

Logistics

- Due date
 - Pre-course survey due Friday at 11:59 PM (extra credit)
 - Practice Assignment due Friday at 11:59pm (1%)
 - Due Monday 11:59PM (will be released Friday):
 - Q1 (Canvas quiz)

Version Control

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UC San Diego



Department of Cognitive Science

jfleischer@ucsd.edu

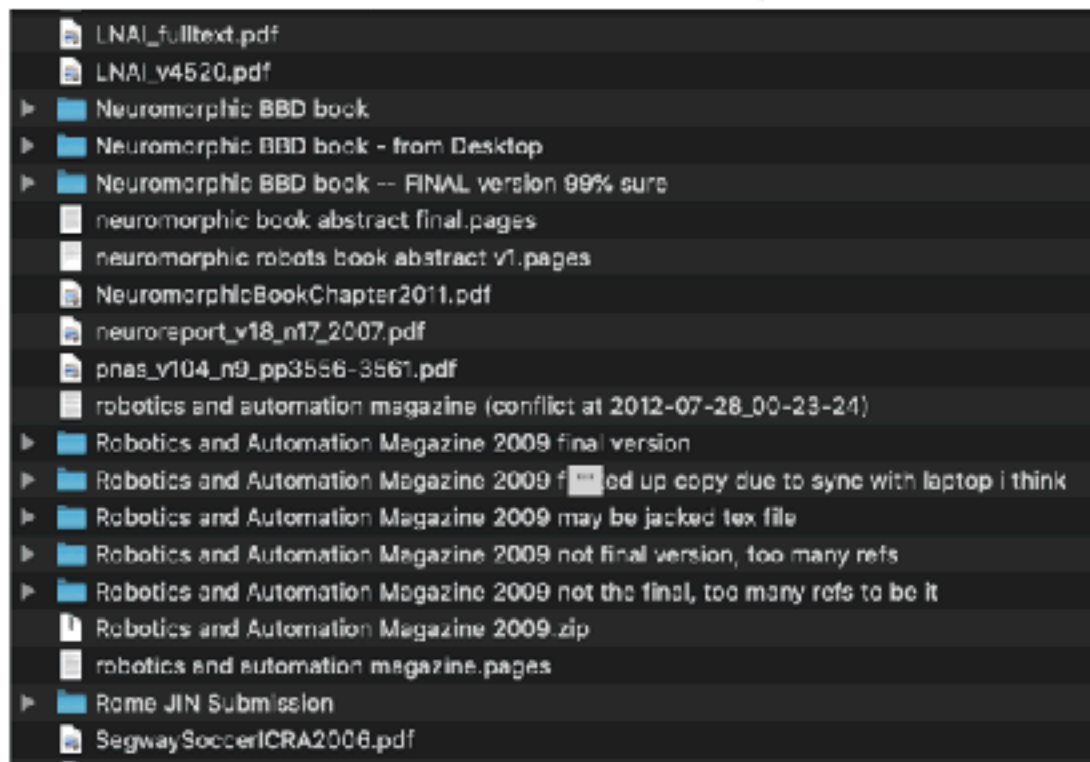
<https://jgfleischer.com>



@jasongfleischer

This sucks

archived version of my Documents folder from ~ 2012



Several months after finishing a writing project, I wanted to keep only the final version of the many different revisions... figuring out which one was the version actually sent to the publisher was hard!

Yup, this sucks too.

May 11



Thanks for chatting with me earlier today. I added the link to the visualization project into my resume, and attached the resume. Thanks for any connections you can make for me. I'd love to know where you send it, so I can keep track of that. Thanks again!

Best,

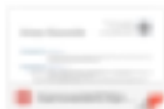


May 11



Actually, please use this one. I fixed a typo that was previously missed. Thanks!!

Best,



May 11



Final copy, please. Thanks for helping out.

Best,



This is a step in the right direction

SSSS Teacher Workshop

Considering how to incorporate data science into your high school STEM classroom?

The goal of this workshop is for you to leave with data science skills and applicable examples that can be used in your classroom.

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This workshop will answer questions like--

- What is data science?
- How can high schoolers prepare for data science courses in college?
- What does a career in data science involve?

use answer questions like--

- What is data science?
- How can high schoolers prepare for data science courses in college?
- What does a career in data science involve? what data science is, who high schoolers can do to best prepare for data science courses in college, and what a career in data science involves

4

We will walk through how data scientists carry out projects using RStudio, introduce the basics of the R programming language, and work with real datasets to generate visualizations and analyze data. The goal of this workshop is for you to leave with data science skills and applicable examples that can be used in your classroom.

Total: 9 edits

VERSION HISTORY

Only show named versions

MARCH

March 4, 3:27 AM

Current version

Shannon Olin

March 3, 9:47 AM

Shanna Leland

Shannon Olin

FEBRUARY

February 27, 5:29 AM

Shannon Olin

February 26, 5:46 PM

Shannon Olin

February 26, 4:57 PM

Shannon Olin

February 26, 3:50 PM

Kelly McConville

February 25, 3:53 PM

Shannon Olin

February 25, 3:38 PM

Shannon Olin

☒ Show changes

Version Control

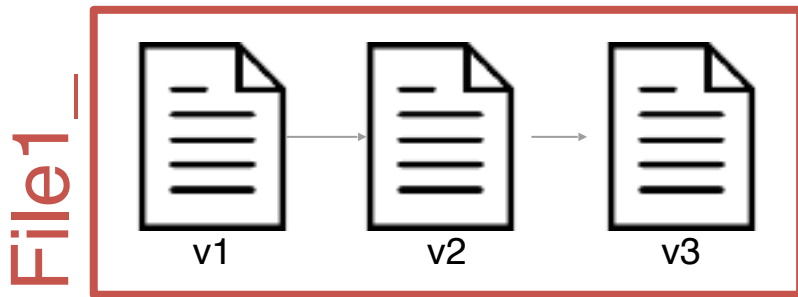
- Enables multiple people to simultaneously work on a single project.
- Each person edits their own copy of the files and chooses when to share those changes with the rest of the team.
- Thus, temporary or partial edits by one person do not interfere with another person's work

What is version control?

A way to manage the evolution of a set of files

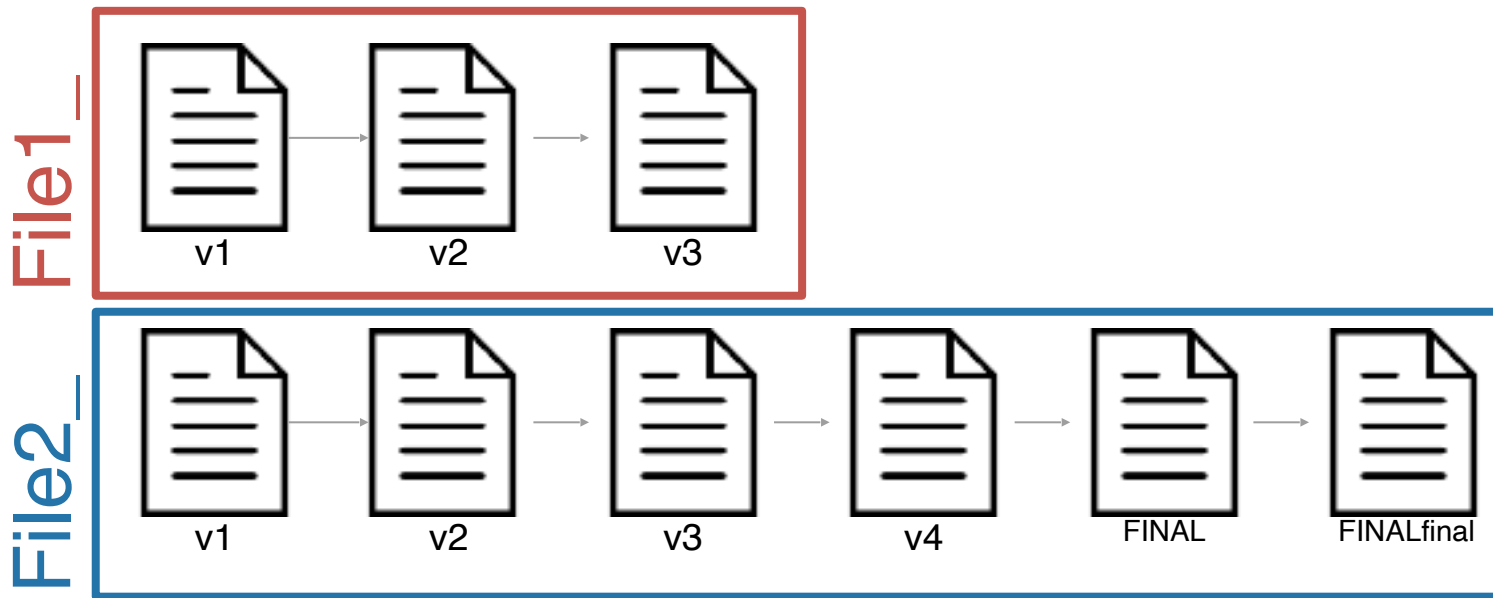
What is version control?

