

# **HAS Tools:**

**Overview of tools and the modern  
Python data science landscape**

August 28, 2024

# Recall the two platforms



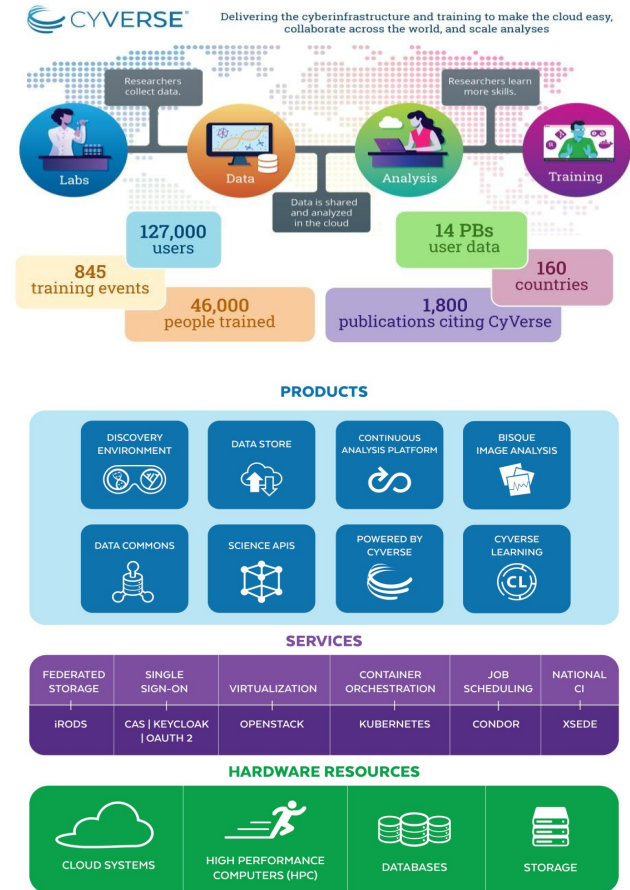
~~This will be~~ <sup>\*was going to be</sup> our  
computational  
platform and  
coding interface



This will be our  
content distribution  
platform and version  
control system

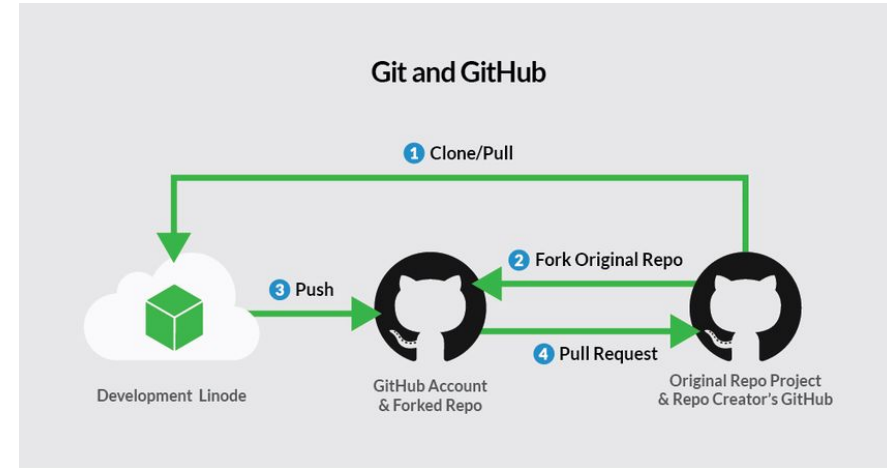
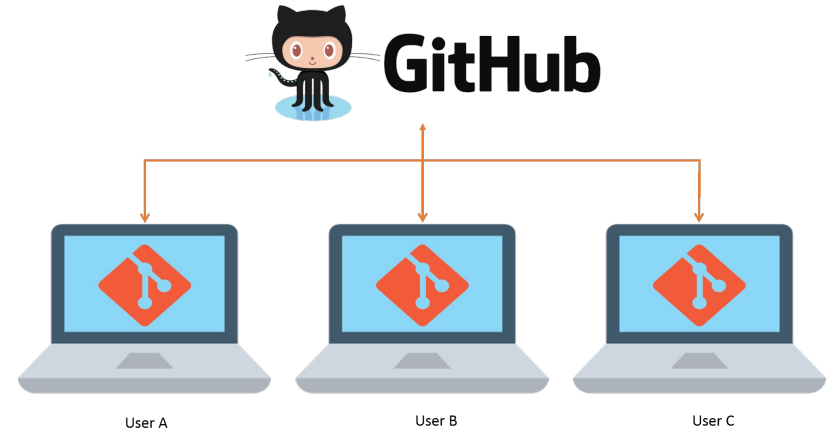


- CyVerse is an open platform and project led by the University of Arizona
- Provides a platform to enable large datasets and computation
- Also allows for standardized “apps” that can be used by many users
- We will use it as our main entrypoint for the class





