Lecture 2: Data in Linguistics, Git/GitHub, Jupyter Notebook

LING 1340/2340: Data Science for Linguists

Jevon Heath

Objectives

- What do linguistic data look like?

- Tools:
  - Git and GitHub
  - Jupyter Notebook

You should be taking NOTES!

To-do #1

- What linguistic data sets did you look at?
  - Corpus data?
  - Non-corpus data?

- What makes a dataset a corpus?

First thing to do every class

1. Open up a Terminal/Git Bash window ("shell" window).
2. Move into your Data_Science directory.

```
cd Documents/Data_Science
```

Hit TAB for auto-completion.

3. Make sure you are in the right directory.

```
pwd
```

"Print Working Directory"

4. Look at what's inside the directory.

```
ls
```

or

```
ls -la
```

`ls` for "list directory".
`-la` for "long/all". Shows all hidden files in long output.

Your first local repository: getting started

Follow steps in Tutorial Part 1, [Creating a Repository]()

1. Create a directory called `languages`
2. Initiate it as a Git repository:
   ```
   git init
   ```
3. Create a new text file 'zulu.txt', add lines to it
4. Add files to staging area:
   ```
   git add zulu.txt
   ```
5. Commit the change:
   ```
   git commit -m "started
   zulu"
   ```
6. Edit the text file again
7. Add files to be committed:
   ```
   git add zulu.txt
   ```
8. Commit the change:
   ```
   git commit -m "details on…"
   ```

Check status between steps:
```
git status
```

Your first local repository: tracking, history

Follow steps in Tutorial Part 1: Tracking Changes, A Commit Workflow, and Exploring History.

- To view entire version history:

```
git log
```

- To view changes:

```
git diff
git diff HEAD~1 file.txt
git diff --staged
```

- To view what changed in a particular version:

```
git show HEAD~1
```

- To scrap new changes since the last commit:

```
git checkout HEAD file.txt
```

- To restore an earlier version:

```
git checkout VERSION file.txt
```

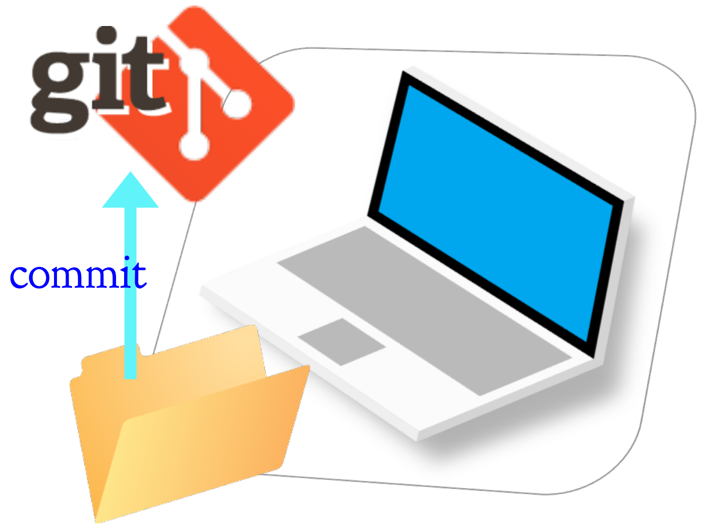
🡐 commit to make this the new HEAD

If thrown into pagination, use `SPACE` to page down, `q` to quit.