A way to manage the evolution of a set of files



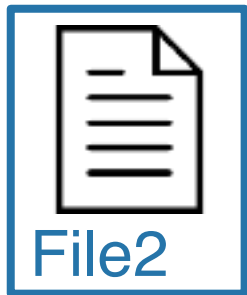
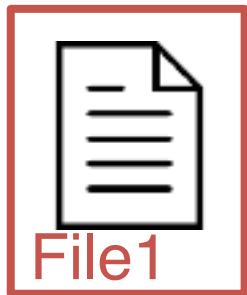
What is version control?

A way to manage the evolution of a set of files



What is version control?

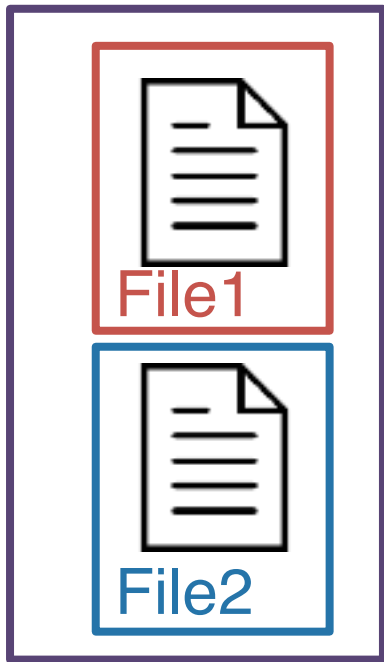
A way to manage the evolution of a set of files



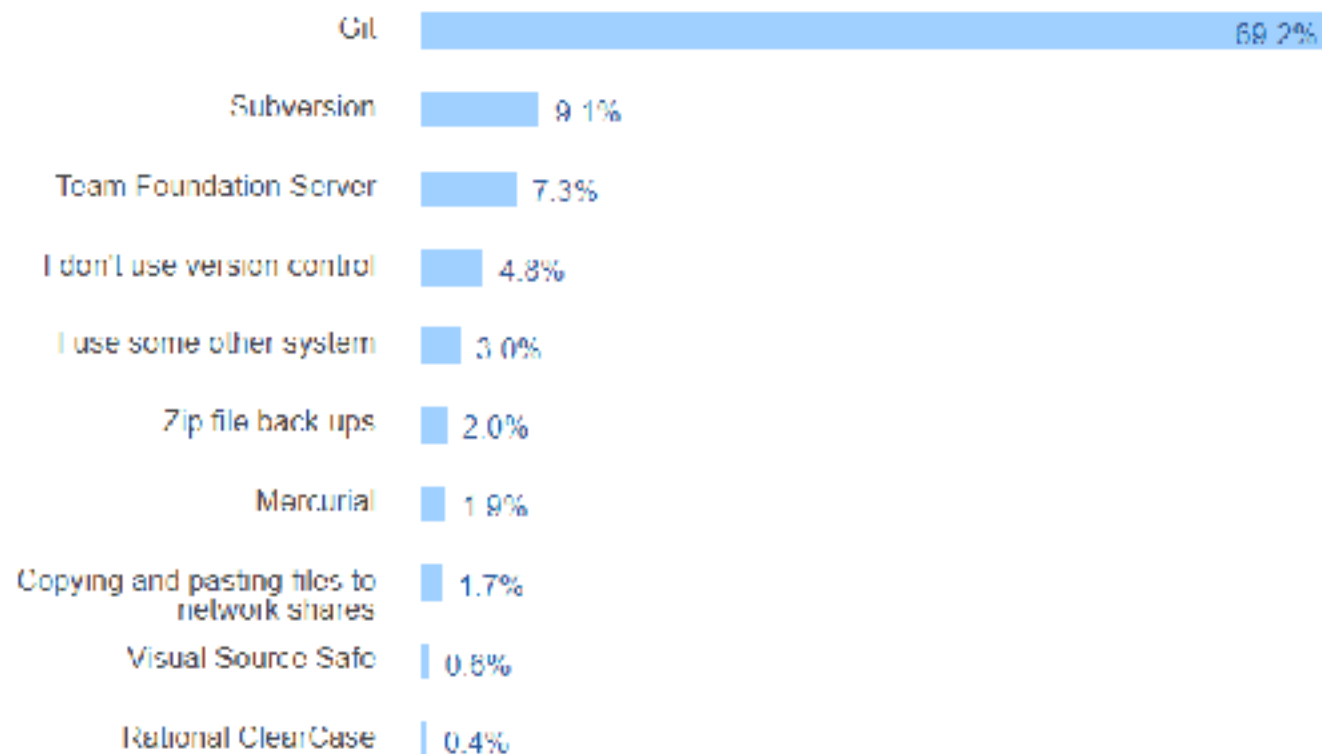
When using a version control system, you have **one copy of each file** and the *version control system tracks the changes* that have occurred over time

What is version control?

A way to manage the evolution of a set of files



The set of files is referred to as a **repository (repo)**



git & GitHub

The word "git" in a bold, lowercase, sans-serif font.

the version control system

~ Track Changes
from Microsoft
Word....on
steroids



GitHub (or Bitbucket or
GitLab) is the home **where**
your git-based projects live
on the Internet.

~ Dropbox +
social media for
programmers

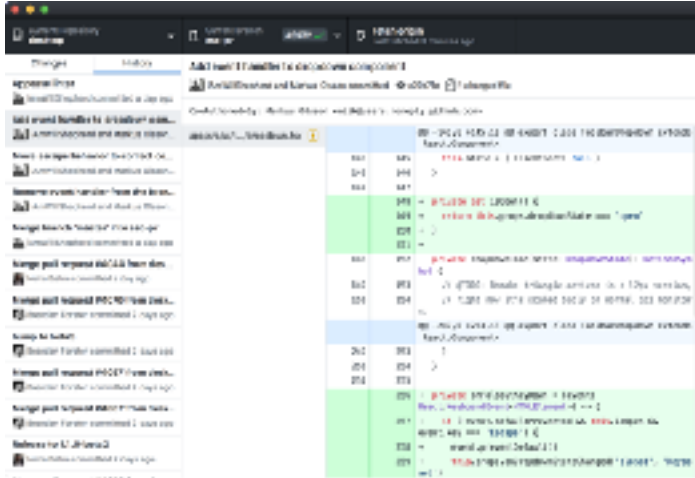
What version control looks like

```
$ git clone https://www.github.com/username/repo.git
$ git pull
$ git add -A
$ git commit -m "informative commit message"
$ git push
```

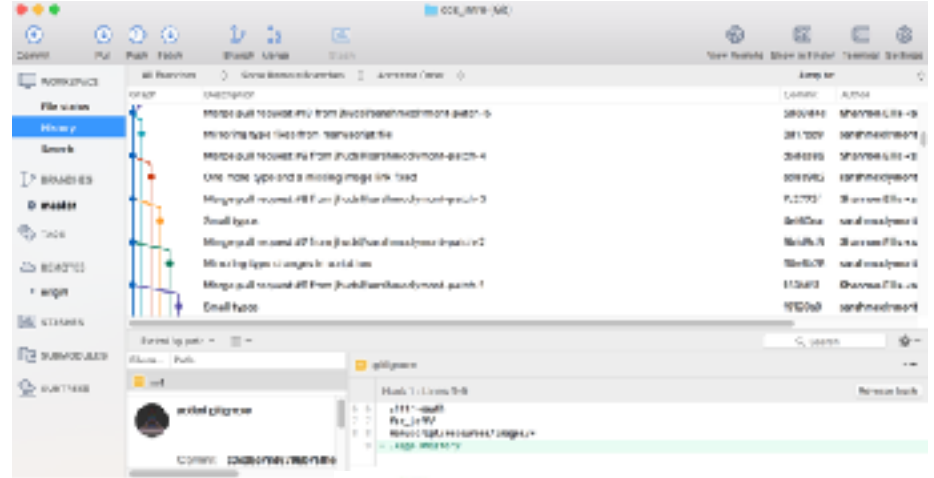
Terminal
git



GUIs can be helpful when working with version control



GitHub Desktop



SourceTree



Version Controller

How do you typically interact with git?

A. I don't

B. command line

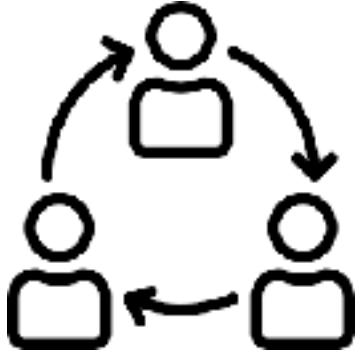
C. GUI GitHub Desktop

D. GUI: SourceTree

E. GUI: other



Why version control with git and GitHub?



