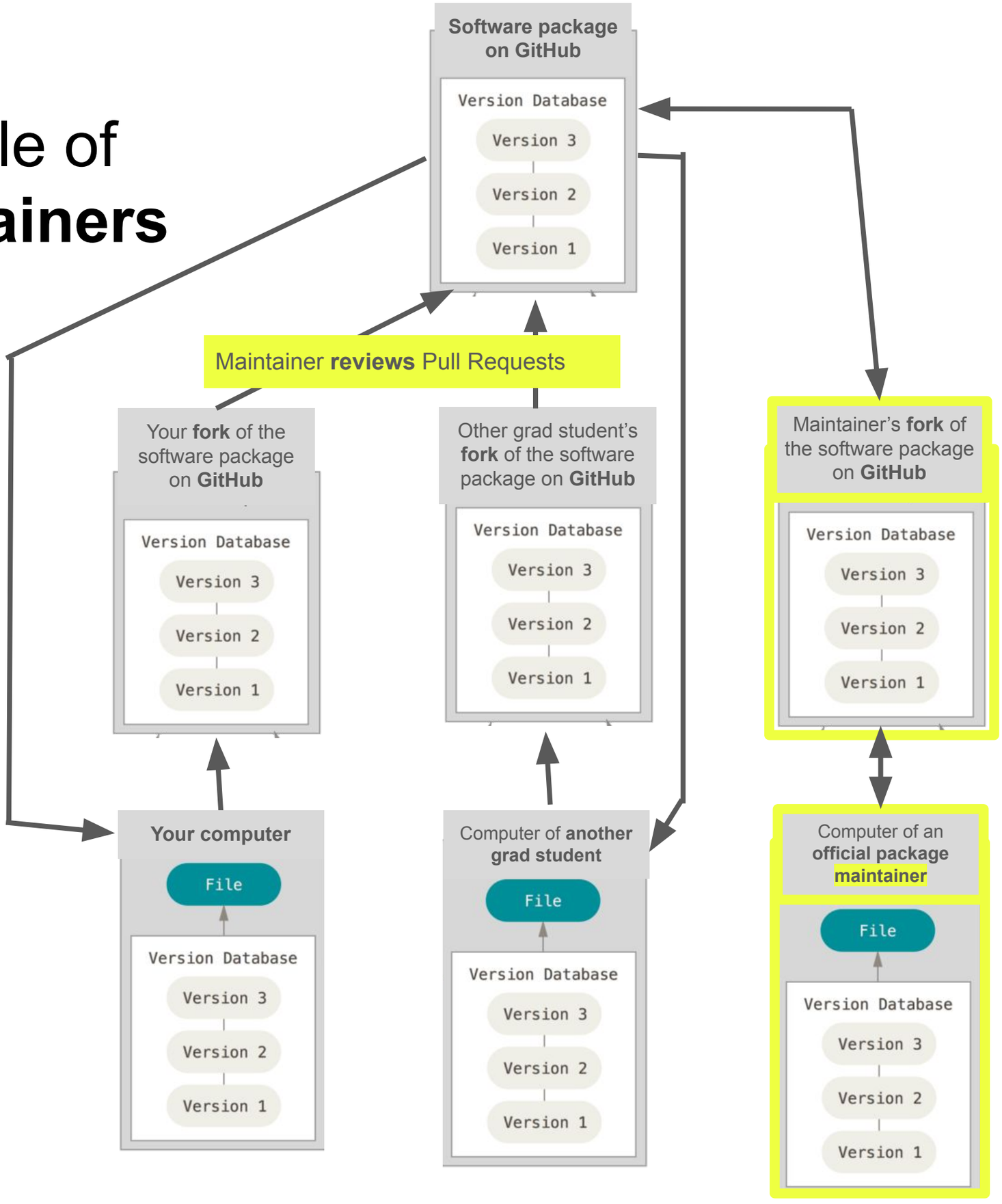


Another way to visualize this

Larger-scale collaboration: **Workflow**



The role of **maintainers**



Git commands for collaboration

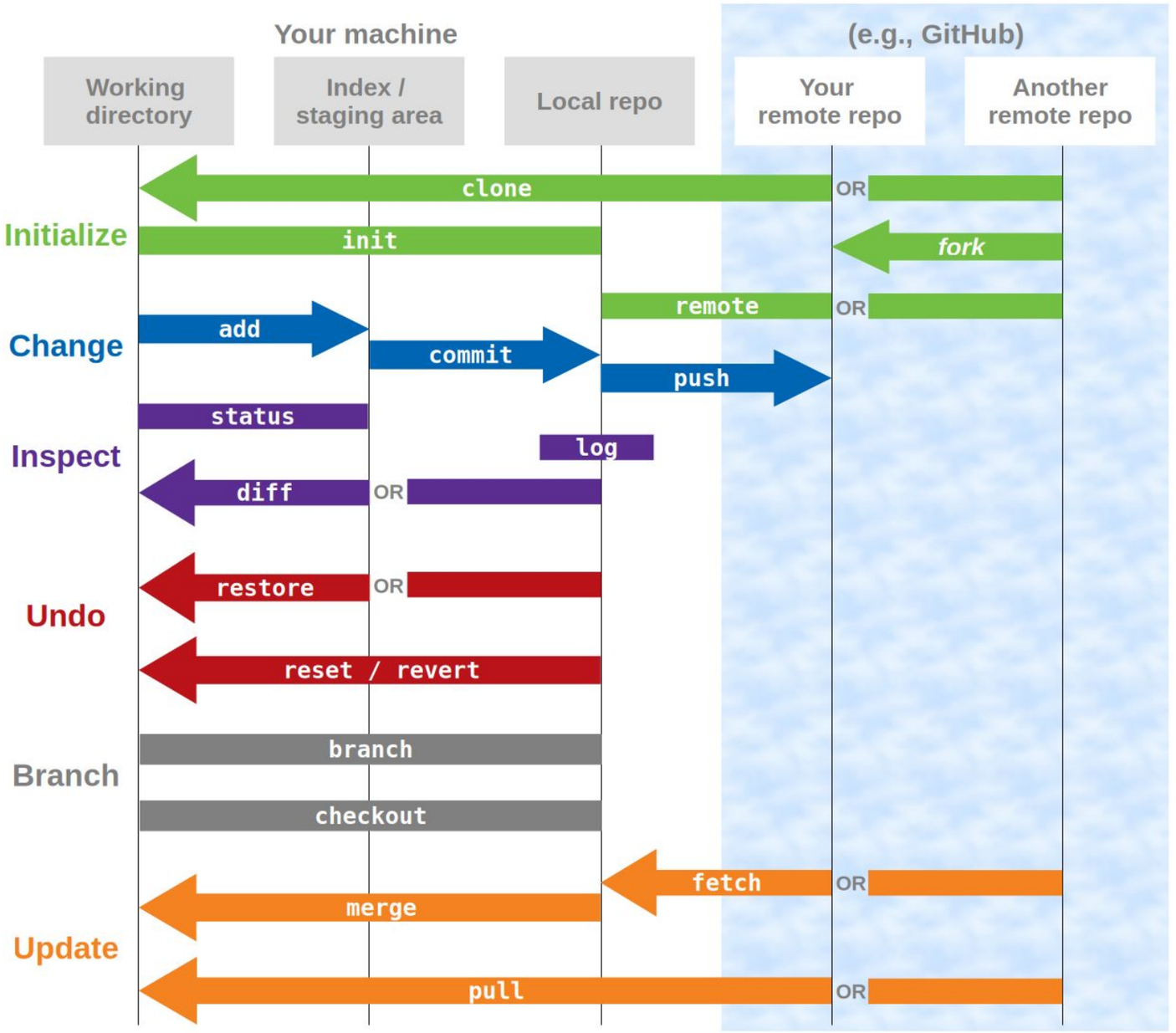
- Show your remote repos
  `git remote -v`

- Add a remote repo
  `git remote add <remote name> <remote address>`