HEAD: the last committed version
HEAD~1: one before that

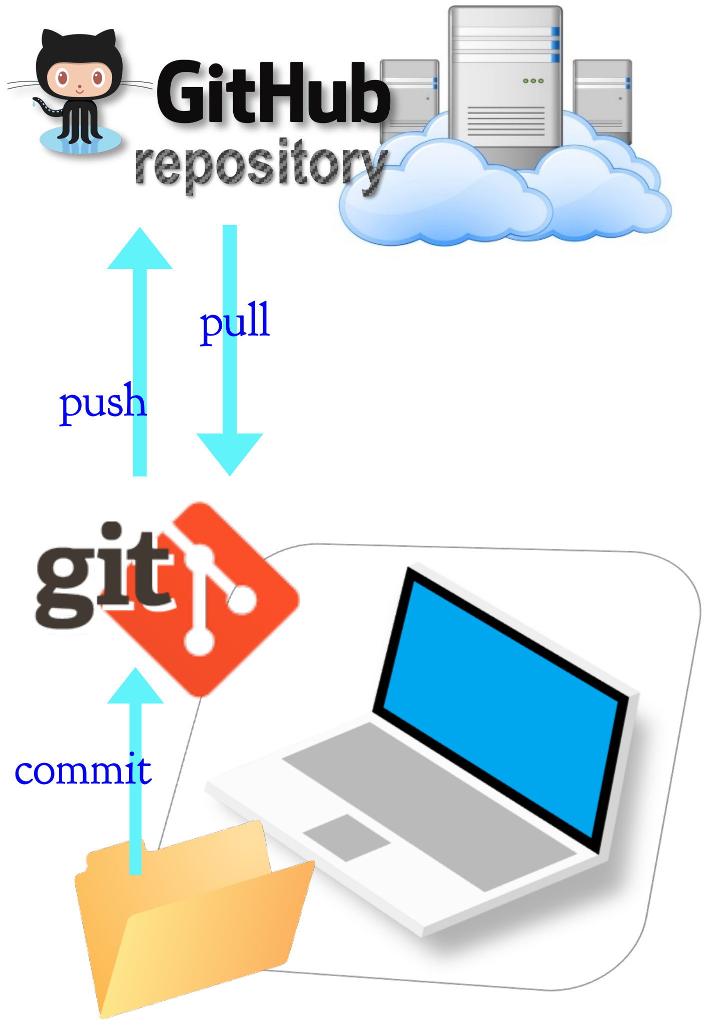
Your first local repository

- Your directory `languages` was set up with a Git repository.
- `languages` is now:
  - tracked by Git
  - all changes will be documented
  - able to revert back to earlier version, if needs be
- But is this all?
  - How about backup? collaboration? social?



GitHub: a *remote* repository

- This is where **GitHub** comes in.
- GitHub is a **repository hosting service.**
  - A website where you can keep a copy of your Git repository.
  - REMOTE repository on GitHub, LOCAL repository on your laptop.
  - Great way to backup, and also showcase your work



Setting up a remote repo

- There are TWO main methods of setting up a remote GitHub repo.

Scenario 1: Your laptop already has an **existing LOCAL Git repo.** You configure it to link it up to a new, empty repo on GitHub, then push up the content.

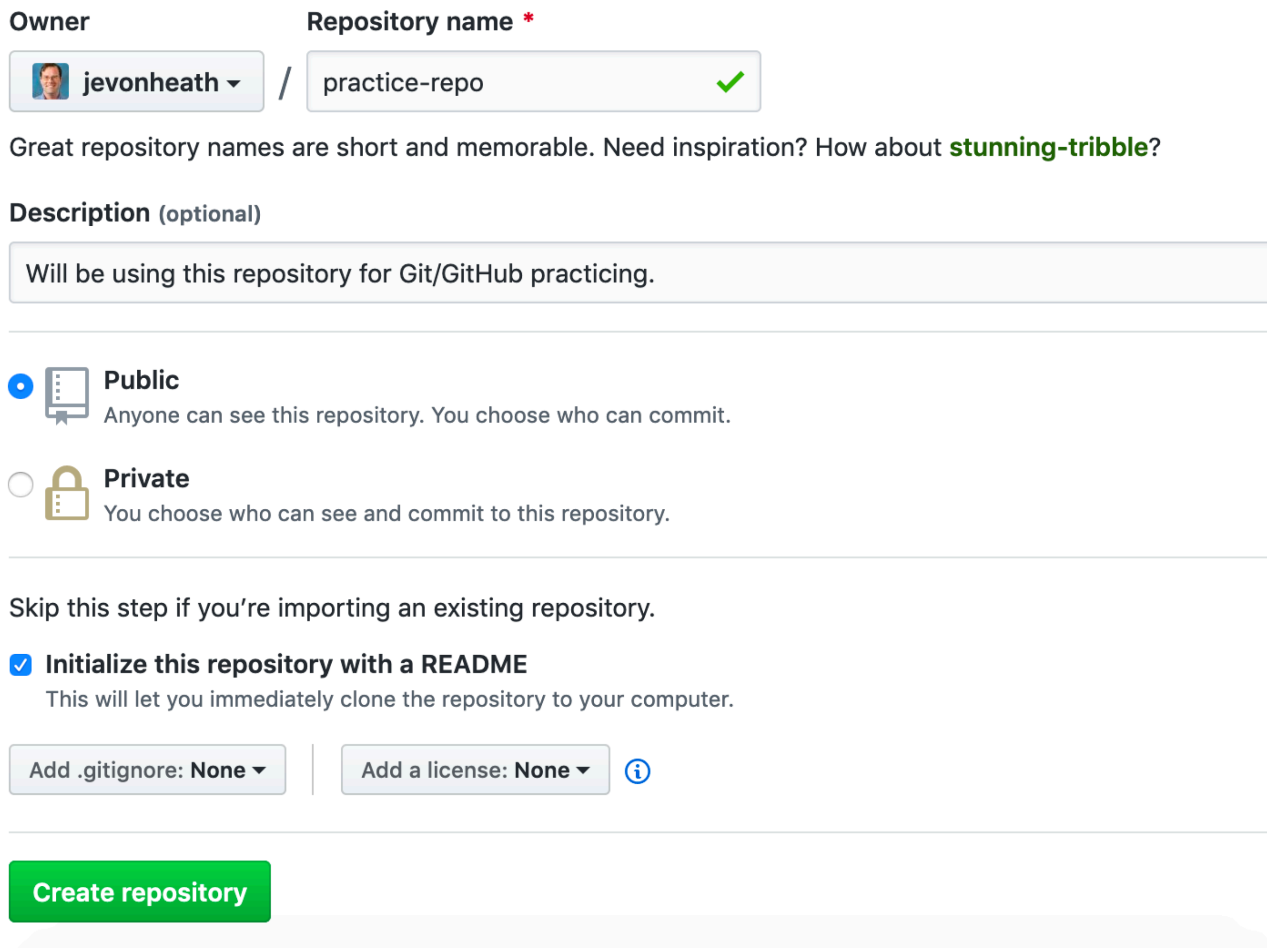
- We can set up our `languages` repo with a GitHub repo this way.
- Part 2 Linking Git with GitHub goes this route.