Collaboration



Returning to
a safe state

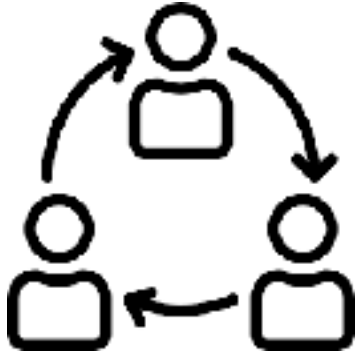


Exposure
for your
work

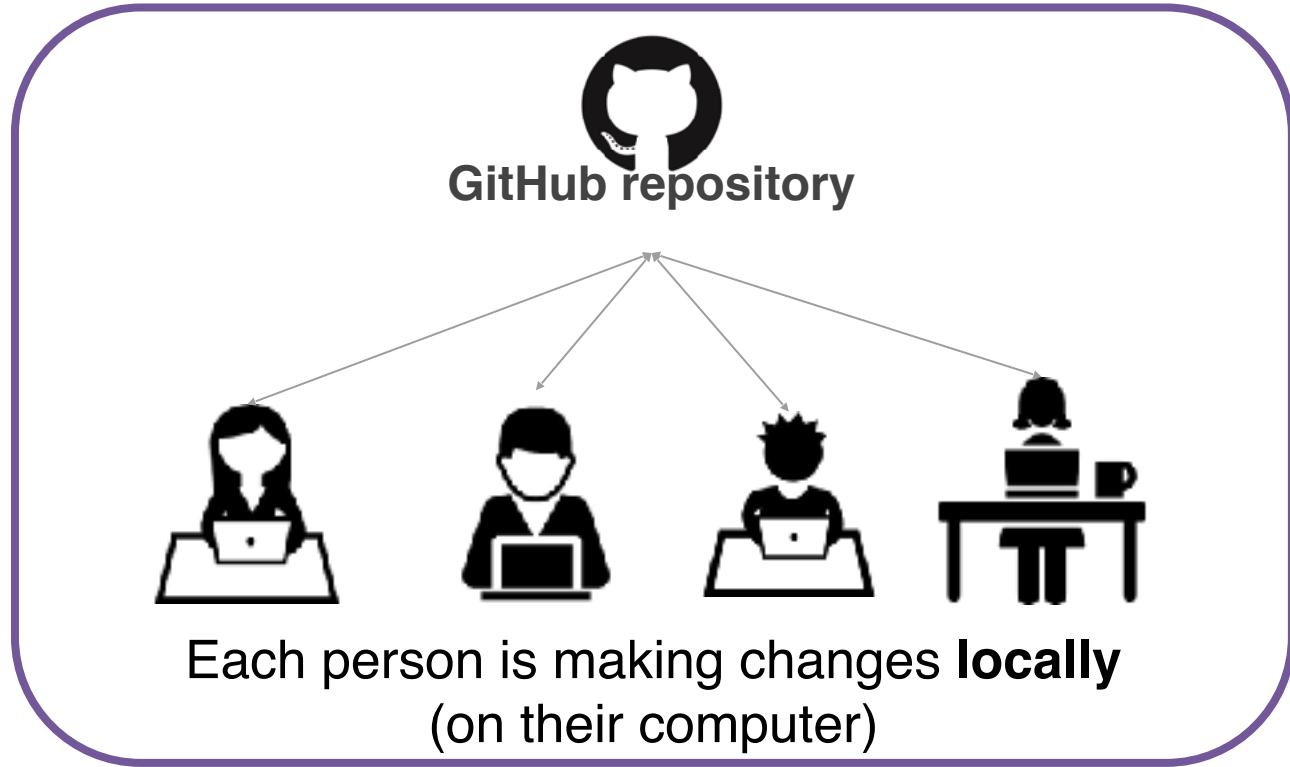


Tracking
others' work

Collaborate like you do with Google Docs



Collaboration



Make changes locally, while knowing a stable copy exists



Returning to
a safe state



You're free and safe to **try things out locally**. You'll only send changes to the repo when you're at a stable point

Your repositories will be visible to others!



Exposure
for your
work



Your public GitHub repos
are your coding social
media

And vice versa, you can search for the code you need

For instance, this might come in handy when thinking about class projects

<https://github.com/topics/datascience-projects>

[Pull requests](#)[Issues](#)[Marketplace](#)[Explore](#)[Explore](#)[Topics](#)[Trending](#)[Collections](#)[Events](#)[GitHub Sponsors](#)

#

april-fools

**DuckMasterAI / rickroll-bot**

Star

5



<> Code



Issues



Pull requests

A simple bot to rickroll your friends on Discord!

discord-bot

discord-py

april-fools

rickroll

never-gonna-give-you-up

never-gonna-let-you-down

rick-astley

discord-py-bot

Updated 2 hours ago

Python

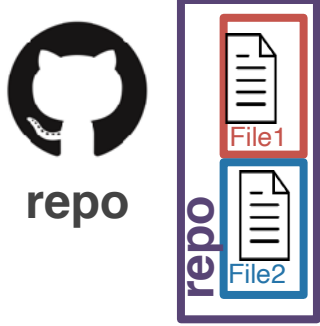
Keep up with others' work easily



Tracking
others' work



As a social platform, you
can see others' work too!

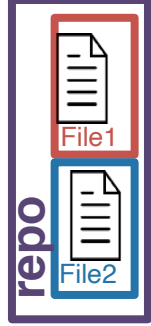


A **GitHub repo** contains all the files and folders for your project.

GitHub is a **remote host**. The files are geographically distant from any files on your computer.



repo



clone →



When you first make a copy onto your local computer (read: laptop), you **clone** the repository.



repo



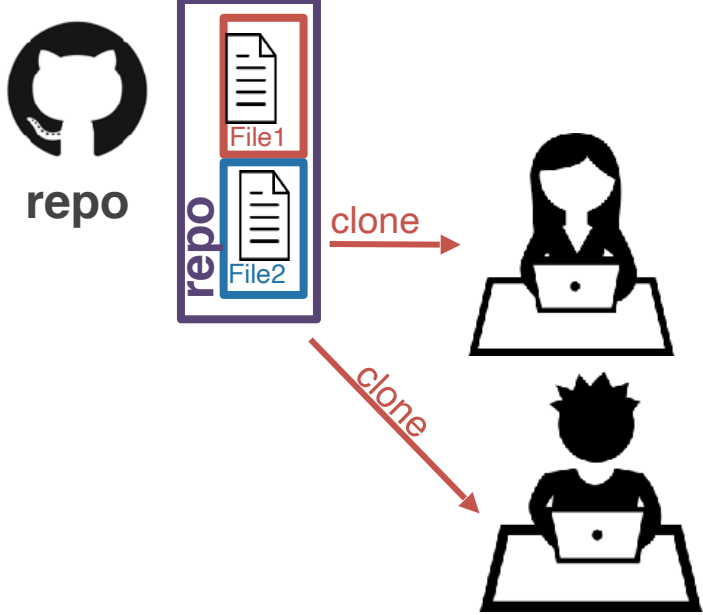
clone



clone



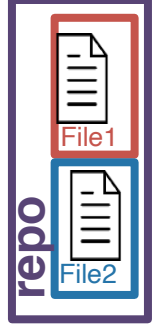
If someone else on your project cloned the repo at the same time, you would have identical copies of the project on each of your computers.



Yay! Everyone can
work on the project!



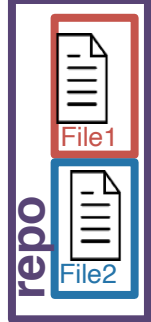
repo



You decide you want to
change some of the text
in the project.



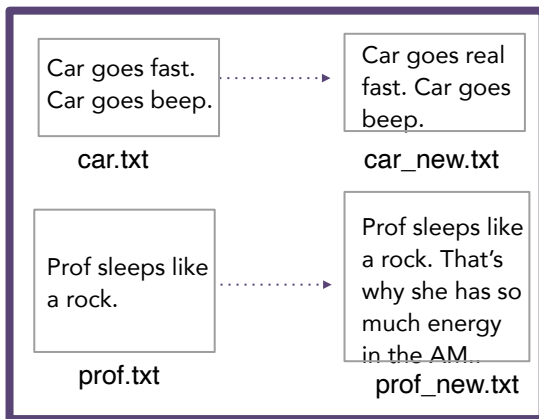
repo



You decide you want to
change some of the text
in the project.