- GitHub 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

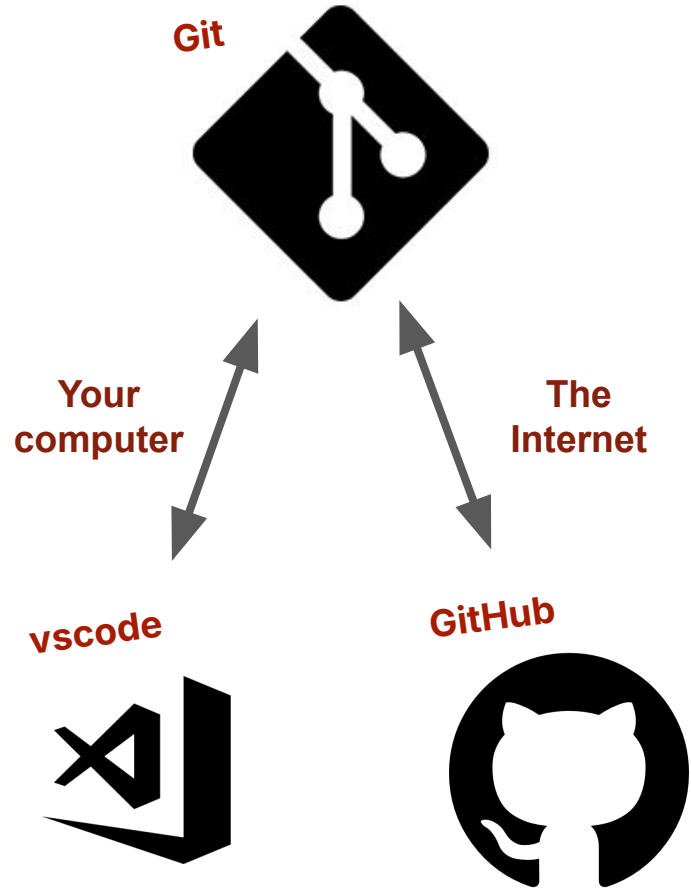
- We will be doing all of our work in Python
  - High level, dynamic, and prominent programming language with massive community support
- We use conda for environment management
  - Provides access to community developed python packages – more on this towards the end of the semester
- Under the hood 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.

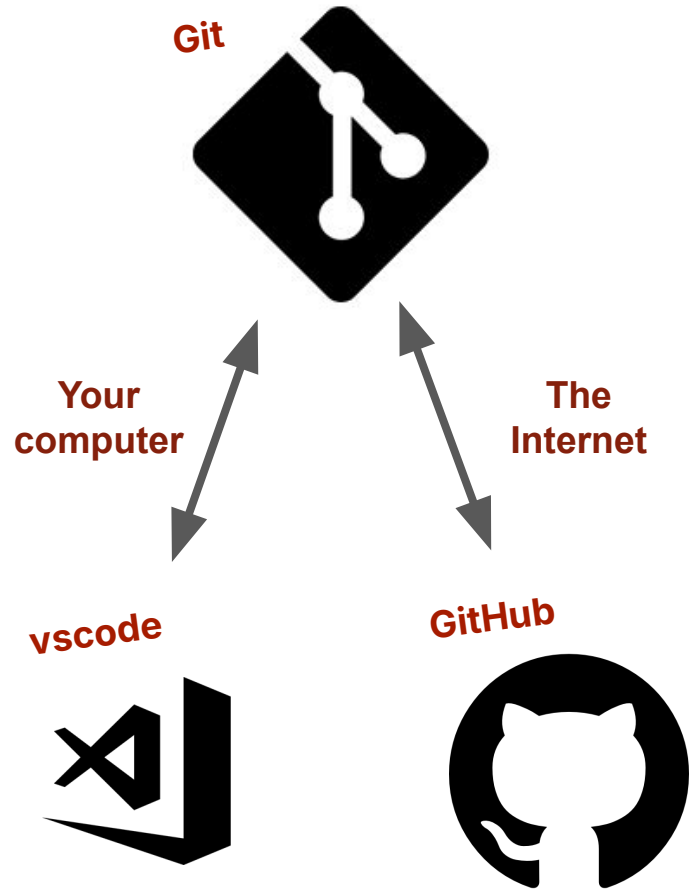
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GitHub is a website that is essentially a social platform for code, built around git as a version control system.