- Push commits to a remote repo
  `git push <remote name> <branch>`

- Pull (fetch and merge) commits from a remote repo
  `git pull <remote name> <branch>`

The commands we covered **today and last week**



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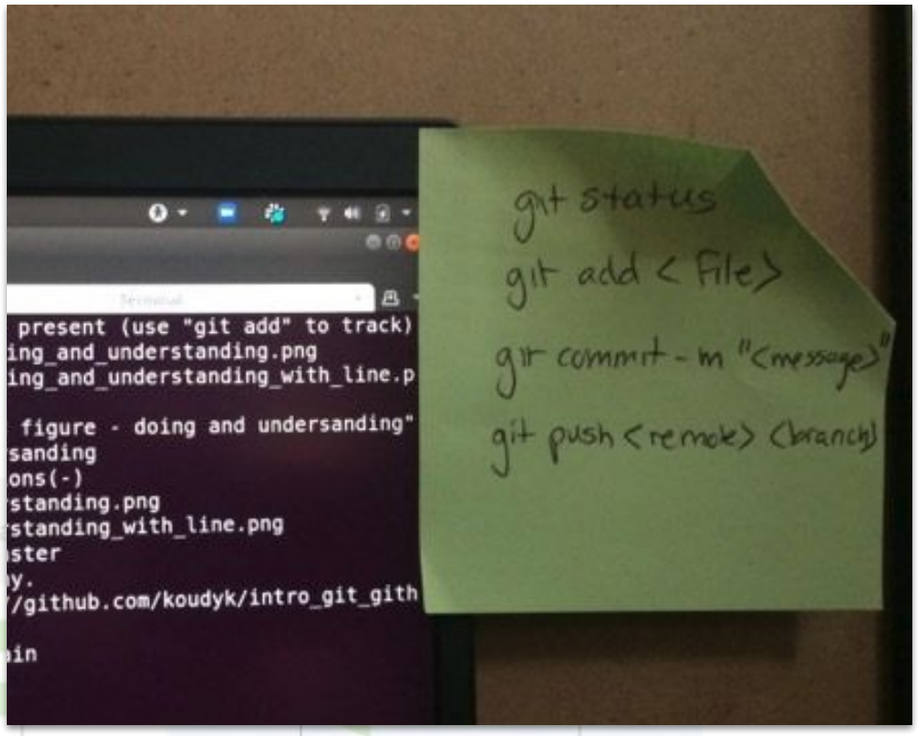