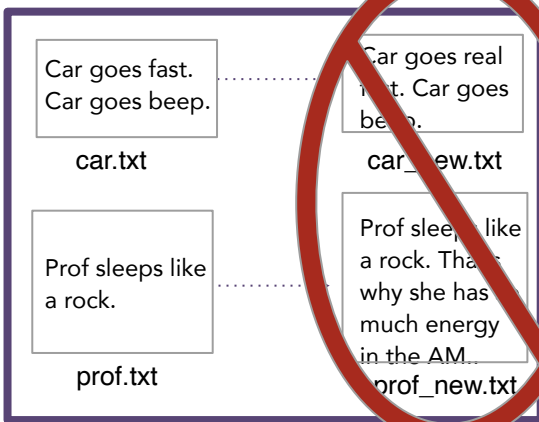
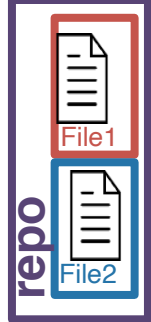
repo



without git...you'd likely rename these files....



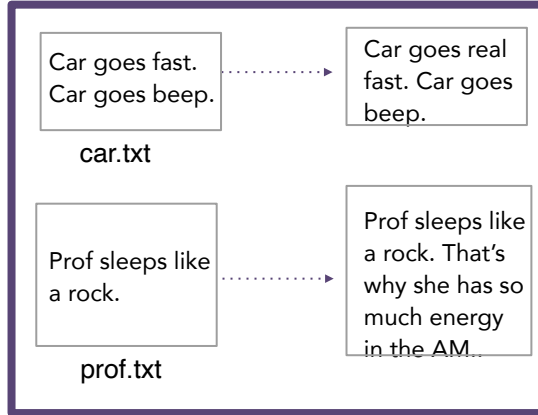
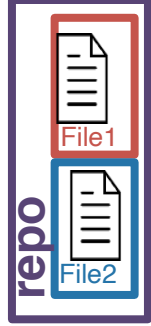
repo



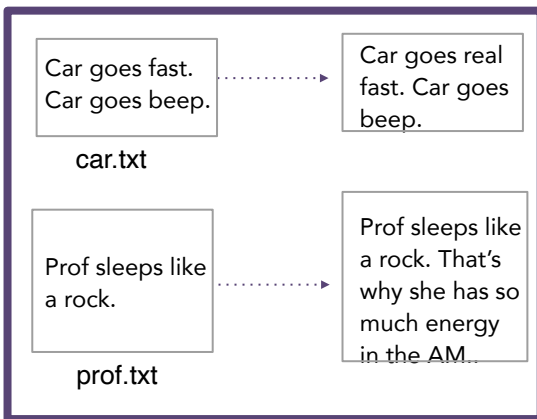
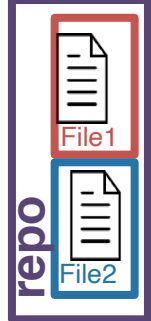
Thank
goodness those
days are over!



repo



Instead, you tell git which files you'd like to keep track of using **add**. This process is called *staging*.

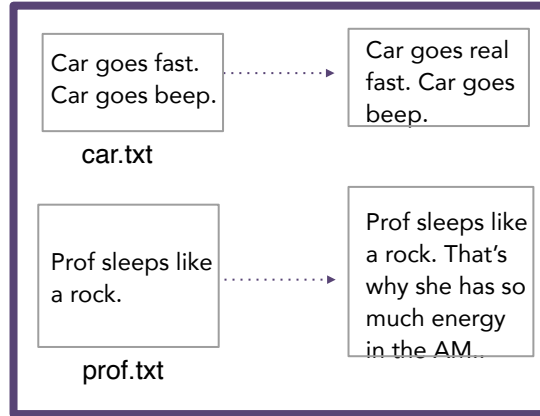


<code>git add file</code>	stages specified file (or folder)
<code>git add .</code>	stages new and modified files
<code>git add -u</code>	stages modified and deleted files
<code>git add -A</code>	stages new, modified, and deleted files
<code>git add *.csv</code>	Stages any files with .csv extension
<code>git add *</code>	Use with caution: stages everything

Instead, you tell git which files you'd like to keep track of using **add**. This process is called *staging*.



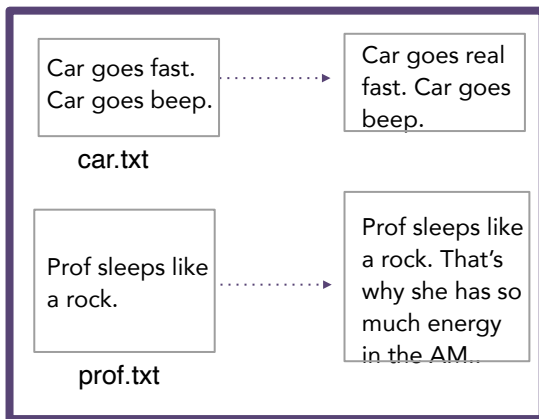
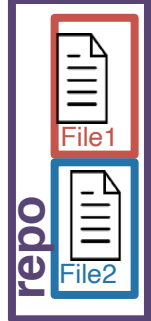
repo



Then, you create a snapshot of your files at this point. This snapshot is called a **commit**.



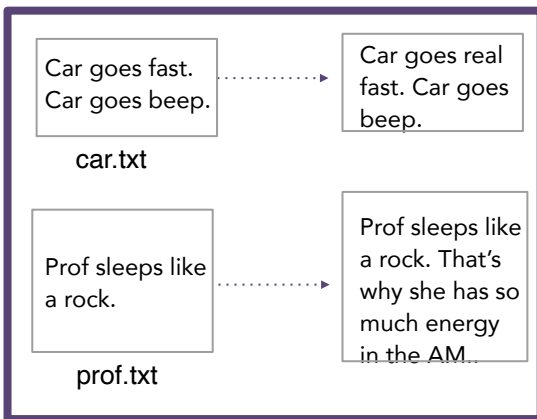
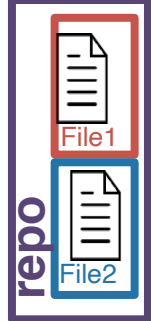
repo



Then, you create a snapshot of your files at this point. This snapshot is called a **commit**.



A **commit** tracks
who, what, and
when



You can make commits more informative by adding a **commit message**.

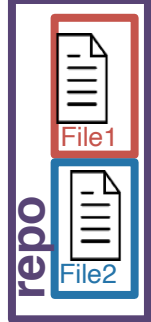
Example: `git commit -m 'fix typos in car and prof'`

Then, you create a snapshot of your files at this point. This snapshot is called a **commit**.

A **commit** tracks who, what, and when



repo



Shannon Ellis
3/28/21 3:28pm
fix typos in car and prof



repo



push

Remember, you're not the only one working on this project though! You want your teammates to have access to these changes! You **push** these changes back to the remote.

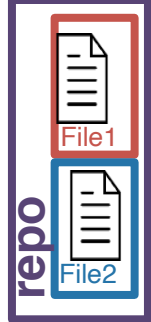


Shannon Ellis
3/28/21 3:28pm

fix typos in car and prof



repo



Shannon Ellis
3/28/21 3:28pm

fix typos in car and prof



Your teammate is still
working with the (out-
of-date) copy he
cloned earlier!

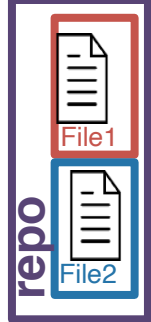


Shannon Ellis
3/28/21 3:28pm

fix typos in car and prof



repo



To catch up, your teammate will have to
pull the changes from GitHub (remote)



Shannon Ellis
3/28/21 3:28pm

fix typos in car and prof



Your teammate is still
working with the (out-
of-date) copy he
cloned earlier!

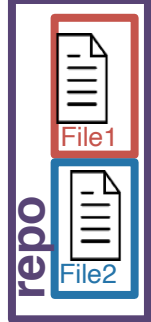


Shannon Ellis
3/28/21 3:28pm

fix typos in car and prof



repo



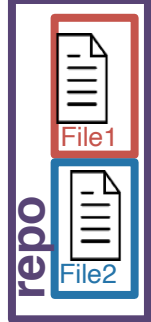
Your teammate pulls
from remote and is
now up-to-date!