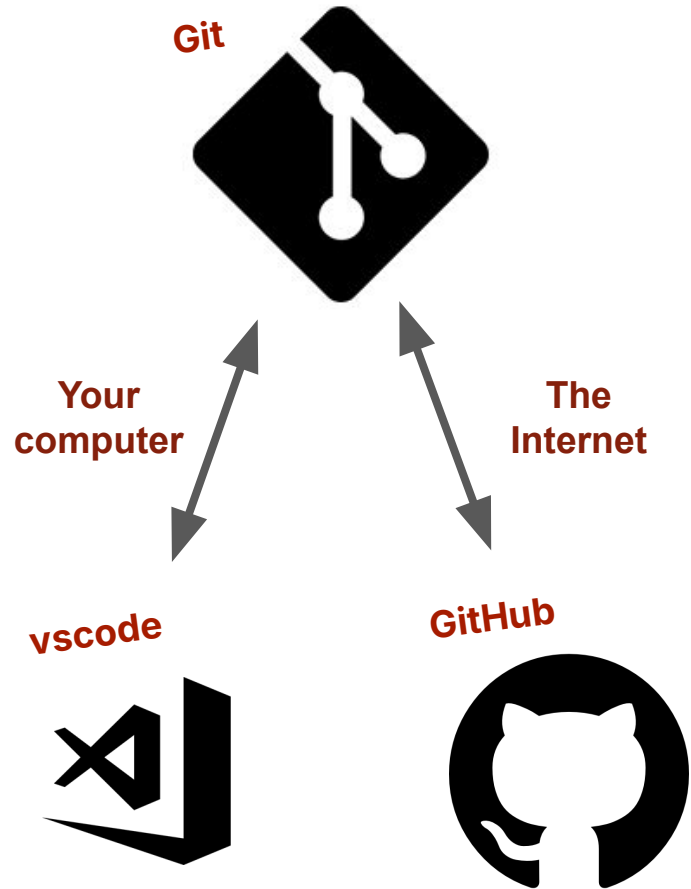


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Git is a version control system. It allows teams to work collaboratively on the same pieces of code (like track changes for MS Word but much more sophisticated)

GitHub is a website that is essentially a social platform for code, built around git as a version control system.

