HAS Tools:

Overview of tools and the modern Python data science landscape

August 28, 2024

Recall the two platforms

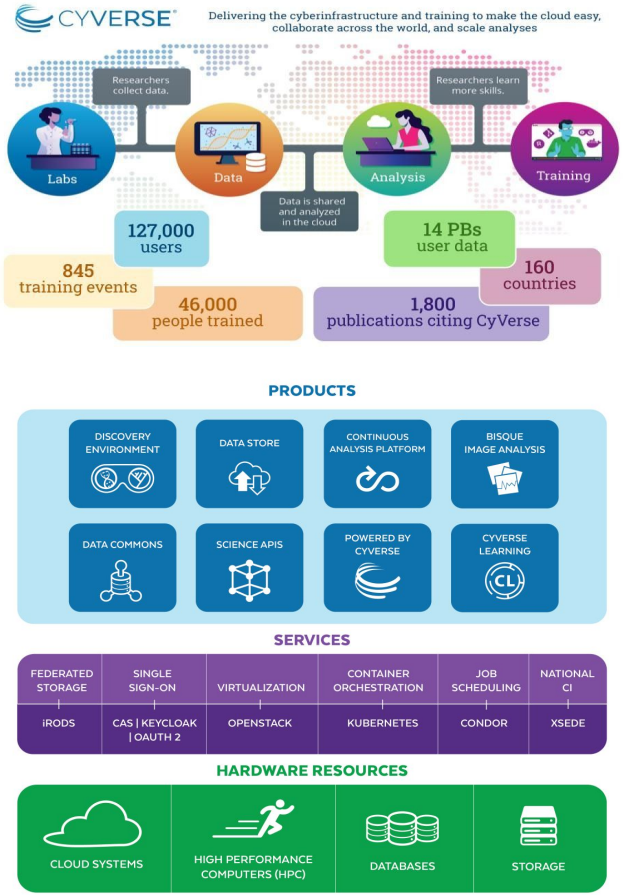
*was going to be

This ~~will~~ be our computational platform and coding interface

This will be our content distribution platform and version control system

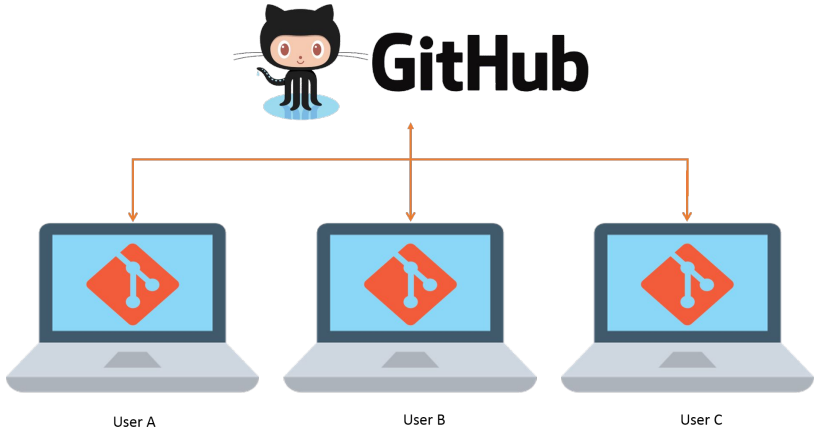
CYVERSE®

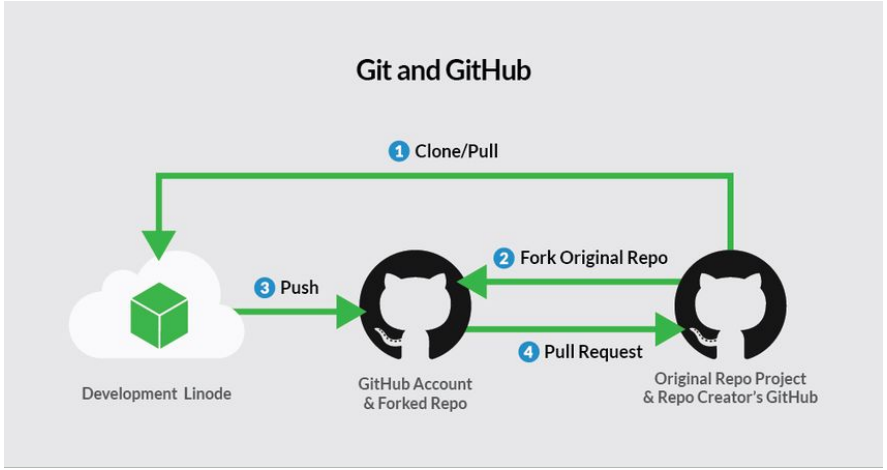
- CyVerse is an open platform and project led by the University of Arizona
- Provides a platform to enable large datasets and computation
- Also allows for standardized “apps” that can be used by many users
- We will use it as our main entrypoint for the class



GitHub

- GitHub is a web platform that enables software developers to manage and share their code
- Also has great integrations for running automation, building websites, and increasing AI integration
- We will use it for course centralization and homework management via GitHub education





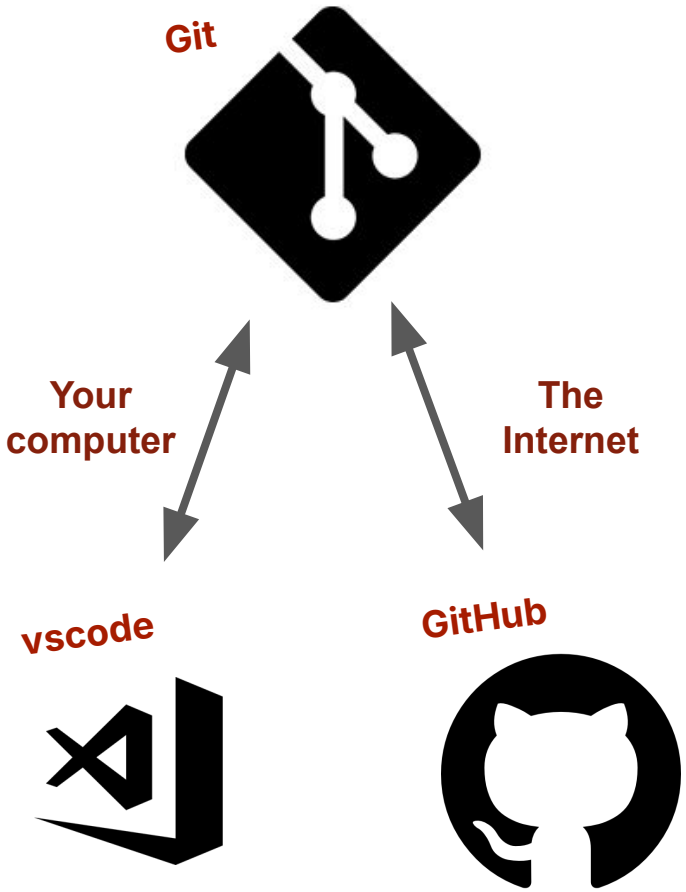
Some other tools used to build this course