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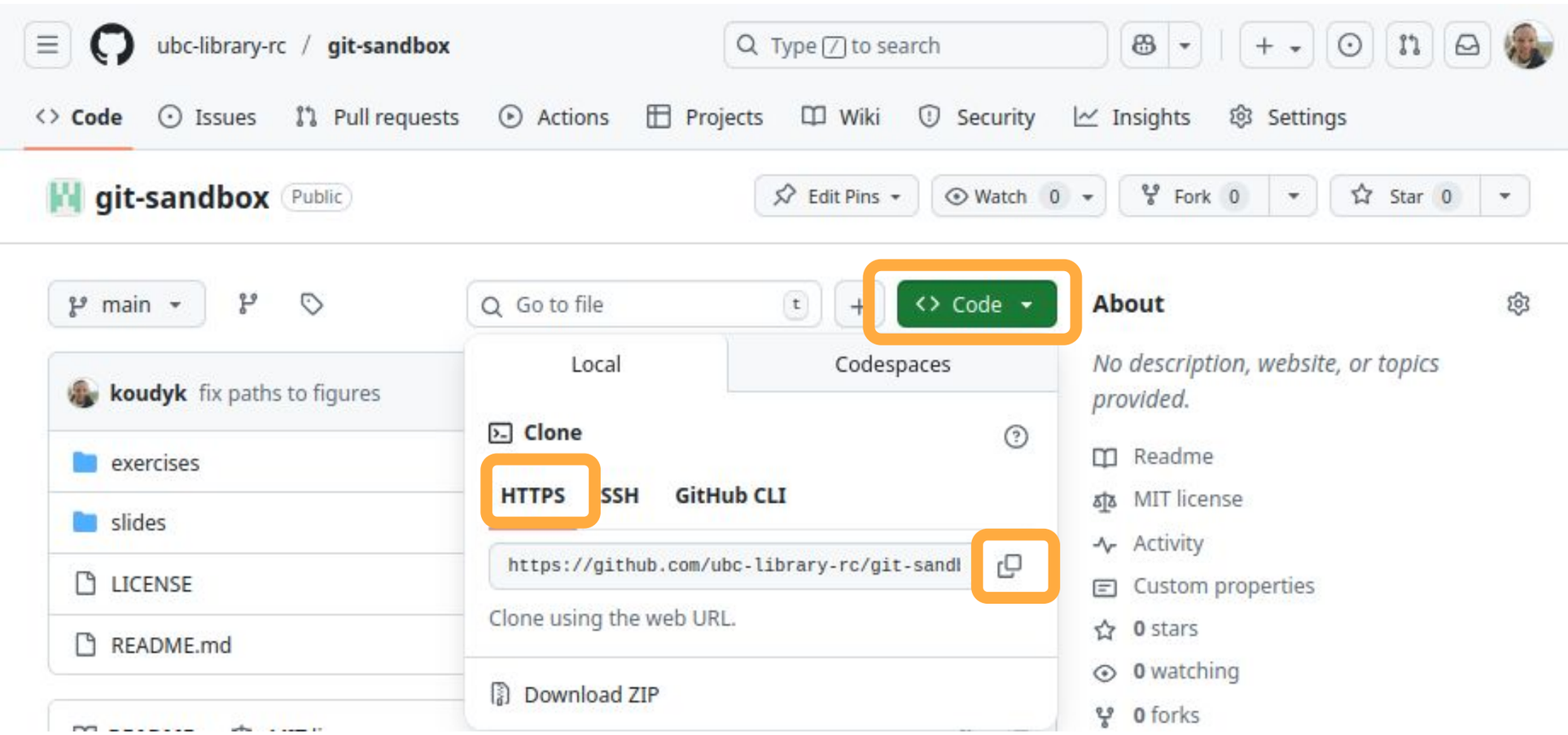
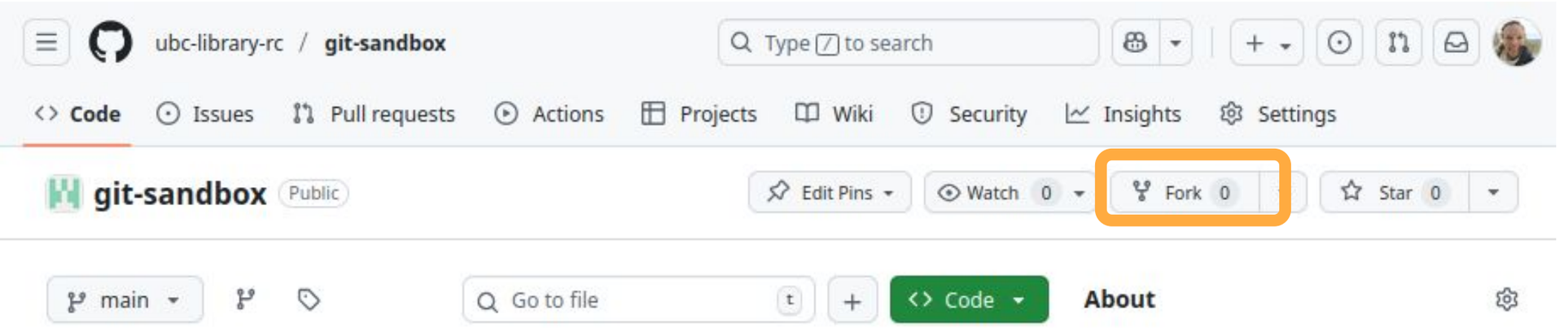
- **Navigating GitHub**
- Try it out!