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



# The first thing to know about git:

## JARGON

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



You are here

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

# 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 are here

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

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

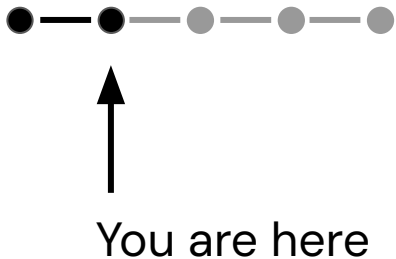
# more fun stuff here
```

# 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

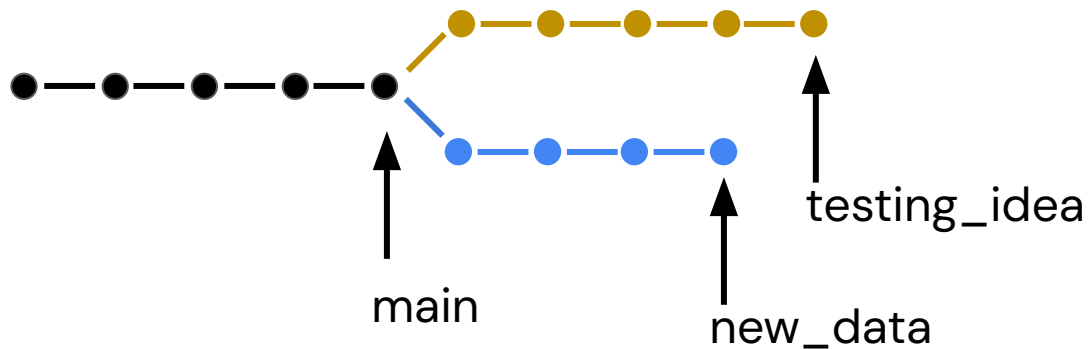
You can also move back and forward



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

# Basic concepts in git: Nodes and trees

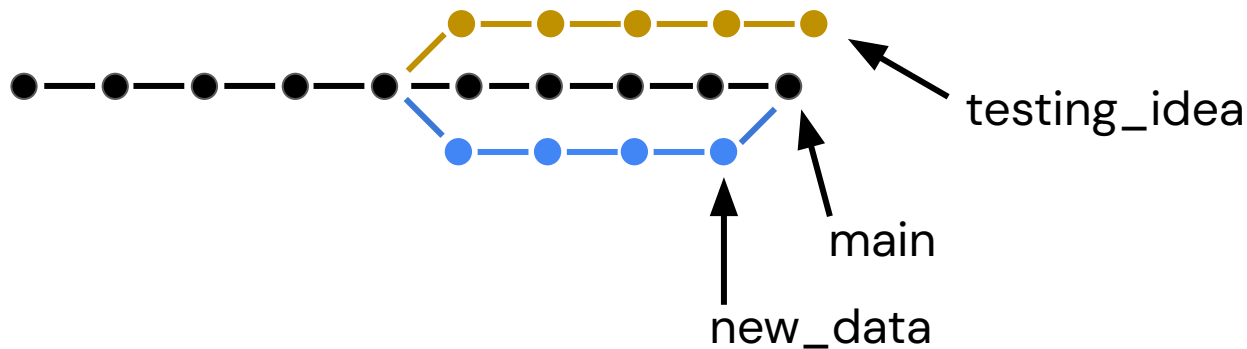
You can also start splits called branches



# Basic concepts in git: Nodes and trees

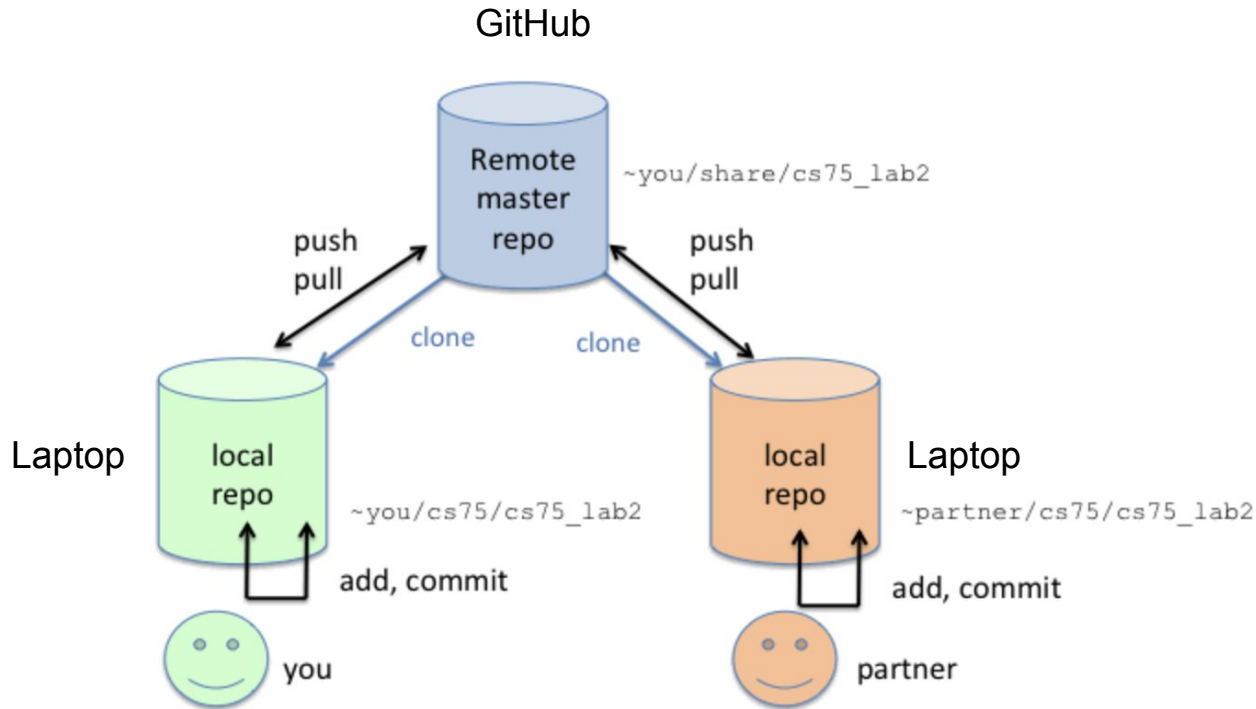
You can also start splits called branches

And when you finish an idea you can merge them together

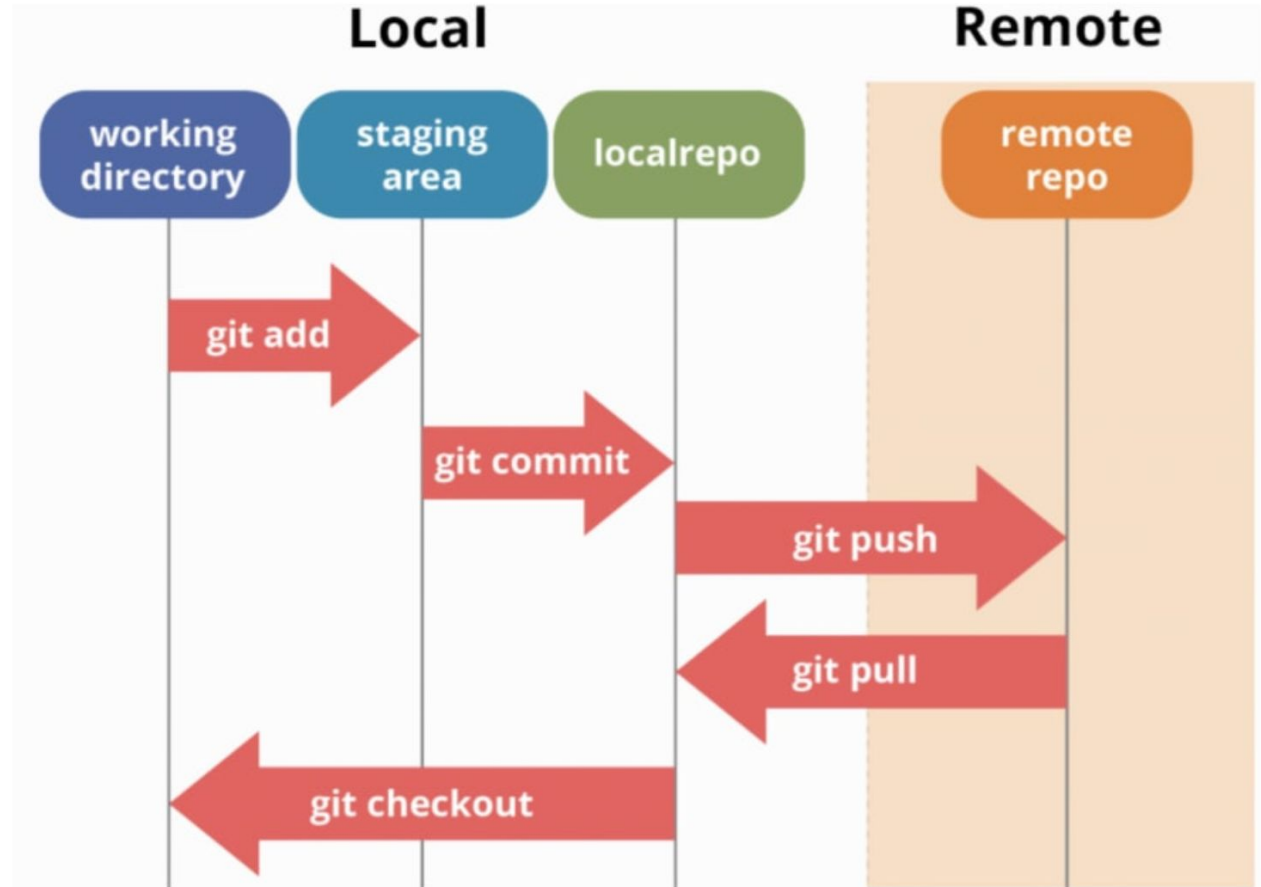




# Basic concepts in git: Local and remote



# GitHub workflow



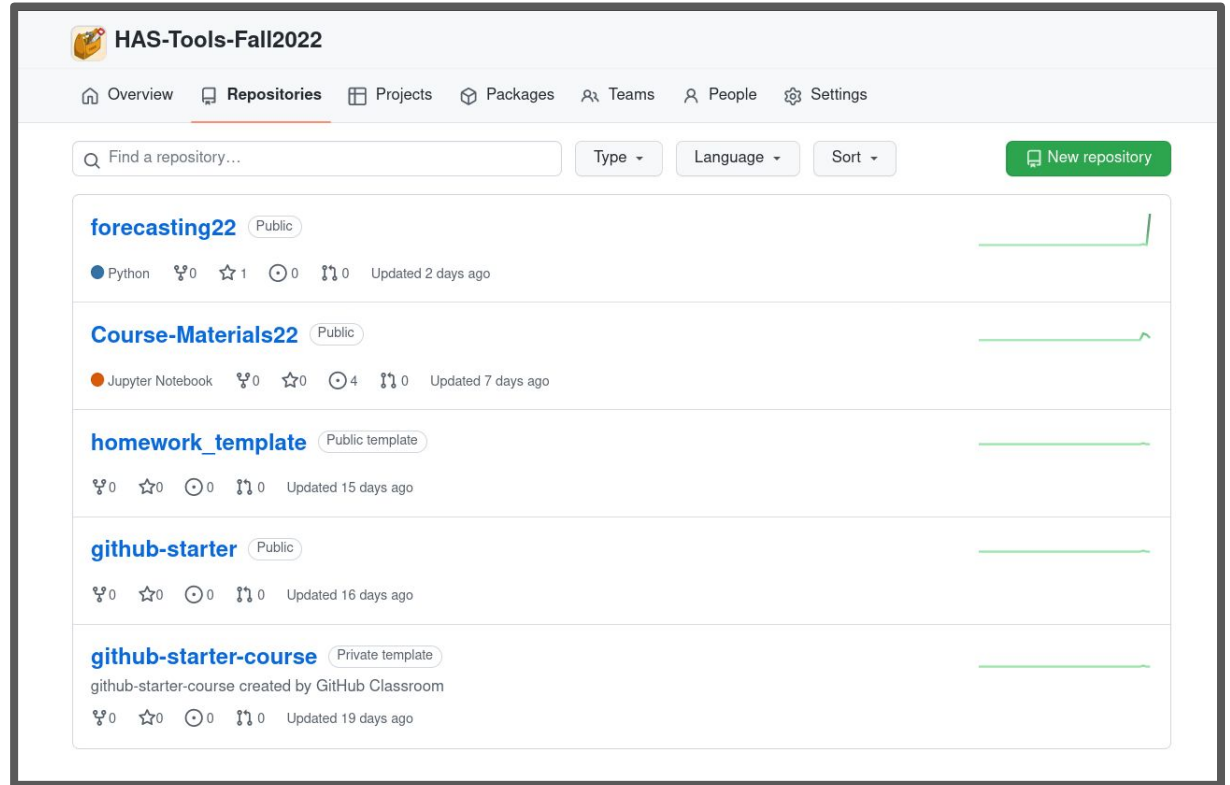
<https://dev.to/mollynem/git-github--workflow-fundamentals-5496>

[https://www.reddit.com/r/git/comments/99ul9f/git\\_workflow\\_diagram\\_showcasing\\_the\\_role\\_of/](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**