Scenario 2: Start from scratch. Create a **new repository on GitHub**, and then **clone it onto your laptop** as a brand-new local repository.

- This YouTube tutorial shows you how.
- ← Let's have you try this.

Your first GitHub repo

- On GitHub, create a new repository called "practice-repo".
  - Provide a short description.
  - Keep it public.
  - Initialize it with a README.


Owner
jevonheath ▾ / Repository name *
practice-repo ✓

Great repository names are short and memorable. Need inspiration? How about **stunning-tribble**?

Description (optional)

Will be using this repository for Git/GitHub practicing.

● **Public**
Anyone can see this repository. You choose who can commit.

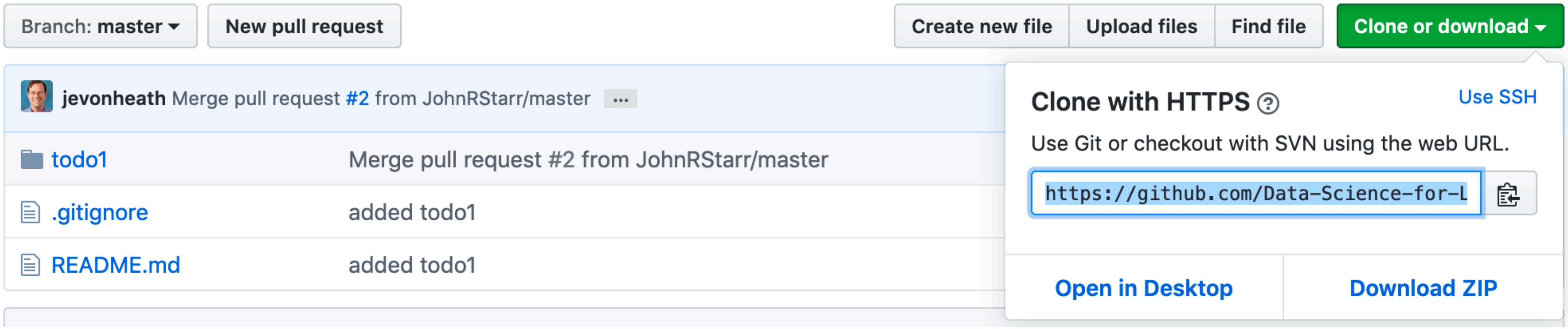
○ **Private**
You choose who can see and commit to this repository.

Skip this step if you're importing an existing repository.

☑ **Initialize this repository with a README**
This will let you immediately clone the repository to your computer.

Cloning first GitHub repo

- GitHub shows a URL to use in cloning. Copy to clipboard.



jevonheath Merge pull request #2 from JohnRStarr/master ...

todo1	Merge pull request #2 from JohnRStarr/master
.gitignore	added todo1
README.md	added todo1

Clone with HTTPS ?

Use Git or checkout with SVN using the web URL.

https://github.com/Data-Science-for-L

- In Terminal/Git Bash, move into your Data_Science/ directory (use `cd` command,) then execute:

```
git clone https://github.com/yourid/practice-repo.git
```