Navigating GitHub



Where to find address for cloning a repo to your computer

Navigating GitHub



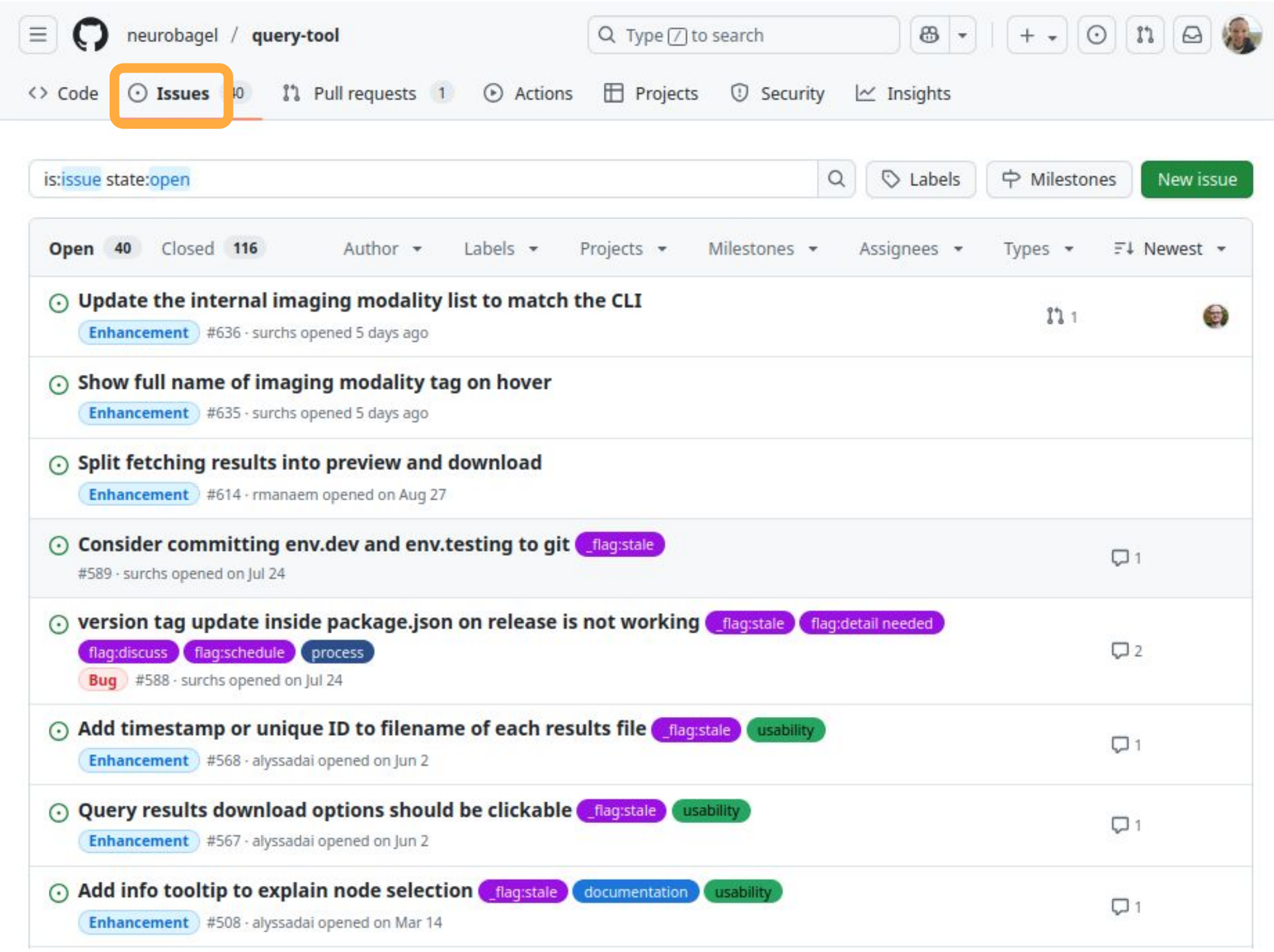
Forks

- Like a clone, but on GitHub
- Most collaborators will have their own fork where they work