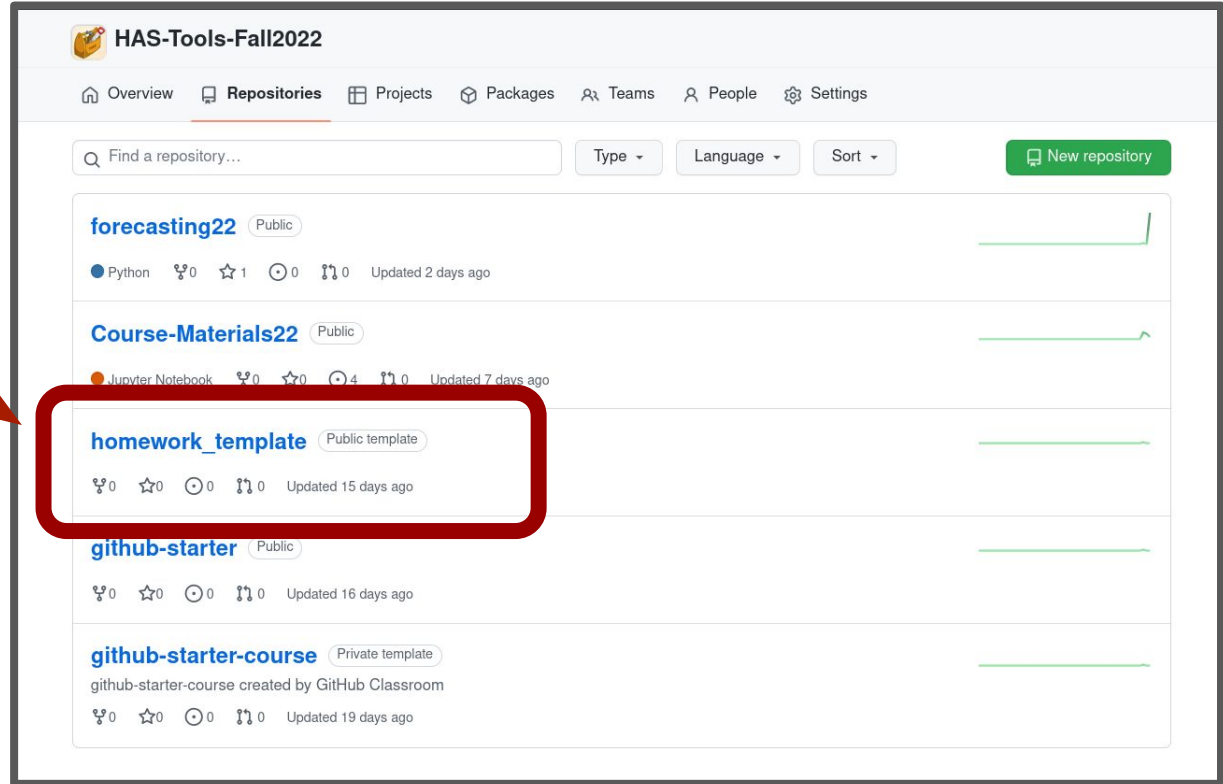
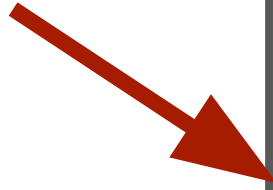


# The homework repo



# The homework repo

**CLICK  
HERE**



# The homework repo

The screenshot shows a GitHub repository page for 'HAS-Tools-Fall2022 / homework\_template'. The repository is a public template generated from 'HAS-Tools-Master/Homework\_Template'. The navigation bar includes links for Code, Issues, Pull requests, Discussions, Actions, Projects, Wiki, Security, Insights, and Settings. Below the navigation bar, there are buttons for 'Go to file', 'Add file', 'Code', and 'Use this template'. The repository has 1 branch (main) and 0 tags. The commit history shows an initial commit by 'arbennett' 16 days ago, with a file size of fdfa52d. The commit includes a folder named 'Cheat\_Sheets' and a file named 'README.md'. The README.md file contains the text: 'This repo is for you to use for your homework assignments'.

HAS-Tools-Fall2022 / **homework\_template** Public template Edit Pins

generated from [HAS-Tools-Master/Homework\\_Template](#)

< > **Code** Issues Pull requests Discussions Actions Projects Wiki Security Insights Settings

main 1 branch 0 tags Go to file Add file Code Use this template

**arbennett** Initial commit fdfa52d 16 days ago 1 commit

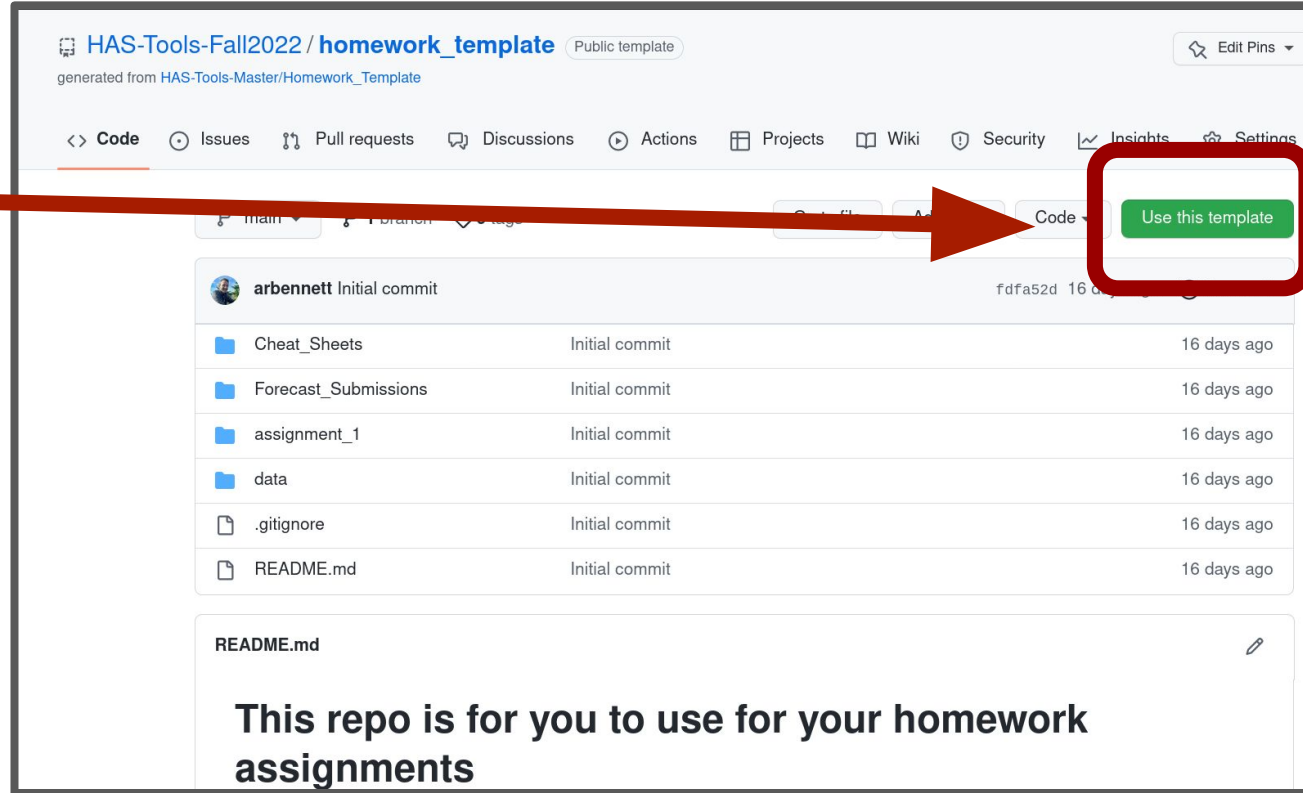