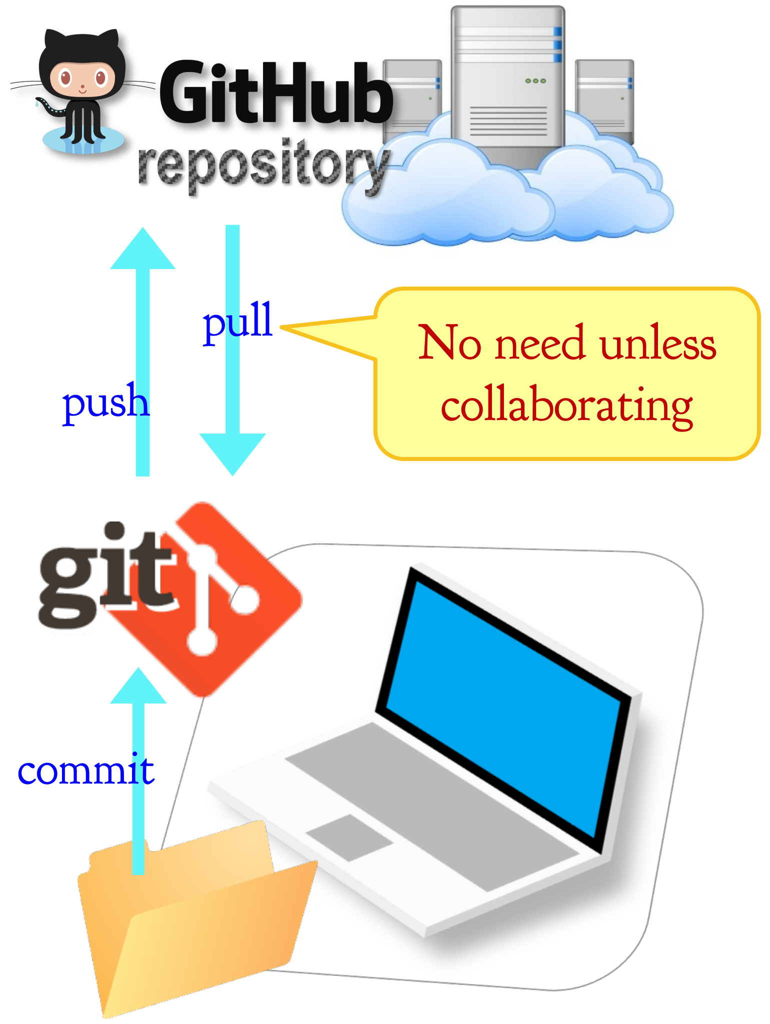
← practice-repo directory is cloned as a local repository.

Local repository ↔ remote repository

- After committing, you now need to *push* to remote repo.
  1. Create a new text file 'notes.txt'
  2. Add files to be committed:
     `git add notes.txt`
  3. Commit:
     `git commit -m "first commit"`
  4. Push change to GitHub: **`git push`**
  5. Edit the text file
  6. Add files to be committed:
     `git add notes.txt`
  7. Commit:
     `git commit -m "changed x, y, z"`
  8. Push change to GitHub: **`git push`**

Check frequently:

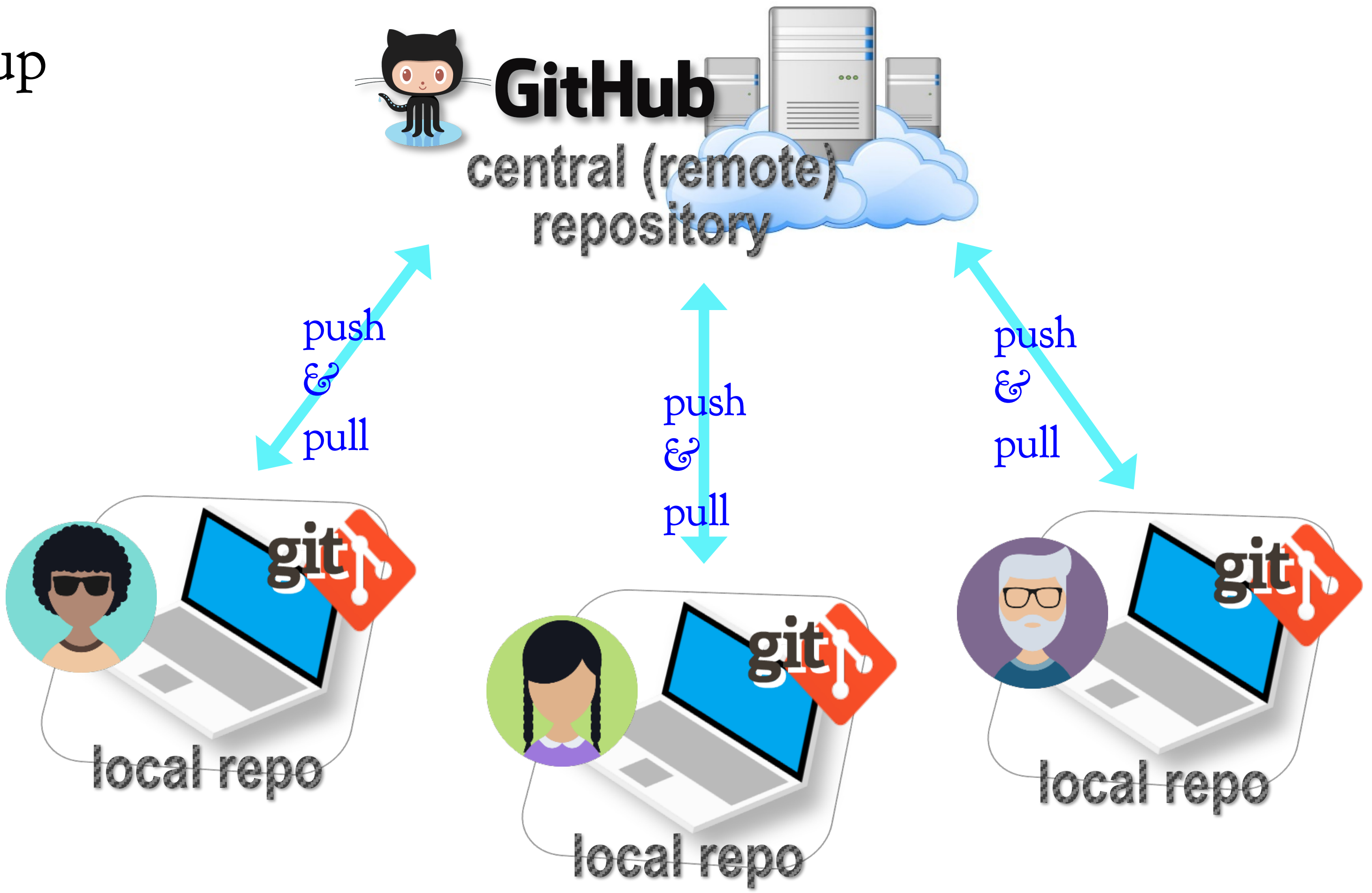
```
git status
git diff
git log
```



*Avatar icons by [FLATICON]

GitHub: a *social*, remote repository

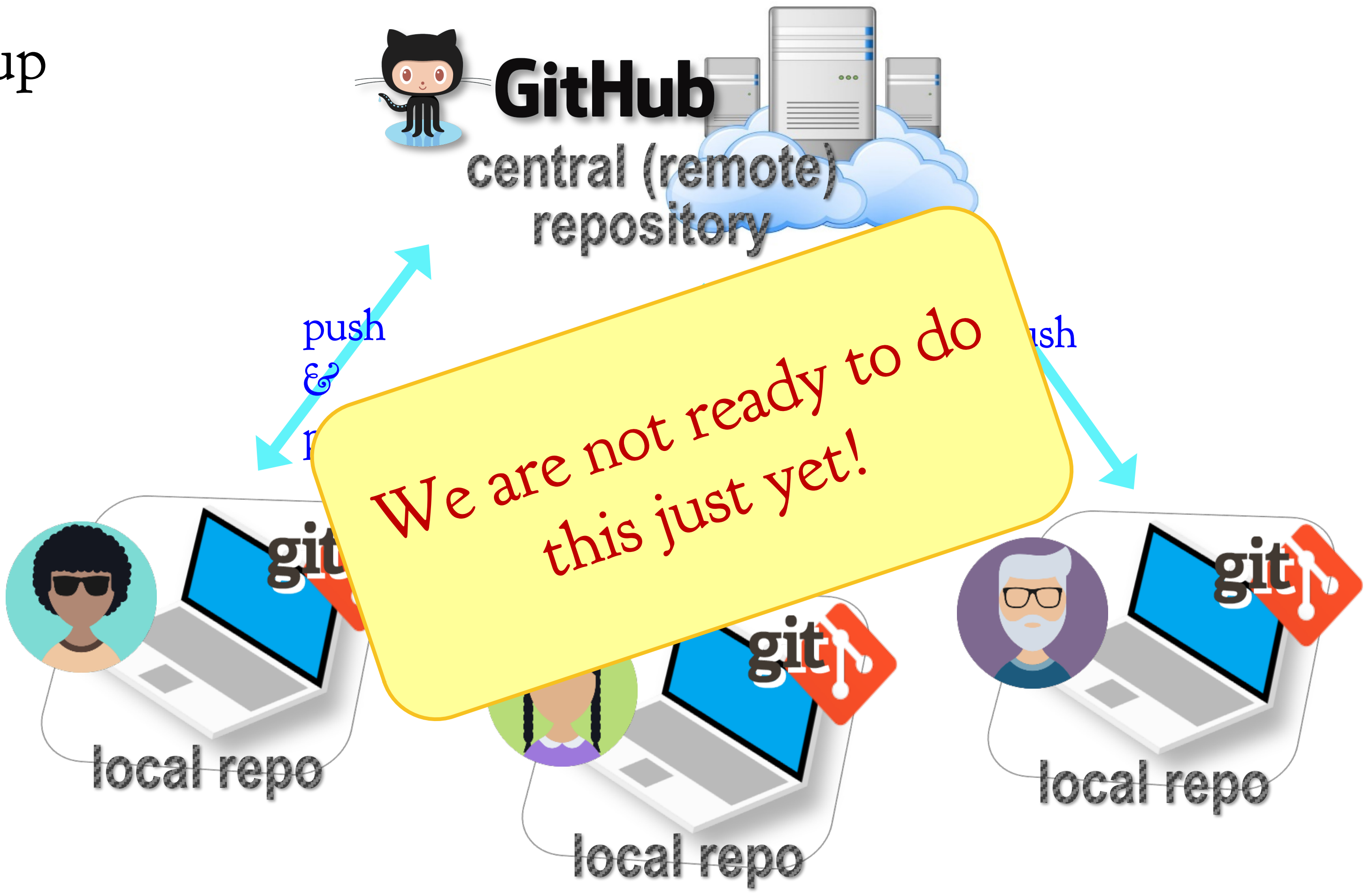
- GitHub also works as a central remote repository among a group of collaborators working on a shared project.
  - Everyone works on their own local copy of the repository, making changes.
  - Git is able to keep track and merge changes submitted by everyone.