Navigating GitHub

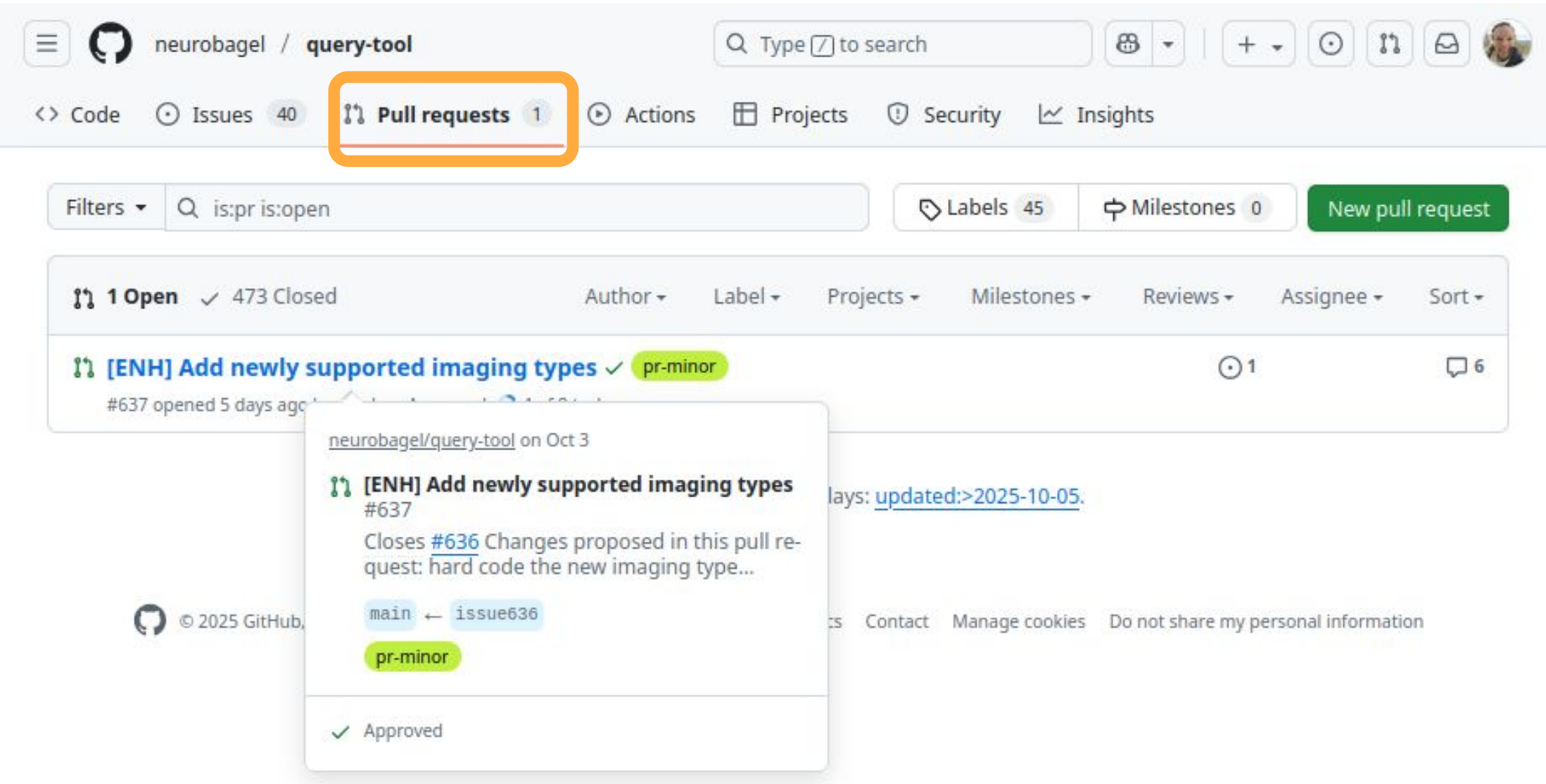
Issues - where you can

- Report a problem
- Propose something new
- Find something to work on



Navigating GitHub

https://github.com/neurobagel/query-tool/pull/637

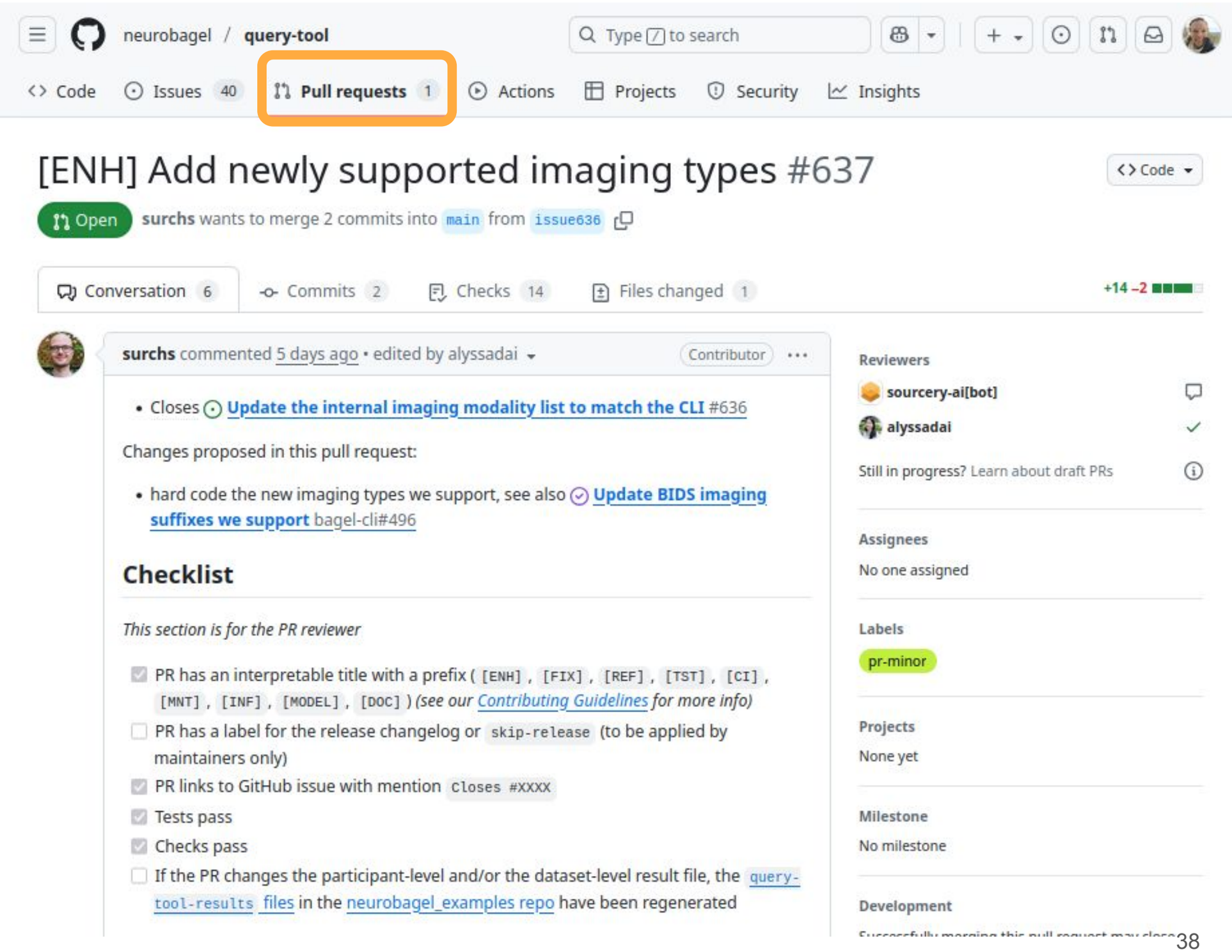


Pull requests

- Push commits from your own brainch to your own fork, then open a pull request
- Then the project maintainers can
  - review your code
  - make suggestions / edits
  - decide whether to merge it into the original repository

Navigating GitHub

https://github.com/neurobagel/query-tool/pull/637



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- Navigating GitHub
- **Try it out!**

Check if you're ready

☑️ A) Can you open a bash shell?