Cheat_Sheets	Initial commit	16 days ago
Forecast_Submissions	Initial commit	16 days ago
assignment_1	Initial commit	16 days ago
data	Initial commit	16 days ago
.gitignore	Initial commit	16 days ago
README.md	Initial commit	16 days ago

**README.md** Edit

**This repo is for you to use for your homework assignments**

# The homework repo

**CLICK  
HERE**



The screenshot shows the GitHub interface for the repository 'HAS-Tools-Fall2022 / homework\_template'. The repository is a public template generated from 'HAS-Tools-Master/Homework\_Template'. The 'Code' tab is selected, and a red arrow points from the 'CLICK HERE' text to the 'Use this template' button. Below the repository name, a table lists the initial commit files and folders, all committed 16 days ago. The README.md file is highlighted, showing the text: 'This repo is for you to use for your homework assignments'.

**HAS-Tools-Fall2022 / homework\_template** Public template

generated from [HAS-Tools-Master/Homework\\_Template](#)

[Code](#) [Issues](#) [Pull requests](#) [Discussions](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#) [Settings](#)

[main](#) [branches](#) [tags](#)

[Use this template](#)

**arbennett** Initial commit fdfa52d 16 days ago

Cheat_Sheets	Initial commit	16 days ago
Forecast_Submissions	Initial commit	16 days ago