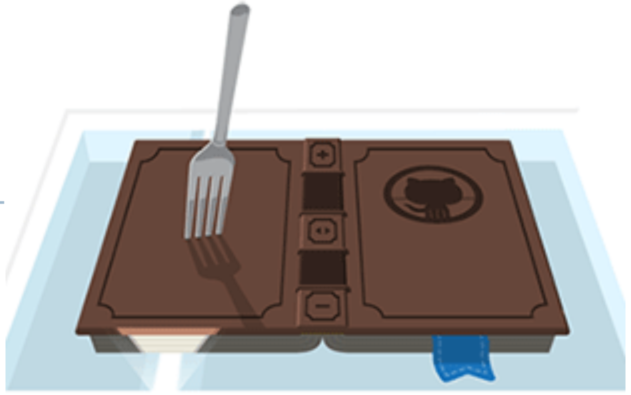
GitHub: a *social*, remote repository

*Avatar icons by FLATICON

- GitHub also works as a central remote repository among a group of collaborators working on a shared project.
  - Everyone works on their own local copy of the repository, making changes.
  - Git is able to keep track and merge changes submitted by everyone.
  - Everyone is an equal collaborator with push (=write) access.


GitHub
central (remote) repository
push & p
ush
git
local repo
local repo
local repo
We are not ready to do this just yet!