- We will be doing all of our work in Python
  - High level, dynamic, and prominent programming language with massive community support
- We use conda for environment management
  - Provides access to community developed python packages - more on this towards the end of the semester
- Under the hood we use jupyter as an interactive computing framework
  - Makes it easy to run “snippets” of code and view their outputs. The standard framework for a lot of exploratory scientific computing
- VSCode will provide the user interface and code editing experience
  - A modern, extensible, and popular code editing application

Please bear with me for a few minutes, but I swear this will all make sense eventually

Let’s talk about git.

Git is a version control system. It allows teams to work collaboratively on the same pieces of code (like track changes for MS Word but much more sophisticated)



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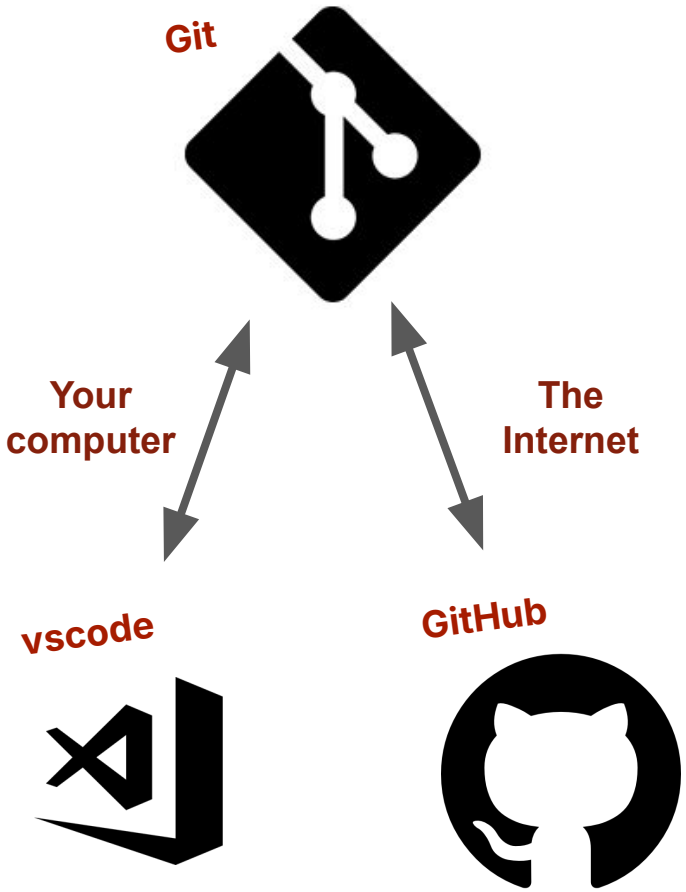

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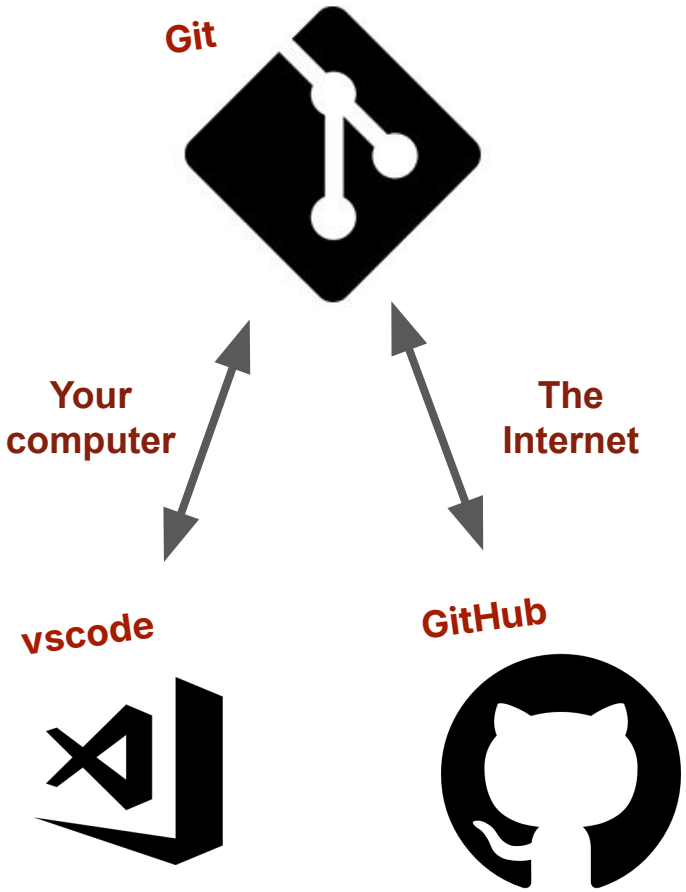
You will mostly interact with git inside of vscode, and use it to communicate with GitHub



The first thing to know about git:

JARGON

repository	The overall “container” for your work (synonym: repo) [noun]
clone	Make a copy of the repository on your local machine [verb]
commit	A snapshot in time of your work, or to save changes [noun|verb]
checkout	How to get to a particular snapshot [verb]
branch	A label to a commit, usually denoting a separate stream of work [noun]
merge	Combine changes from different branches [verb]
remote	A computer somewhere else with a repo on it (GitHub) [noun]
local	The computer you are working on (laptop) [noun]
fetch	Download information about history from a remote [verb]
pull	Do a fetch, but also update the code status with a checkout [verb]
push	Sync changes on your local to a remote [verb]
conflict	Occurs when two commits contradict each other [noun?]