Shannon Ellis
3/28/21 3:28pm
fix typos in car and prof



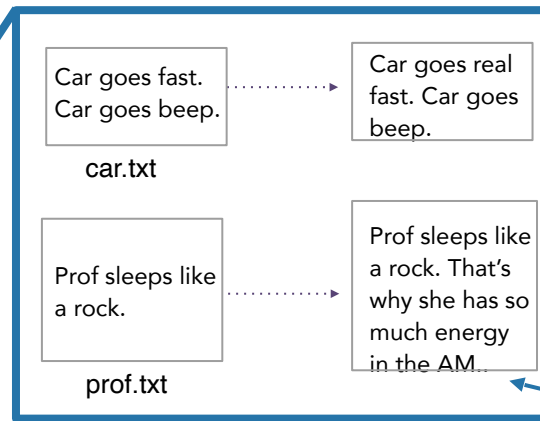
repo



pull



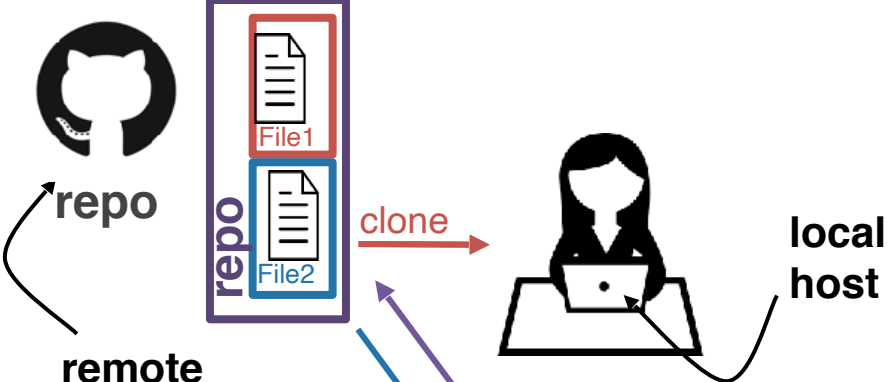
Your teammate pulls from remote and is now up-to-date!



The files in his project locally will now have the updated files

Shannon Ellis
3/28/21 3:28pm

fix typos in car and prof



remote
host

local
host

Let's recap real quick!

repo - set of files and folders for a project

remote - where the repo lives

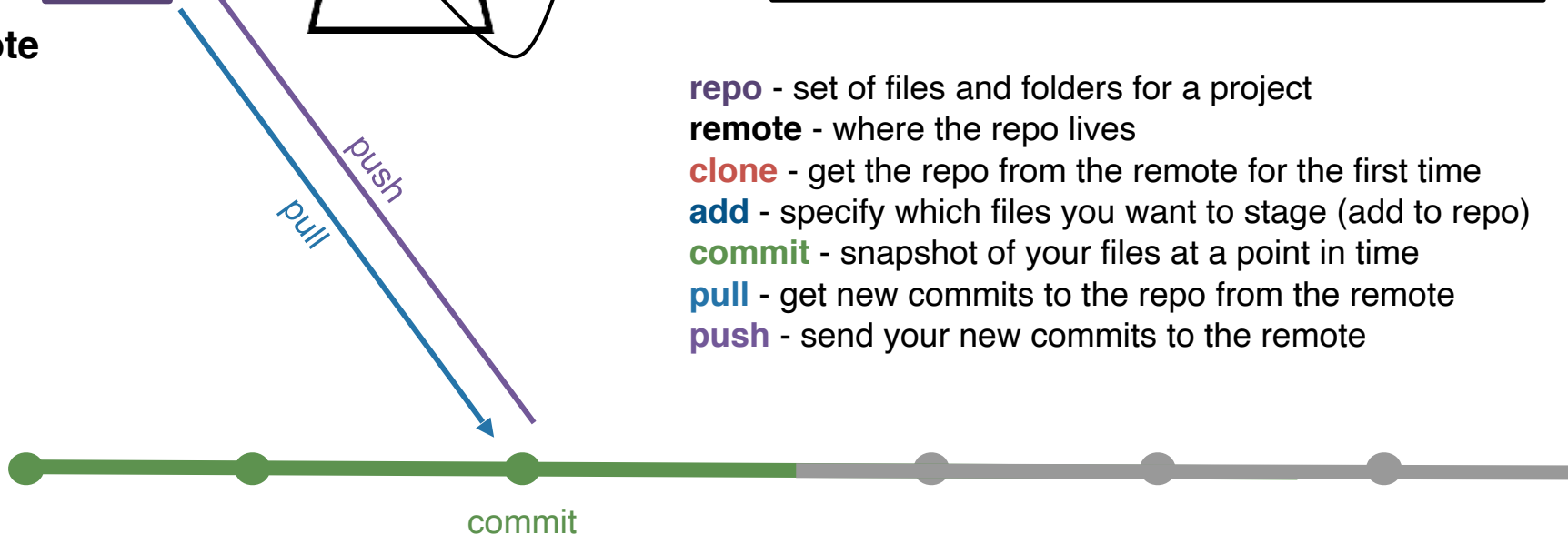
clone - get the repo from the remote for the first time

add - specify which files you want to stage (add to repo)

commit - snapshot of your files at a point in time

pull - get new commits to the repo from the remote

push - send your new commits to the remote



```
(base) sellis:Projects shannonellis$ git status
```

```
On branch master
```

```
Your branch is up to date with 'origin/master'.
```

```
Untracked files:
```

```
(use "git add <file>..." to include in what will be committed)
```

```
FinalProject_Guidelines.pdf
```

```
nothing added to commit but untracked files present (use "git add" to track)
```

```
(base) sellis:Projects shannonellis$ git add FinalProject_Guidelines.pdf
```

```
(base) sellis:Projects shannonellis$ git commit -m "update Project Guidelines"
```

```
[master 264e91a] update Project Guidelines
```

```
1 file changed, 0 insertions(+), 0 deletions(-)
```

```
create mode 100644 FinalProject_Guidelines.pdf
```

```
(base) sellis:Projects shannonellis$ git push
```

```
Counting objects: 3, done.
```

```
Delta compression using up to 8 threads.
```

```
Compressing objects: 100% (3/3), done.
```

```
Writing objects: 100% (3/3), 148.21 KiB | 29.64 MiB/s, done.
```

```
Total 3 (delta 1), reused 0 (delta 0)
```

```
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
```

```
To https://github.com/COGS108/Projects.git
```

```
6931768..264e91a master -> master
```

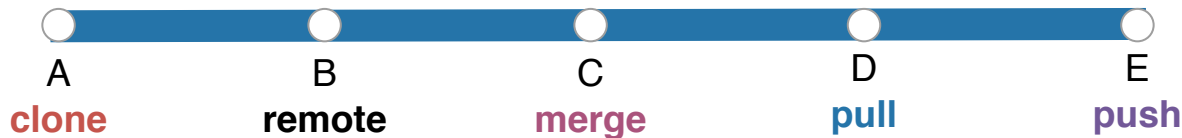
Review & Question Time



Version Controller I

You've been working with a team on a project in a repo. You've made changes locally and you want to see them on the remote.

What do you do to get them on the remote?