- Open a terminal, type `echo $SHELL` and press ENTER.
- The output should include `bash` or `zsh`

☑️ B) Do you have git installed?

- In the bash terminal, `git --version` and press ENTER.
- The output should be `git version X` (where the X is the version number)
- *Don't worry if you don't have the exact same version as I do*

☑️ C) Do you have git configured?

- In the bash terminal, type `git config --list` and press ENTER
- You should see your name and email (and other things that aren't essential to configure)

☑️ D) Can you open a text editor? E.g.,

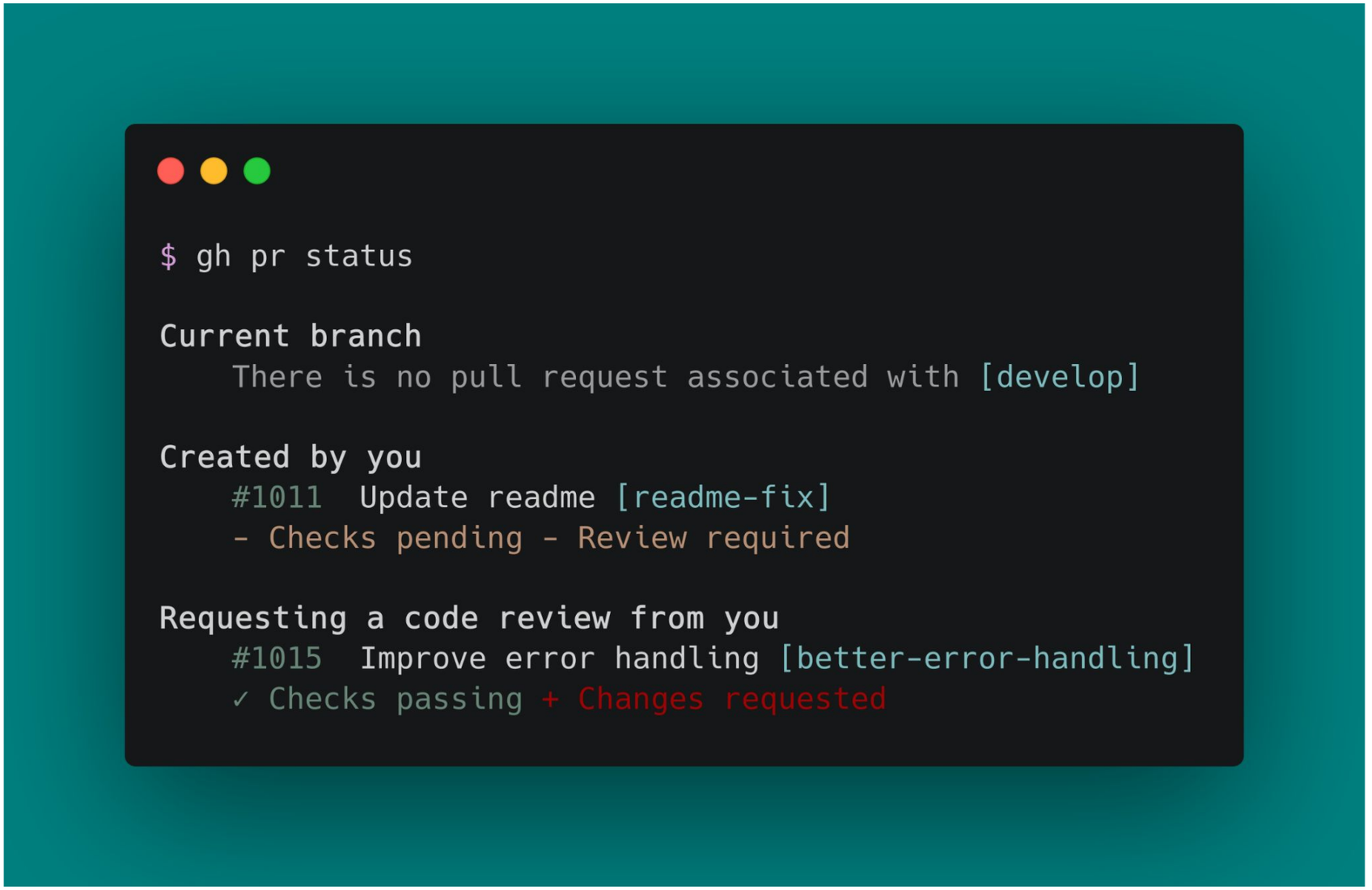
- Linux: gedit, nano
- macOS: textedit
- Windows: notepad

☑️ E) Can you go your GitHub account?