assignment_1	Initial commit	16 days ago
data	Initial commit	16 days ago
.gitignore	Initial commit	16 days ago
README.md	Initial commit	16 days ago

**README.md**


This repo is for you to use for your homework assignments

**Change to  
HAS-Tools-Fall202  
2**

**Call it  
homework\_YOURNAM  
E**

### Create a new repository from homework\_template


The new repository will start with the same files and folders as [HAS-Tools-Fall2022/homework\\_template](#).


**Owner \***  
 arbennett ▾

**Repository name \***


How about **cautious-octo-happiness**?

**Description (optional)**

☒  **Public**  
Anyone on the internet can see this repository. You choose who can commit.

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

☐ **Include all branches**  
Copy all branches from HAS-Tools-Fall2022/homework\_template and not just main.

 You are creating a public repository in your personal account.

Create repository from template



## Create a new repository from homework\_template

The new repository will start with the same files and folders as [HAS-Tools-Fall2022/homework\\_template](#).

Owner \*

HAS-Tools-Fall2022

Repository name \*

homework\_arbennet

Can't find repository names are short and memorable. Need inspiration? How about [cautious-octo-happiness](#)?

Description (optional)

☐ Public


Anyone on the internet can see this repository. You choose who can commit.

☒ Private

You choose who can see and commit to this repository.

☐ Include all branches

Copy all branches from HAS-Tools-Fall2022/homework\_template and not just main.

 You are creating a private repository in the HAS-Tools-Fall2022 organization.

Create repository from template

**Change to  
HAS-Tools-Fall-202  
4**

**Call it  
homework\_USERNAME**

## Create a new repository from homework\_template

The new repository will start with the same files and folders as [HAS-Tools-Fall2022/homework\\_template](#).

Owner \*

HAS-Tools-Fall2022 ▾

Repository name \*

homework\_arbennet ✓

Great repository names are short and memorable. Need inspiration? How about **cautious-octo-happiness**?

Description (optional)

☐ Public

Anyone on the internet can see this repository. You choose who can commit.

☒ Private

You choose who can see and commit to this repository.

☐ Include all branches

Copy all branches from HAS-Tools-Fall2022/homework\_template and not just main.

You are creating a private repository in the HAS-Tools-Fall2022 organization.

Create repository from template

**Change to  
HAS-Tools-Fall-202  
4**

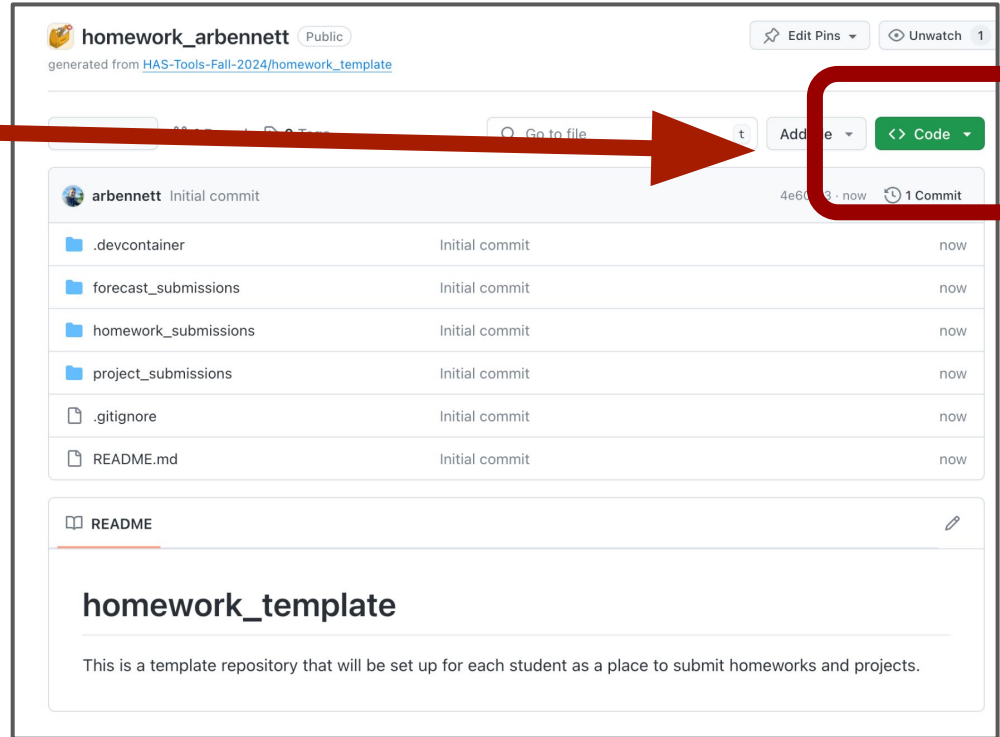
**Call it  
homework\_USERNAME**

**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