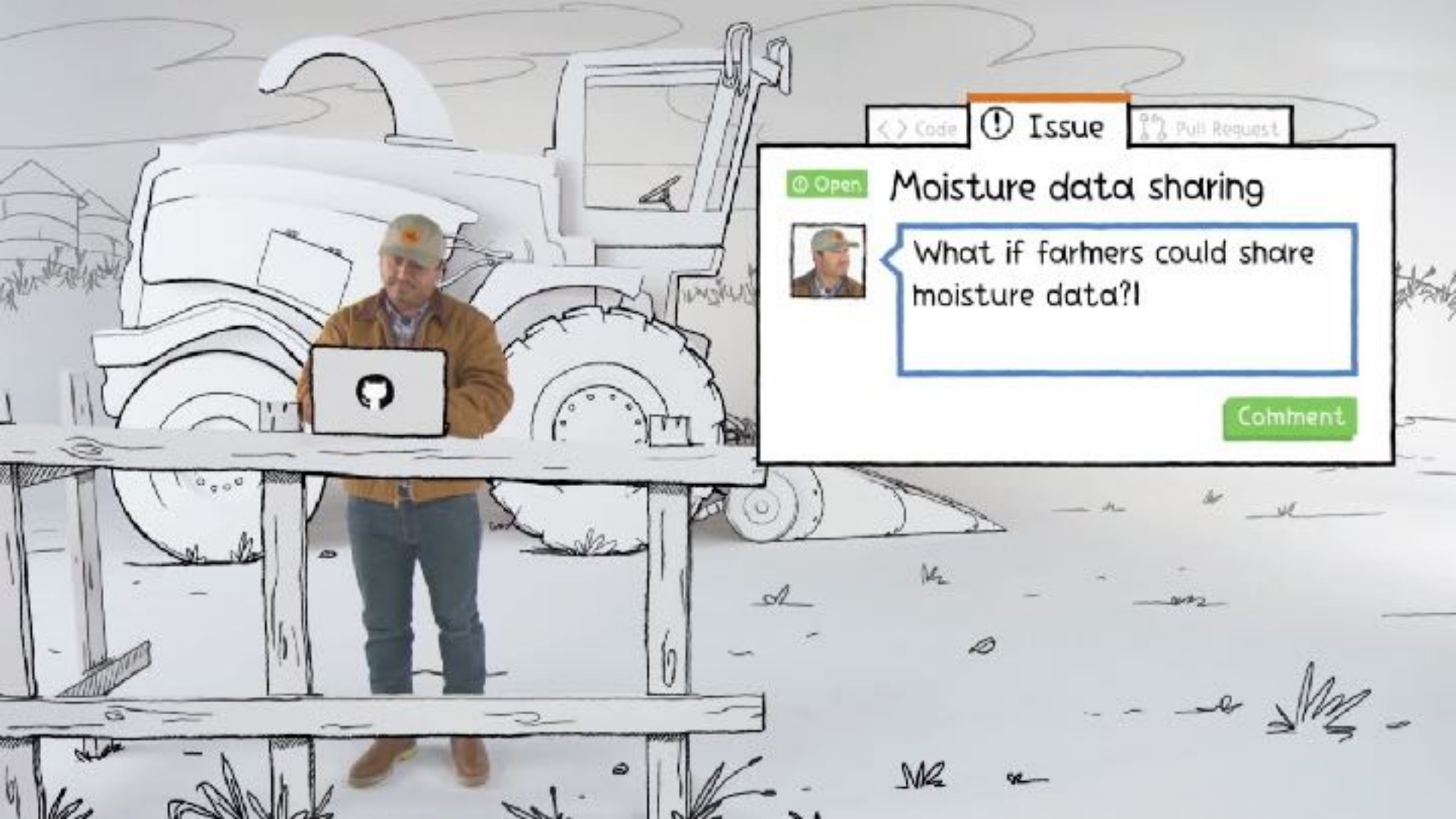


Version Controller II

Your teammate has given you access to a GitHub repository to work on a project together. You want to get them for the first time on your computer locally.

What do you do to get the repo on your computer?





< > Code

! Issue

🔑 Pull Request

🔓 Open

Moisture data sharing

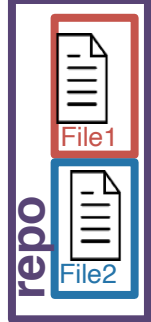


What if farmers could share moisture data?!

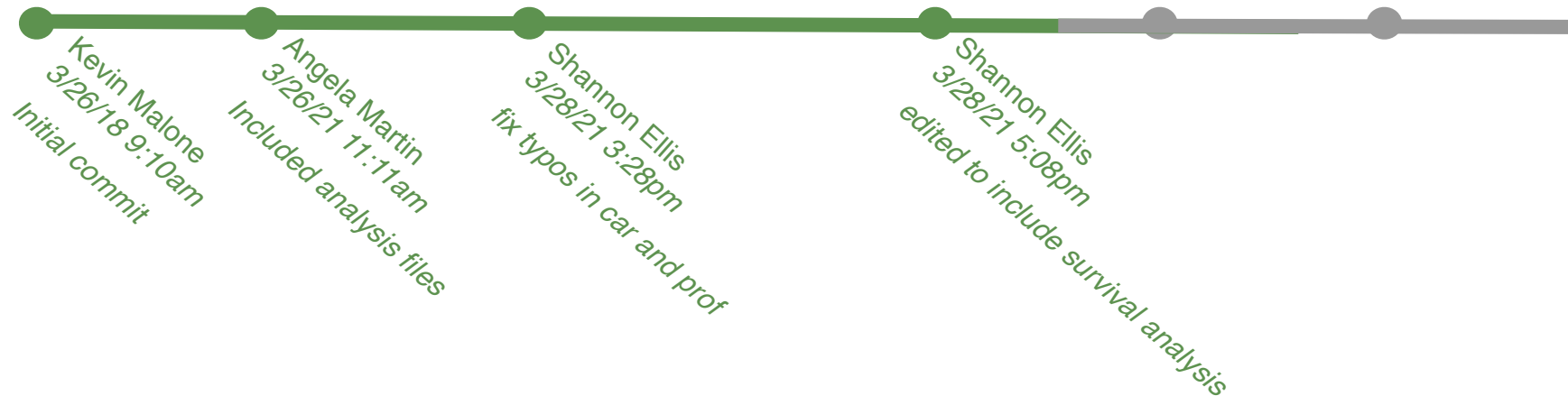
Comment



repo

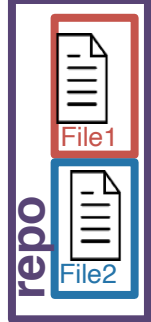


Each time you create a commit, git tracks the changes made automatically.



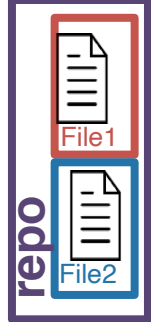


repo



By committing each time you make changes, git allows you to time travel!





By committing each time you make changes, git allows you to time travel!

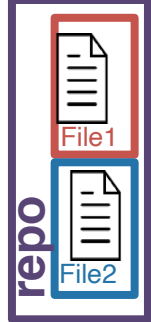


377dfcd00dd057542b112cf13be6cf1380b292ad

439301fe69e8f875c049ad0718386516b4878e22

456722223e9f9e0ee0a92917ba80163028d89251

There's a unique id, known as a **hash**, associated with each commit.

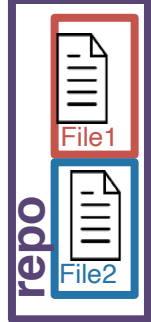


You can return to the state of the repository at any commit. Future commits don't disappear. They just aren't visible when you **check out** an older commit.

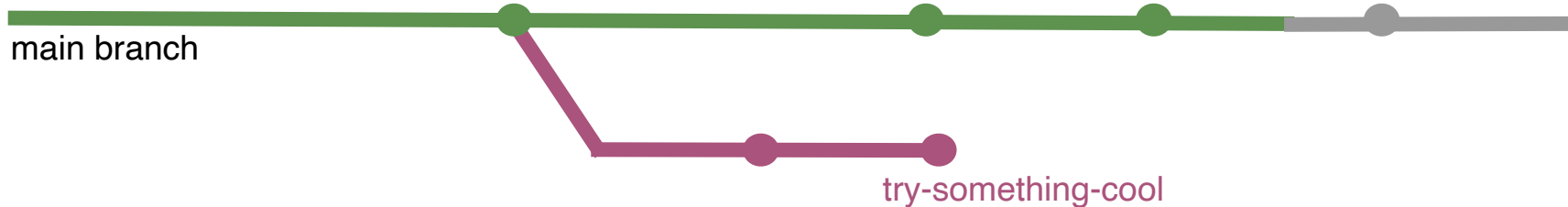


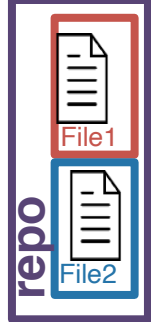
377dfcd00dd057542b112cf13be6cf1380b292ad



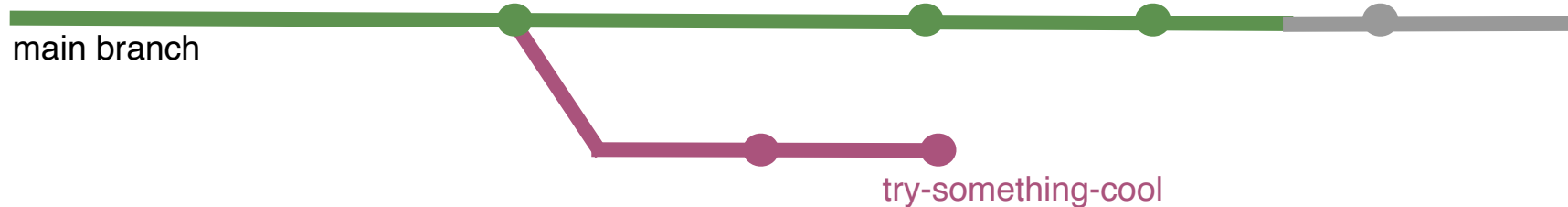


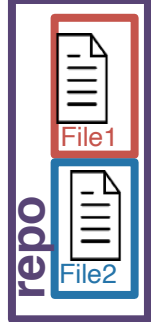
But...not everything is always linear.
Sometimes you want to try something out
and you're not sure it's going to work.
This is where you'll want to use a **branch**.