Basic concepts in git: Nodes and trees

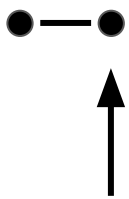
All repos start from an initial commit

You are here

```
# Your Codefile
print(‘hello world’)
```

Basic concepts in git: Nodes and trees

All repos start from an initial commit
As you do work, you can make changes and add commits



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```
# Your Codefile
name = ‘HAS Tools’
print(‘hello ’ + name)
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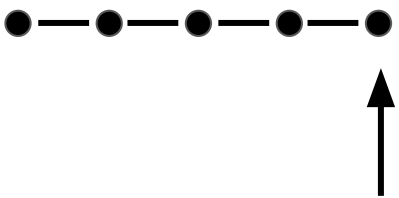


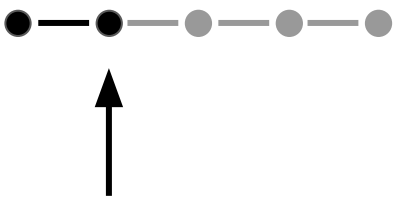

```
# Your Codefile
import numpy as np
name = ‘HAS Tools’
print(‘hello ’ + name)

x = np.arange(50)
y = np.sin(x / np.pi)

# more fun stuff here
```

Basic concepts in git: Nodes and trees

All repos start from an initial commit
As you do work, you can make changes and add commits
You can also move back and forward



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Basic concepts in git: Nodes and trees

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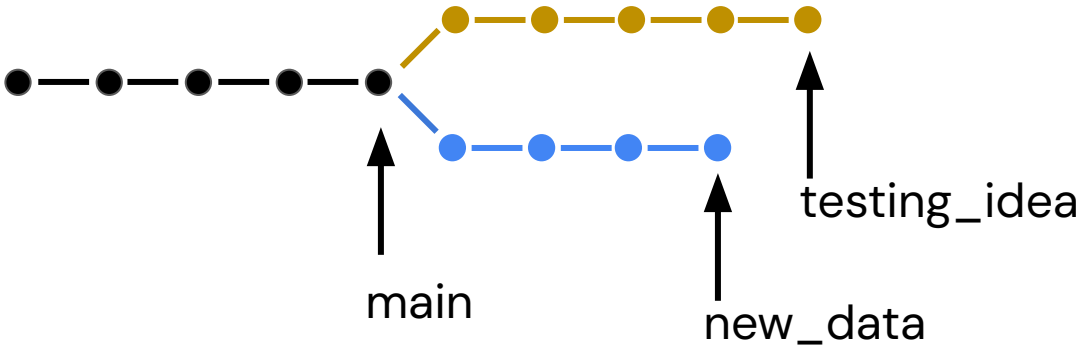
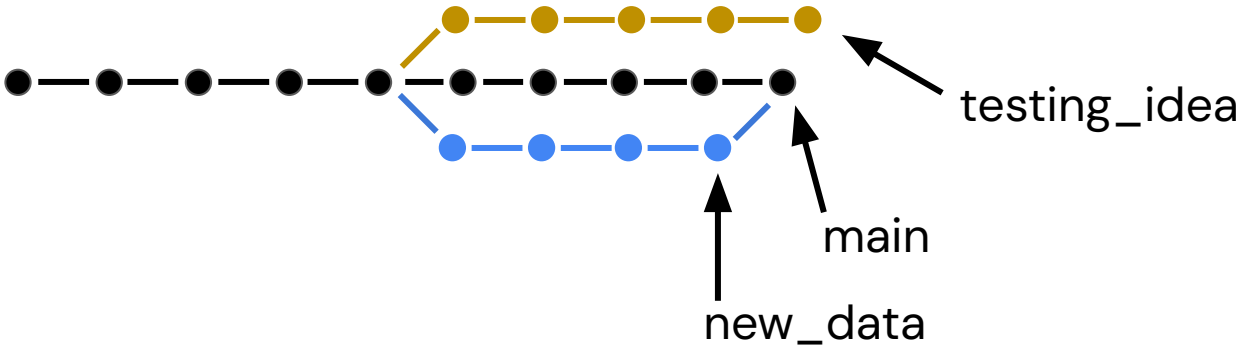
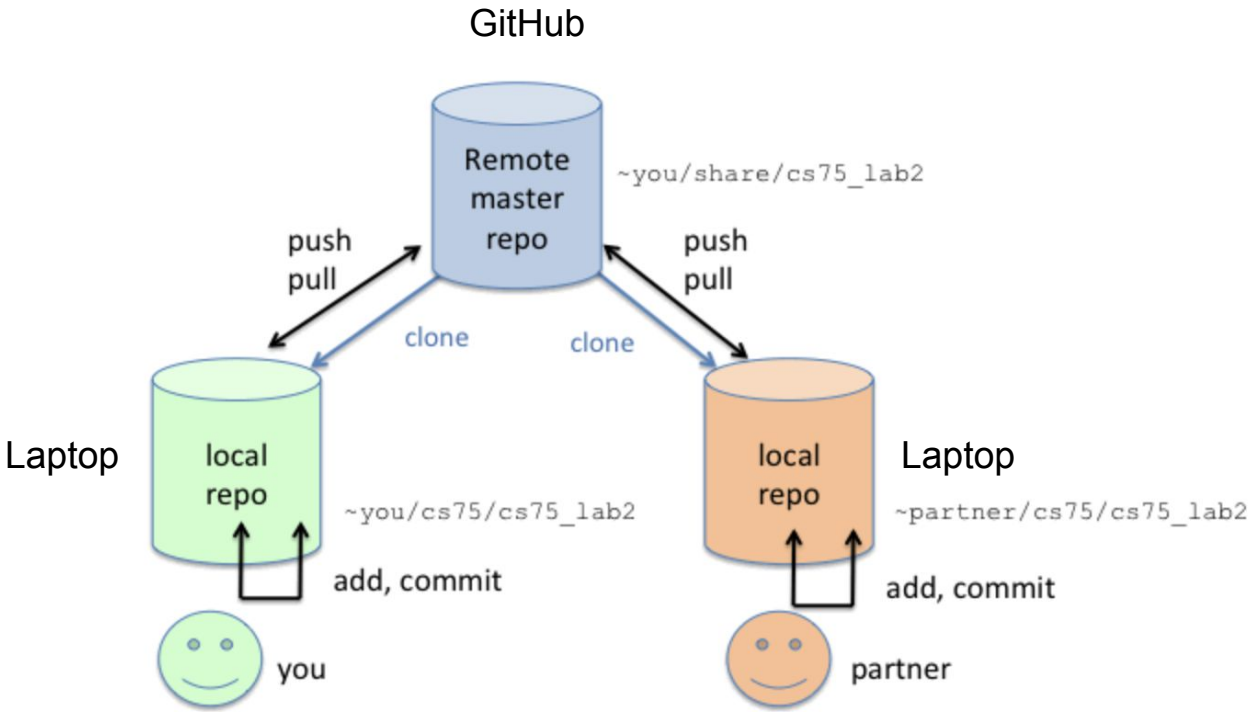