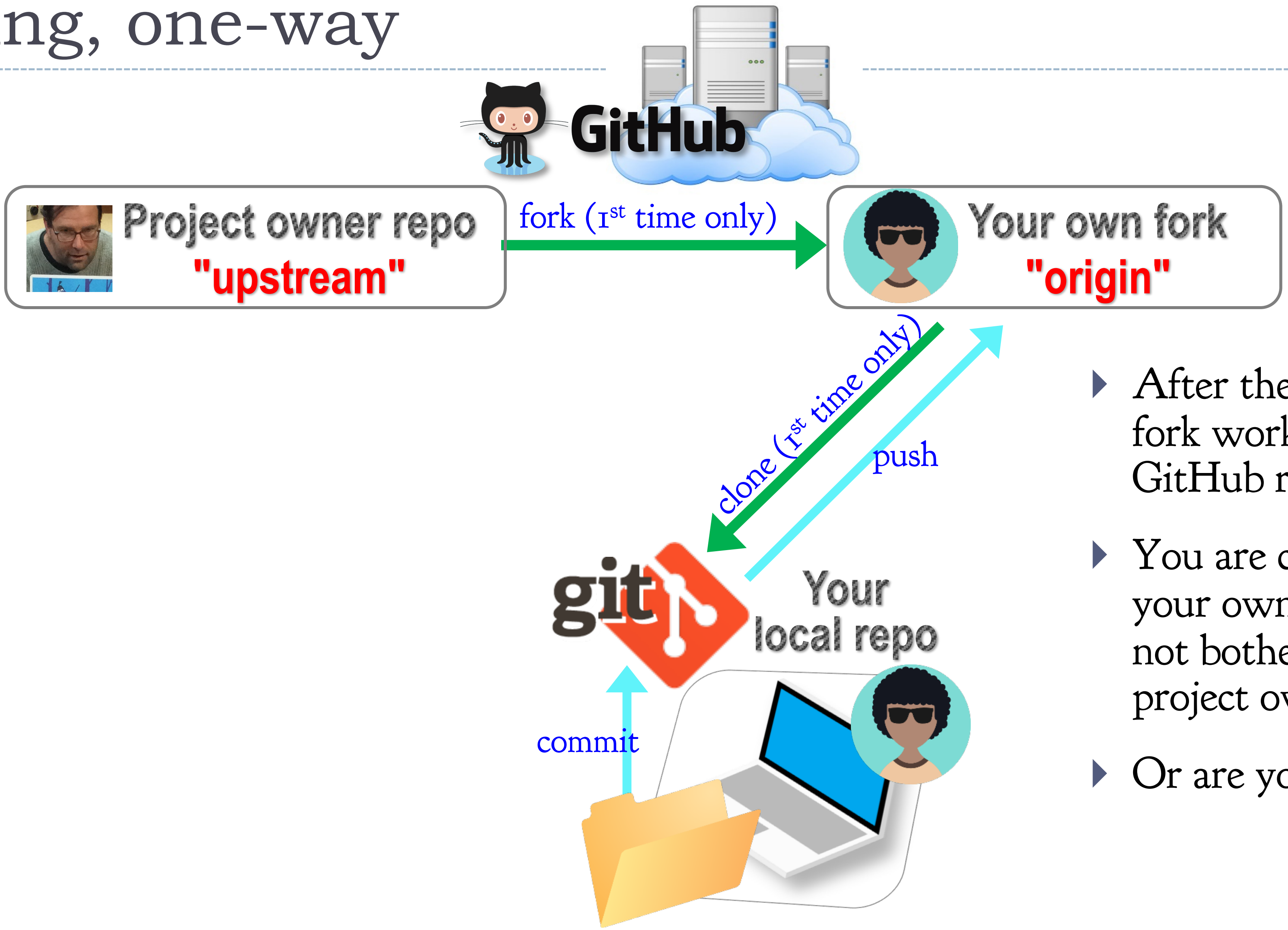
But first, forking



- When you **start with someone else's project.**
  - You are *not* a collaborator in their repo. (No push access)
- https://help.github.com/articles/fork-a-repo/
- You fork the original repo into your own GitHub account, creating your own "fork".
- You make changes in your own fork. The original repo is not affected!

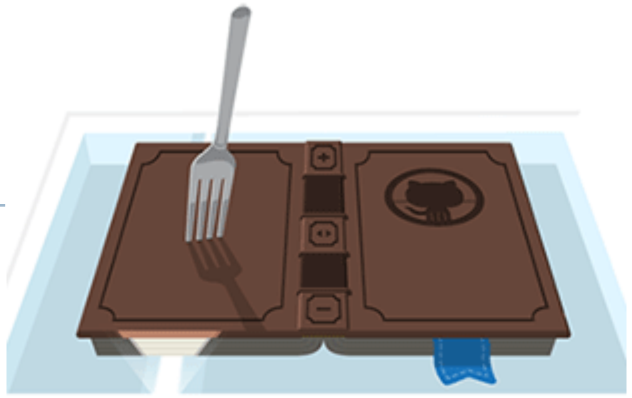
*Avatar icons by FLATICON

Forking, one-way



- After the spin-off, your fork works as if your own GitHub repo.
- You are content to do your own development, not bothering the original project owner…
- Or are you??