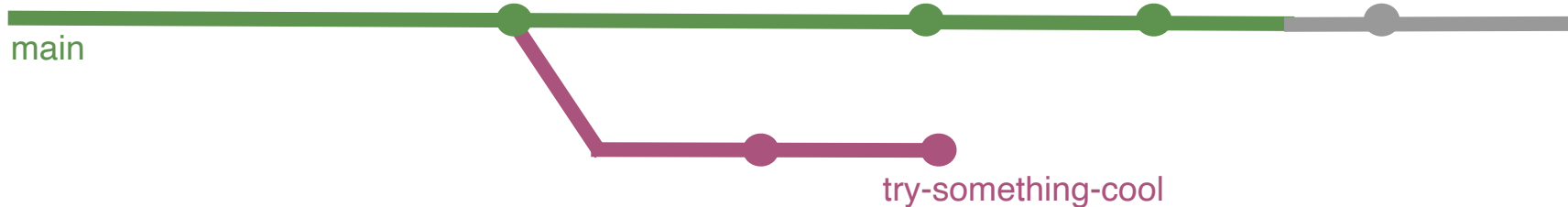


It's a good way to experiment. It's pretty easy to get rid of a branch later on should you not want to include the commits on that branch.



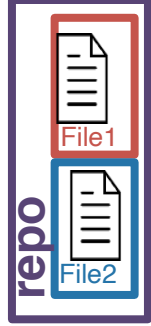


But...what if you DO want to include the changes you've made on your try-something-cool branch into the **main** branch?





repo

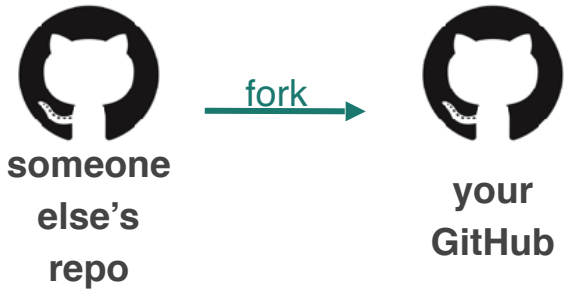


main

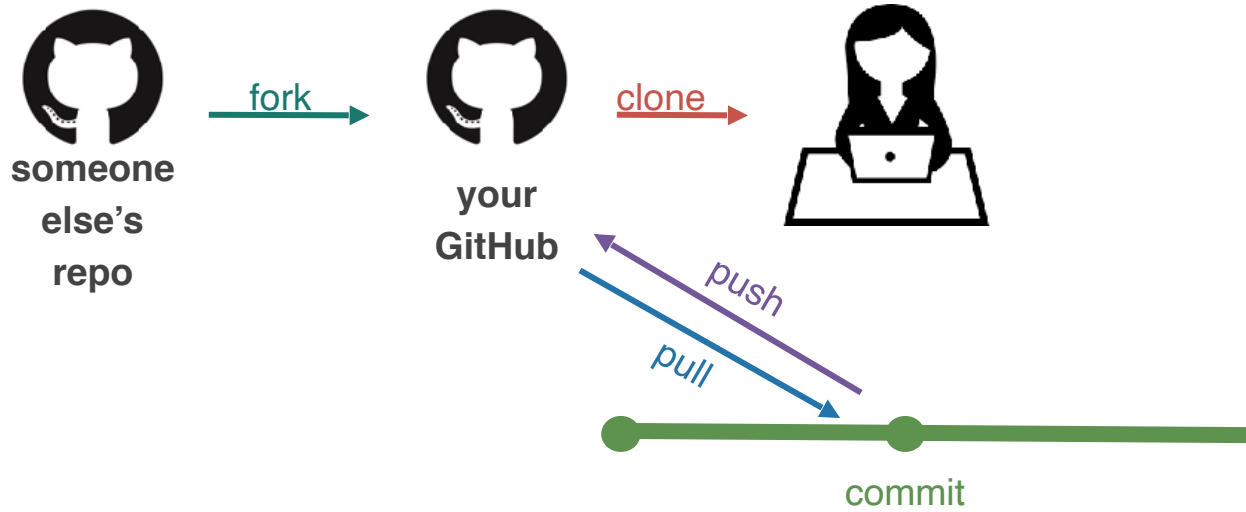
try-something-cool

A **merge** allows you to combine the commits from a branch back into the main.

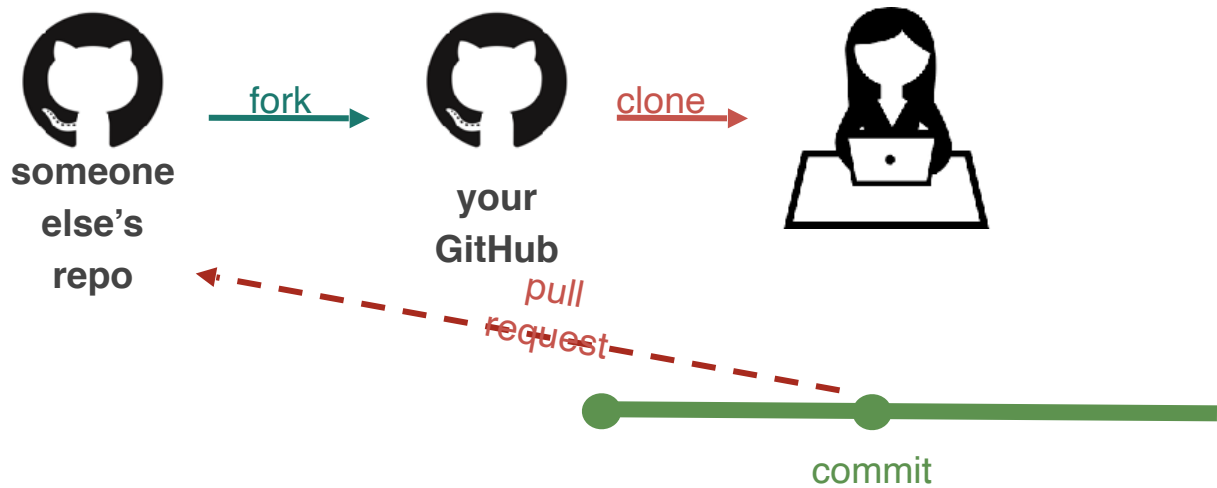




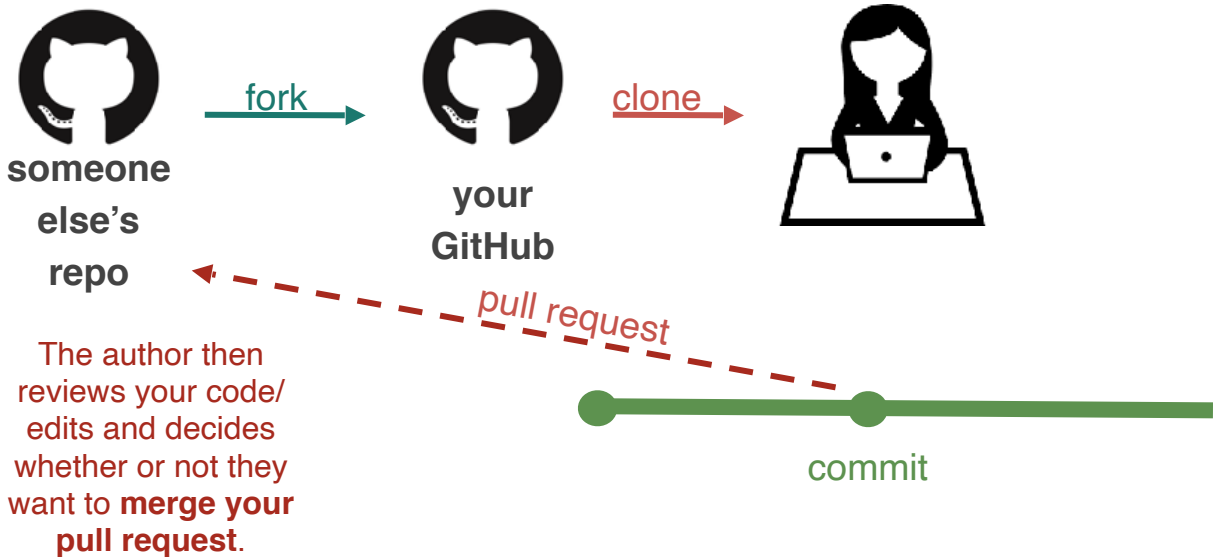
What if someone else is working on something cool and you want to play around with it? You'll have to **fork** their repo.



After you fork their repo, you can play around with it however you want, using the workflow we've already discussed.



But what if you think you've found a bug in their code, a typo, or want to add a new feature to their software? For this, you'll submit a **pull request** (aka **PR**).



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someone
else's
repo

Last but not least...what if you find a bug in someone else's code OR you want to make a suggestion but aren't going to submit a suggestion with a PR. For this, you can file an **issue** on GitHub.



someone
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Issues are *bug trackers*.

While, they can include bugs, they can also include feature requests, to-dos, whatever you want, really!

They can be assigned to people.

They can be closed once addressedor if the software maintainer doesn't like the suggestion



One more git recap...



One more git recap...