Basic concepts in git: Nodes and trees

You can also start splits called branches
And when you finish an idea you can merge them together

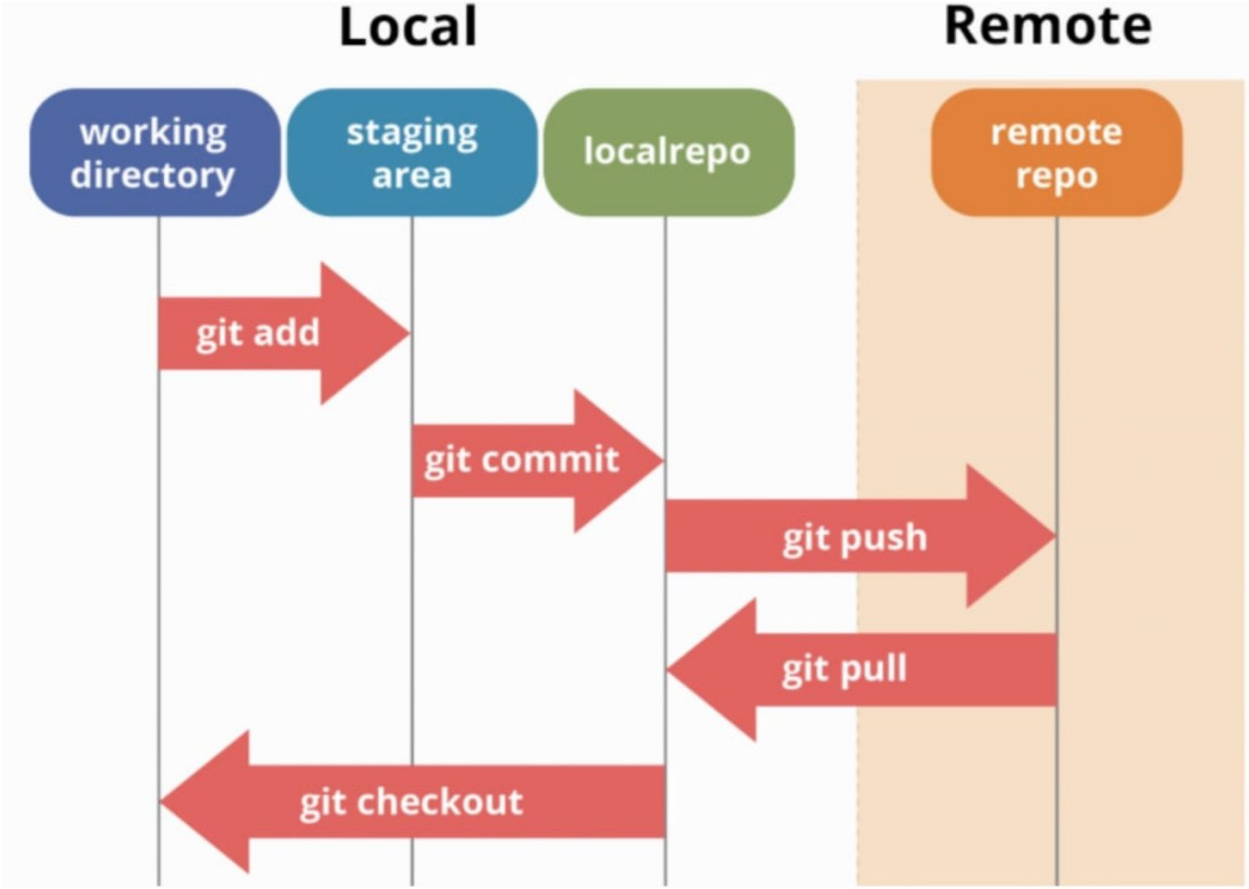


Basic concepts in git: Local and remote



https://www.cs.swarthmore.edu/~newhall/unixhelp/git_create.php

GitHub workflow

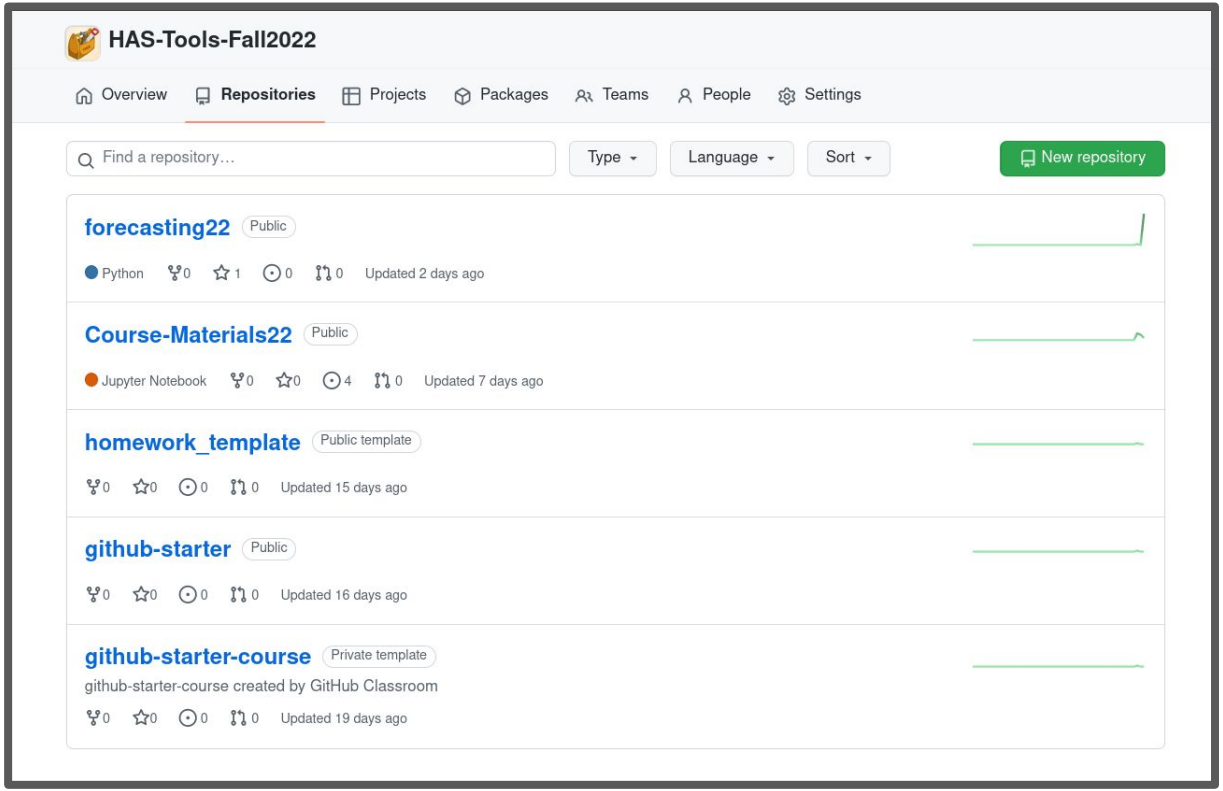