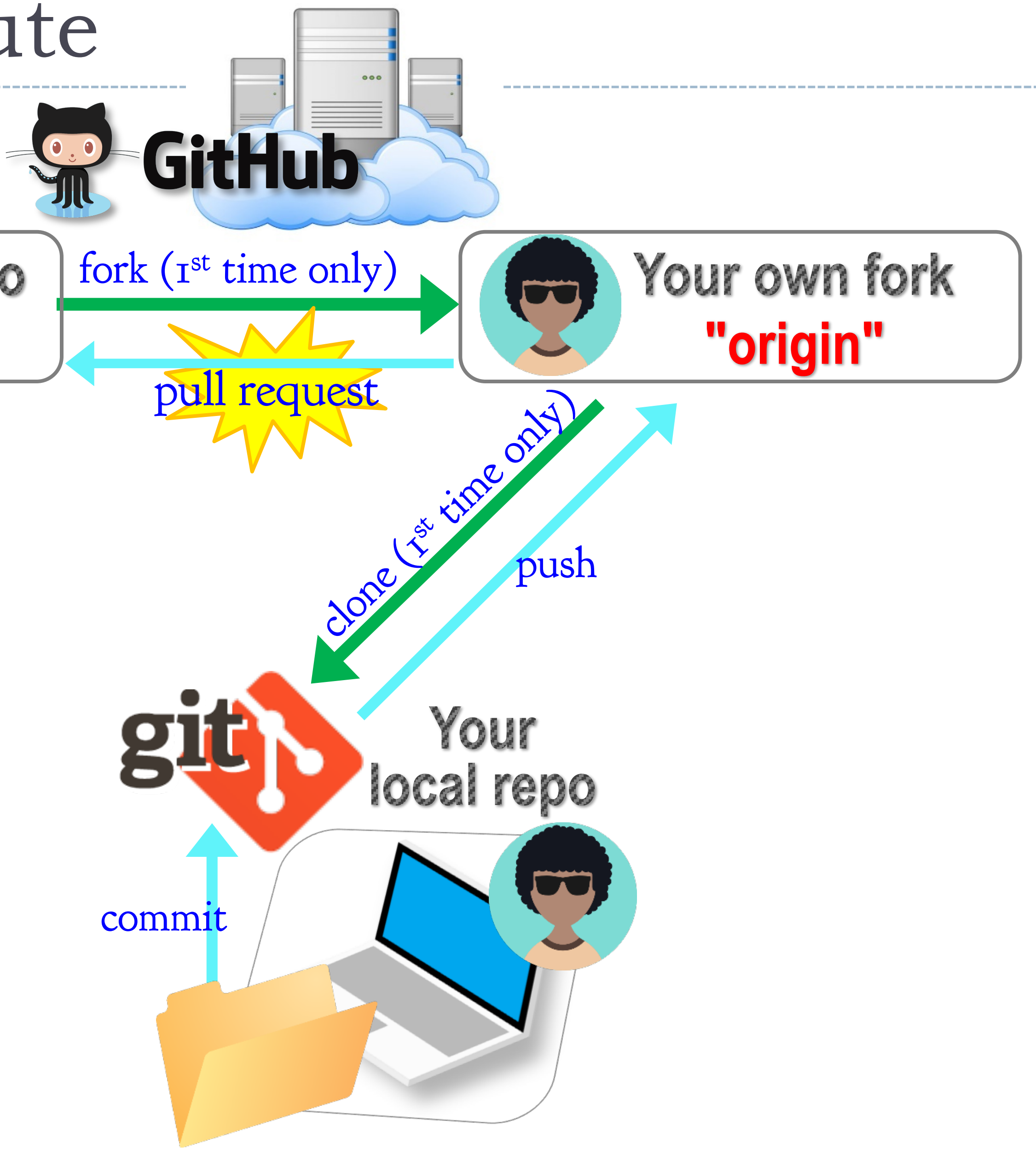
Forking: contributing back



- When you **start with someone else's project.**
  - You are *not* a collaborator in their repo. (No push access)
- https://help.github.com/articles/fork-a-repo/
- You fork the original repo into your own GitHub account, creating your own "fork".
- You make changes in your own fork. The original repo is not affected!
- pull request: When you think the original project could benefit from your new work, you ask the owner to "pull" from your fork.
  - Owner of original ("upstream") will review your contribution, and then either merge it or reject it.

*Avatar icons by [FLATICON]

Offering to contribute



- Will the project owner like what you did?
  - If so, they will accept the pull request and merge, updating their repo.
  - If not, they will reject the request.

Your first fork

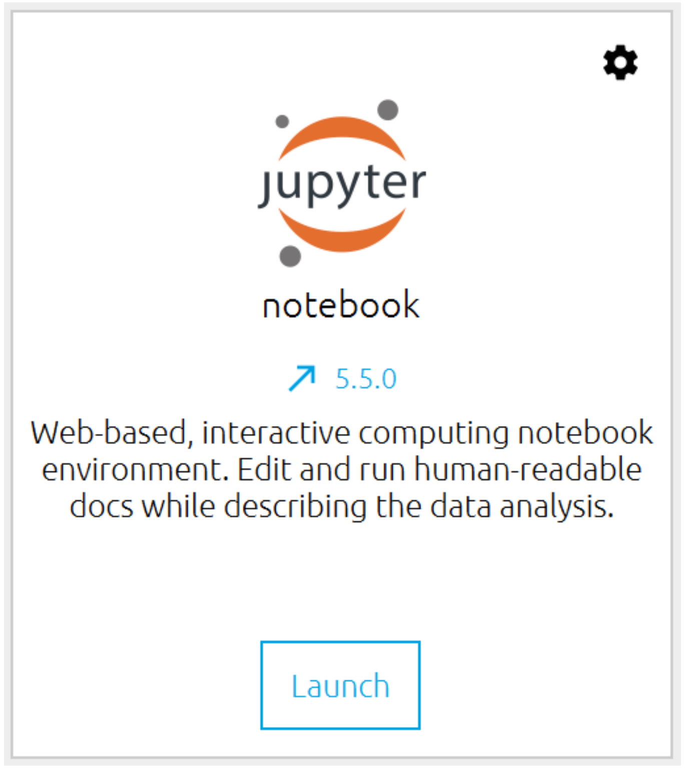
- On **GitHub**:
  1. Go to our organization's profile.
  2. Fork "Class-Exercise-Repo". You will now have the exact same content in your own account.
- On your **laptop**:
  1. Move into your (`Data_Science/`) directory. Clone your fork there via git clone.
  2. Copy over your To-Do1 submission file into `todo1/` directory. Make sure the file name has your name in it: lingdata_jevon.txt etc.
  3. Add, commit, and then push to your fork.
- Back on **GitHub**:
  1. Confirm your GitHub fork now has your submission file.
  2. Create a **pull request** for Jevon.

Jupyter Notebook

- Allows you to create and share documents that contain live code, equations, visualizations and explanatory text.
- Learn how to use it. Your Python code should be in the Jupyter Notebook format:
  - xxxx.ipynb
- You can launch it from the command line.
  - Move into the desired directory, and then execute

```
jupyter notebook &
```

← '&' is not necessary, but it lets you keep using the terminal



Web-based, interactive computing notebook environment. Edit and run human-readable docs while describing the data analysis.

Wrapping up

- Homework #1 is out: due on Tuesday.
  - Don't be too ambitious!

- Office hours
  - Posted on Course home page.
  - We are all happy to meet by appointment.

- Start learning:
  - Git, GitHub
  - Jupyter Notebook
  - numpy