Linking git to GitHub

GitHub CLI (FYI; not recommended here)

- Lets you use GitHub from the terminal
- Makes workflows more efficient for software developers and maintainers
- Probably overkill for many of us



Linking git to GitHub

SSH (FYI; not recommended here)

- Secure Shell Protocol (SSH Protocol)
- “a cryptographic network protocol for operating network services securely over an unsecured network.” (https://en.wikipedia.org/wiki/Secure_Shell)
- Often preferred by programmers
- May be more secure

- May be more challenging for those new to programming

Linking git to GitHub

Git Credit Manager (what we'll use today)

- Manages personal access token and 2-Factor Authentication

- **Windows**
  - If you installed Git for Windows, you already have it!

- **MacOS**
  - Type this in the terminal:
    ```
    brew install --cask git-credential-manager
    ```

- **Linux**
  - More complicated…
  - Install GCM
  - Configure git and GCM

Check if you’re ready, con’t

☑️ F) Have you connected git to your GitHub account?

- This will download the repo with the exercises.
  In the terminal, paste this:

```
git clone https://github.com/ubc-library-rc/git-sandbox.git
```

Acknowledgements

Many parts of this presentation are inspired / based on these great resources:

- Chacon, S., & Straub, B. (2014). Pro git. Springer Nature. Available at https://git-scm.com/book/en/v2
- The Carpentries. (2021). Version Control with Git. https://swcarpentry.github.io/git-nov....
- https://docs.github.com/en/get-started/git-basics/set-up-git

Figure references

Here are the sources of some figures on my slides:

- The Carpentries. (2021). Version Control with Git. https://swcarpentry.github.io/git-nov....
- Chacon, S., & Straub, B. (2014). Pro git. Springer Nature. Available at https://git-scm.com/book/en/v2
- https://github.com/cli/cli#installation

The end

Options

- Commands can become powerful with options

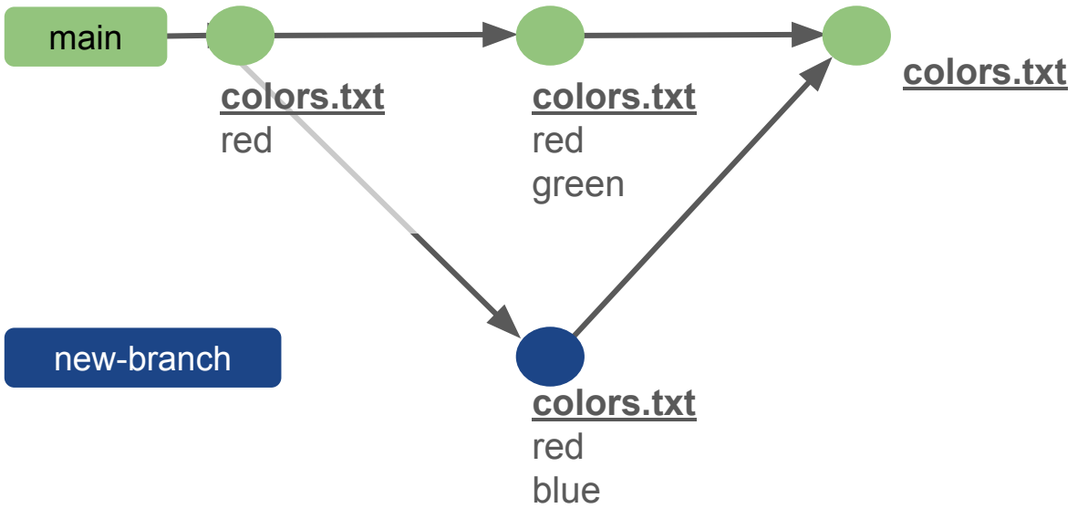
```
git log --pretty=format:"%h - %an, %ar : %s" --graph
```

- “How on earth will I remember that??”

- You can set aliases for commands you use a lot

```
git config --global alias.fancylog 'log
--pretty=format:"%h - %an, %ar : %s" --graph'

git fancylog
```



What do you think you can do now?

(select as many as you want)

A) Explain why git and GitHub are useful
B) Track your own work with git
C) Share your own work on GitHub
D) Collaborate on GitHub

Basic Bash

- `cd <directory path>` changes directories (aka folders)
  - `.` represents the current directory
  - `..` represents the directory one level up

- `mkdir <directory path>` makes a new directory

- `touch <filename>` creates a new file

- `ls` lists the directory's contents
  - `ls -a` includes hidden files

- `<text editor name>` opens a text editor
  - `<text editor name> <filename>` opens a file in a text editor