https://dev.to/mollynem/git-github--workflow-fundamentals-5496

https://www.reddit.com/r/git/comments/99ul9f/git_workflow_diagram_showcasing_the_role_of/

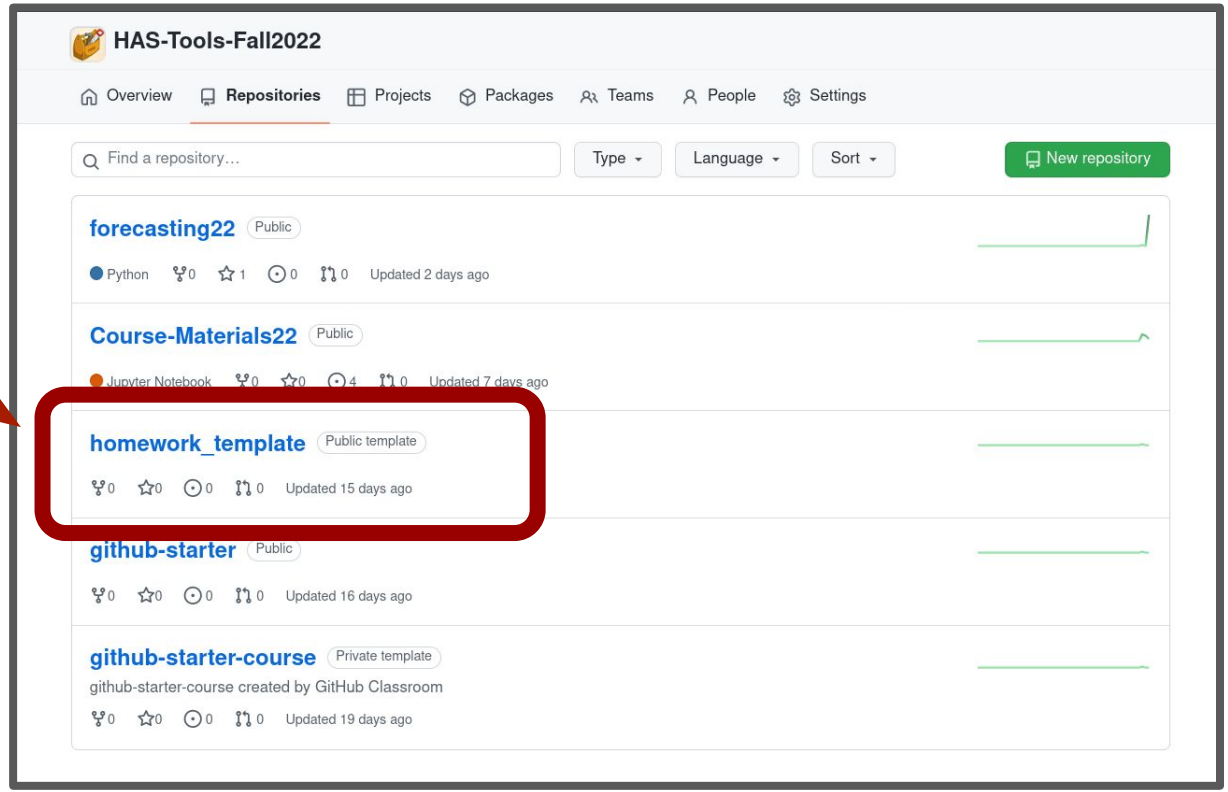
To get familiar with the setup let’s start with a short tour

The homework repo



The homework repo

CLICK HERE



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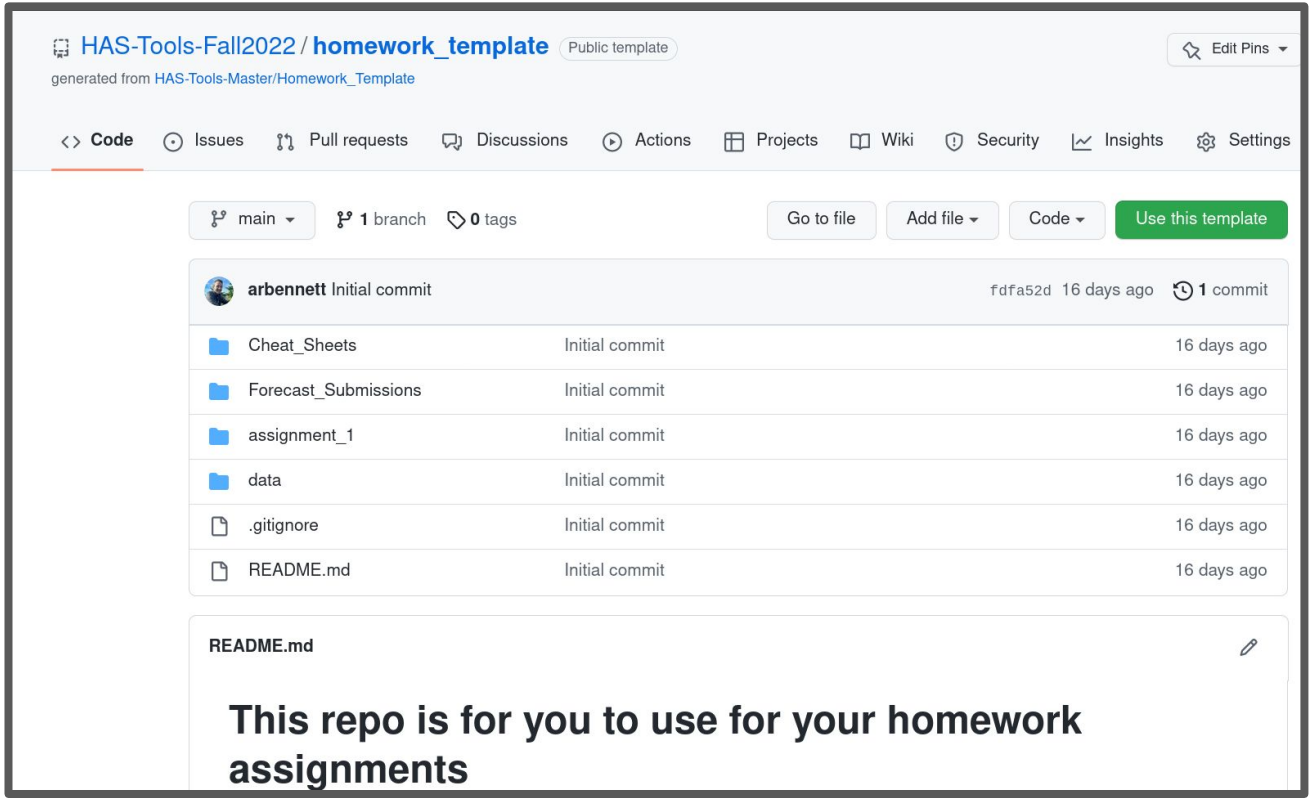