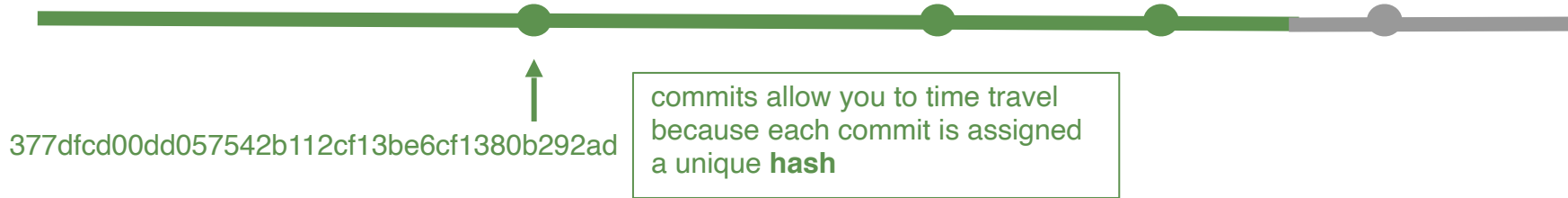

someone
else's
repo

fork →


your
GitHub

You can work on others' repos by first **forking** their repository onto your GitHub

One more git recap...



fork →



You can work on others' repos by first **forking** their repository onto your GitHub

Pull requests allow you to make specific edits to others' repos

Issues allow you to make general suggestions to your/others' repos

One more git recap...

Review & Question Time

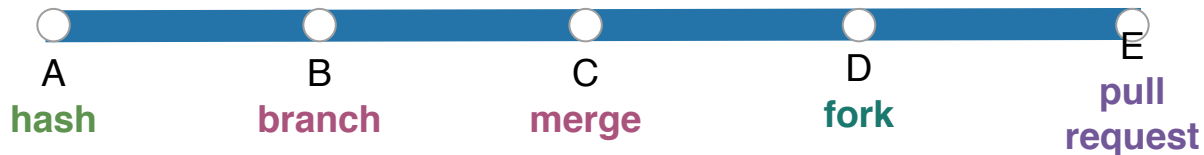


Version Controller III

<https://forms.gle/eyxgHB3wvqmy17uR9>

To experiment within your own repo (test out a new feature, make some changes you're not sure will work)...

what should you do?

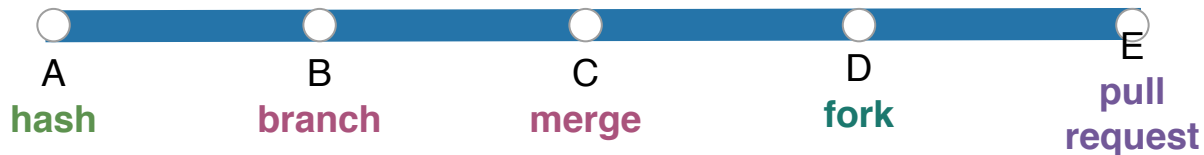




Version Controller IV

<https://forms.gle/eyxgHB3wvqmy17uR9>

If you've made edits to someone else's repo that you're not a collaborator on...
what would *they* have to do to incorporate your changes?



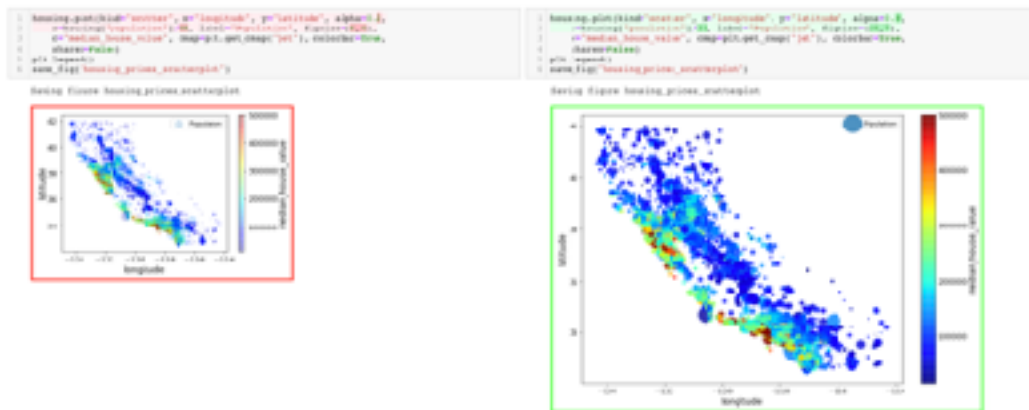


Jupyter notebooks suck to version control

<https://nextjournal.com/schmudde/how-to-version-control-jupyter>

ReviewNB

ReviewNB is a GitHub app that also offers visual diffing with an interface that looks similar to the traditional Jupyter IDE. Because the outputs are visualized, problems associated with committing binary blobs disappear.



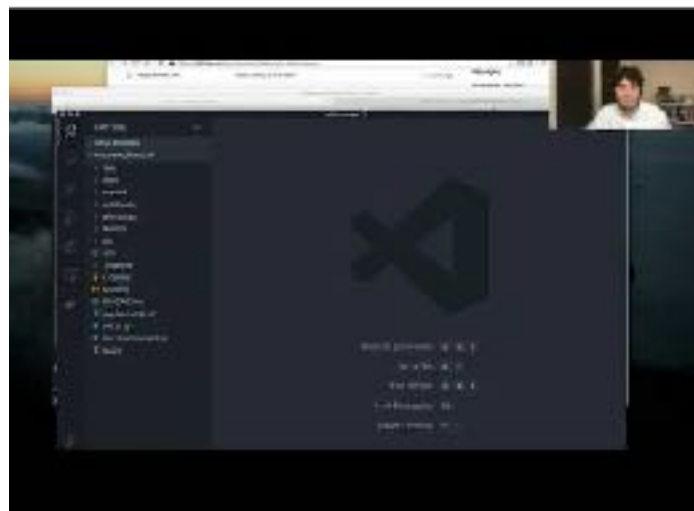
ReviewNB example courtesy of the ReviewNB website

More options

nbautoexport

docs: stable | py3: v0.5.0 | conda-forge: v0.5.0 | tests: passing | codecov: 99%

Making it easier to code review Jupyter notebooks, one script at a time.



- jupy
+ text

Using text notebooks

Docs

- nbautoexport makes it easy to convert Jupyter notebooks to text
- The Jupyter notebook is a text file, so you can use the same tools to review it
- nbautoexport also converts the output of the notebook to a text file, so you can review the results of the code
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Version Control: Practice

Please do not put assignments on GitHub.

- Discussion Lab 1: Part 3
- Assignment 1: Part 1
 - This will get you practice with git & GitHub
 - Understand what you're doing in the assignment!
 - You may have to google, ask others, spend some time with this!
 - Part II is a Python review; each part of this assignment is self-contained
 - Do this part of the assignment ASAP
- git & Github == How to get the course lectures/materials
 - Assignment 1 will have you fork the Lectures and Project repos
 - You can keep the lectures up-to-date throughout the quarter
- you'll be using GitHub for your final projects



Git and GitHub Crash Course

<https://youtu.be/RGOj5yH7evk>

COGS 108 Final Projects

The COGS 108 Final Project will give you the chance to explore a topic of your choice and to expand your analytical skills. By working with real data of your choosing you can examine questions of particular interest to you.

- You are encouraged to work on a topic that matters to the world (your family, your neighborhood, a state/province, country, etc).
- Taboo Topics: Movie Predictions/Recommendation System; YouTube Data Analysis, Kickstarter success prediction/analysis, prediction of what makes a song popular on Spotify
Whatever is MOST popular EVER and whatever is HOTTEST RN on Kaggle

Final Project: Objectives

- Identify the problems and goals of a *real* situation and dataset.
- Choose an appropriate approach for formalizing and testing the problems and goals, and be able to articulate the reasoning for that selection.
- Implement your analysis choices on the dataset(s).
- Interpret the results of the analyses.
- Contextualize those results within a greater scientific and social context, acknowledging and addressing any potential issues related to privacy and ethics.
- Work effectively to manage a project as part of a team.

Upcoming Project Components

Project Group Signup - 1 submission per group (due Fri Week 2)

Project Review (5%) - Before Mon of week 3, your group will be assigned a previous COGS 108 project to review; A google Form will be released to guide your thinking/discussion about and review of what a previous COGS 108 group did for their project. (due Fri Week 3)

Project Proposal (8%) - a GitHub repo will be created for your group; 'submit' on GitHub (due Fri Week 4)

Project Proposal (8%)

Full project guidelines are here:

[https://github.com/COGS108/Projects/blob/master/
FinalProject_Guidelines.md](https://github.com/COGS108/Projects/blob/master/FinalProject_Guidelines.md)