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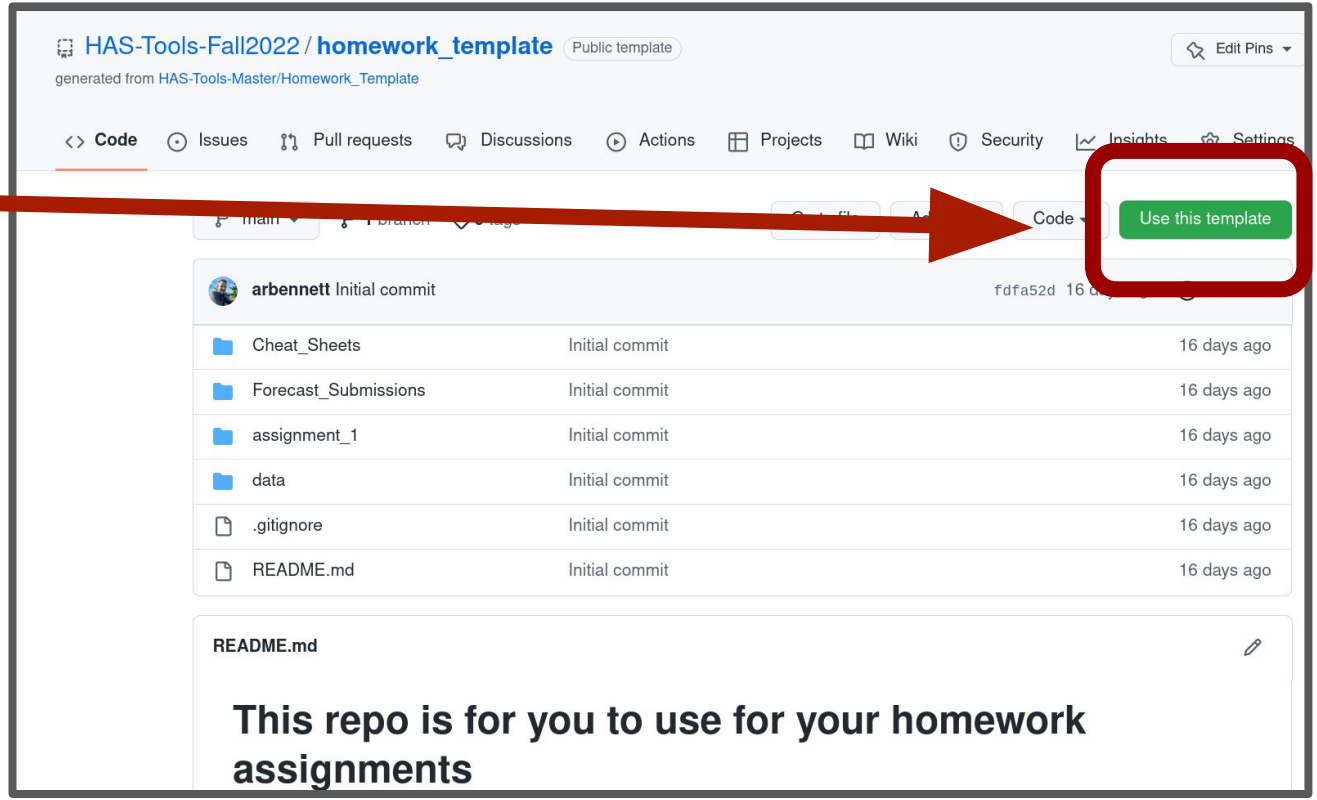
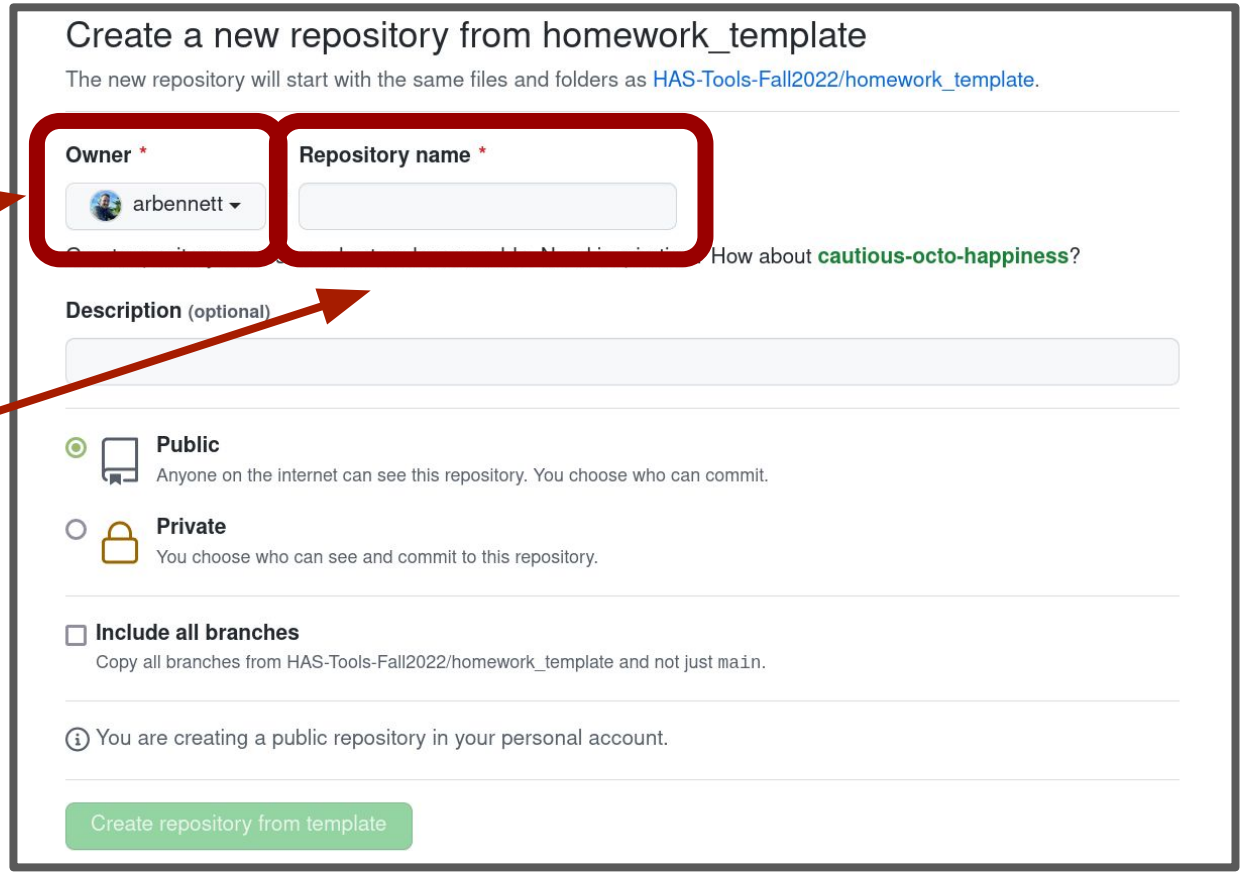


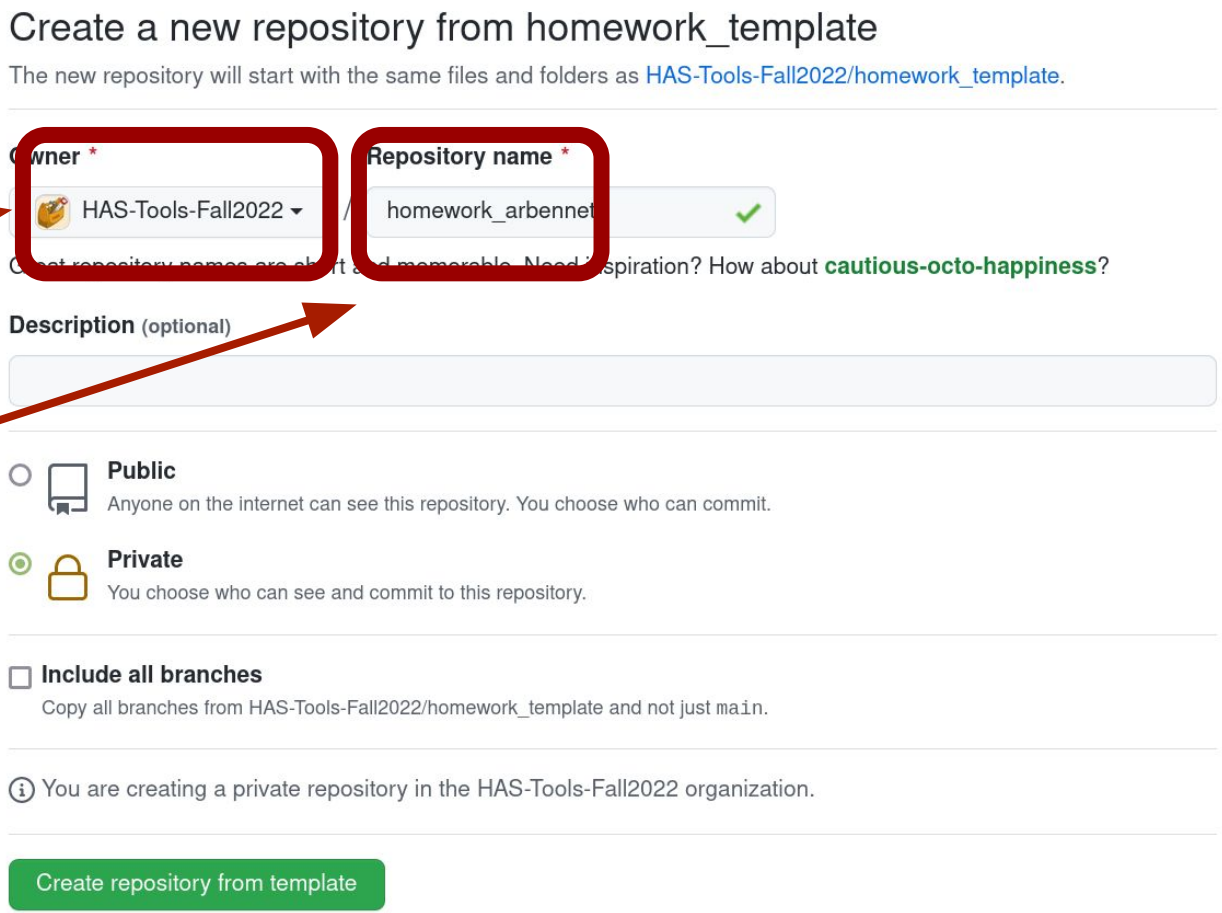
Change to HAS-Tools-Fall2022

Call it homework_YOURNAME



Change to HAS-Tools-Fall-2024

Call it homework_USERNAME



Change to HAS-Tools-Fall-2024

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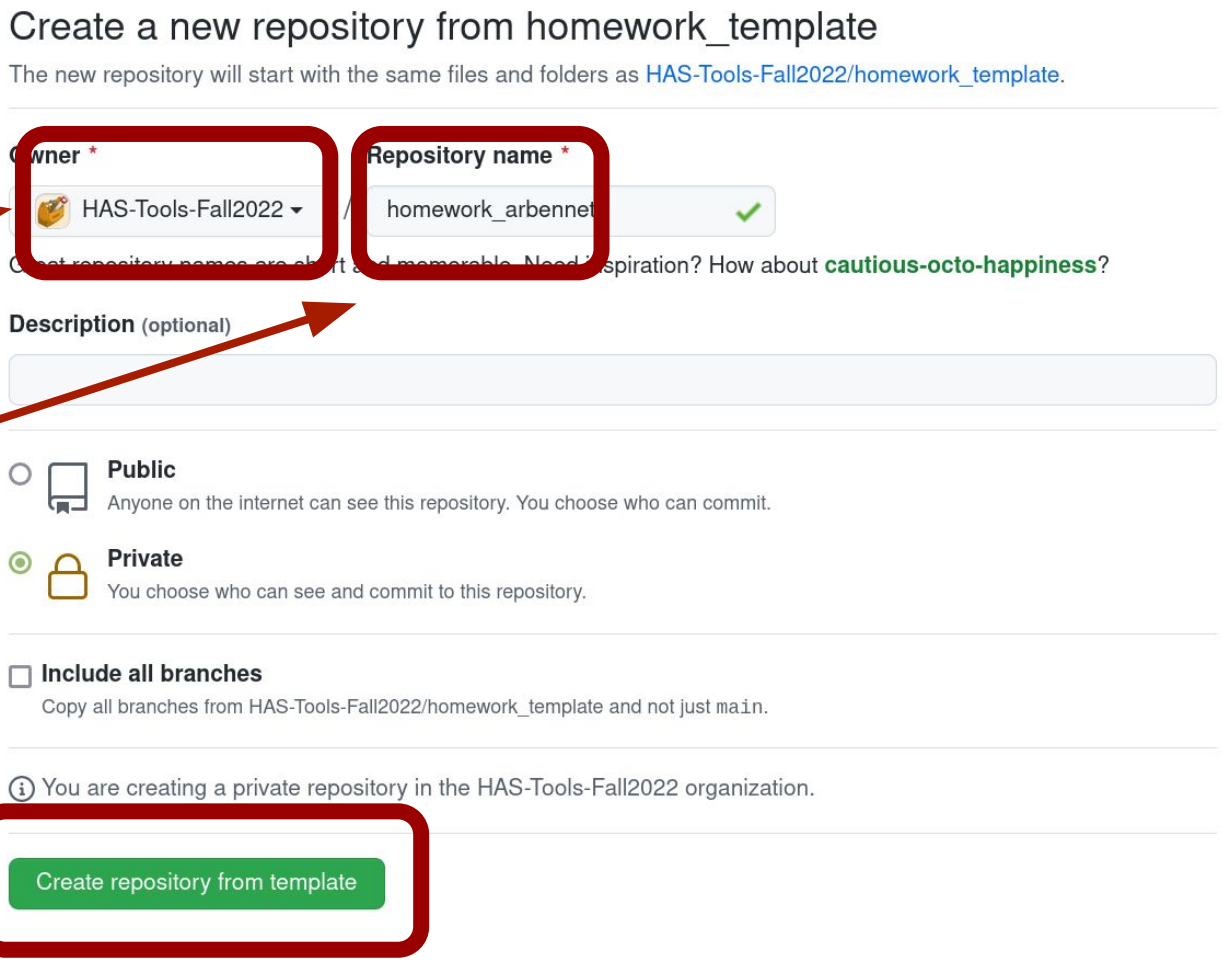
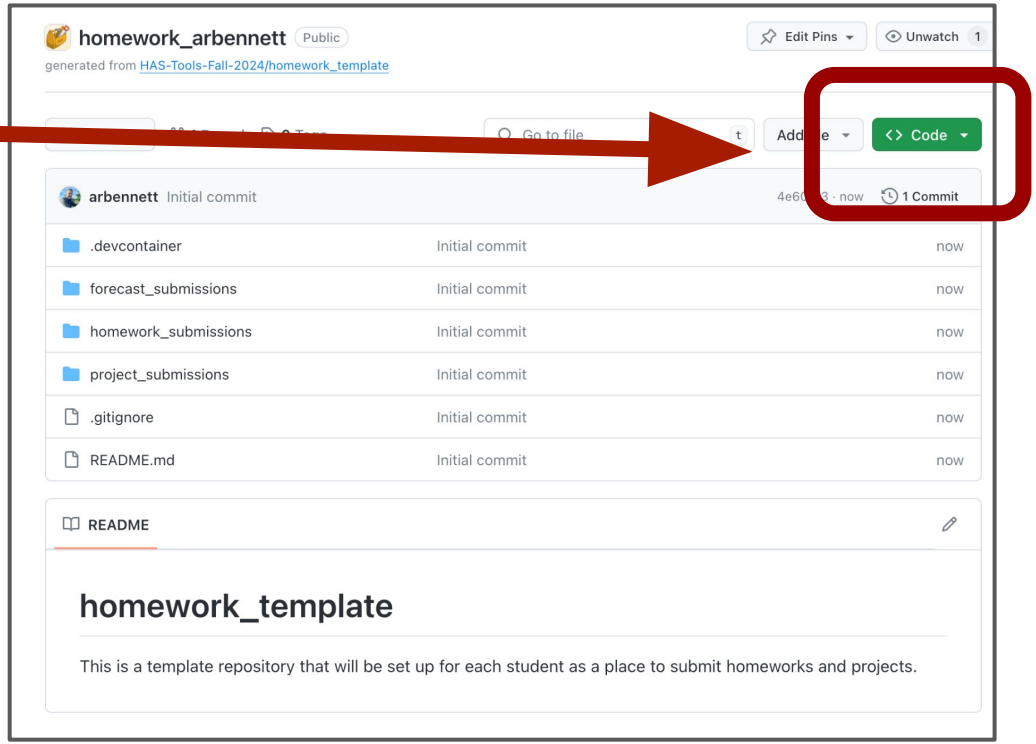
SMASH that create button



Your first codespace

CLICK HERE

Then select the “Codespace” tab and finally hit the “+” button



Whiteboard example time while the codespace boots up

Whiteboard example time while the codespace boots up

Once codespaces boots up, a quick tour of vscode and git

That’s all for today. Next class, we start python!

- Please make sure your GitHub account is in the class organization
- Also please make sure you get your GitHub education account set up
- Your first assignment: Make a modification to the README.md file in your homework repository to add the following line:
    - “The first assignment was to modify the readme to include this statement”
- Make sure that this change is “committed” and “pushed” from your “local” codespace back to the “remote” on GitHub so that you and I can see the change