

ERT 429/529 GITHUB INTRO

Course Platform Setup



Outline

- Set up your **GitHub repo** in the **GitHub organization**
 - Step-by-step instructions
- Get familiar with the **GitHub CodeSpace**
 - The coding interface – Microsoft VS Code
 - Jupyter Notebook
 - Terminal (folder structures)
- Course logistics
 - How can we do future lab sessions?
 - How can we submit homework?

By the end of this lab, you will need to know

1. Open **Github CodeSpace**
2. Pull updates from **the CourseMaterials26** repo
 - Materials in labs will be published in **CourseMaterials26**
3. Navigate yourself in VSCode, including creating folders and notebooks
4. Submit homework by **pushing changes** to your **homework repo**

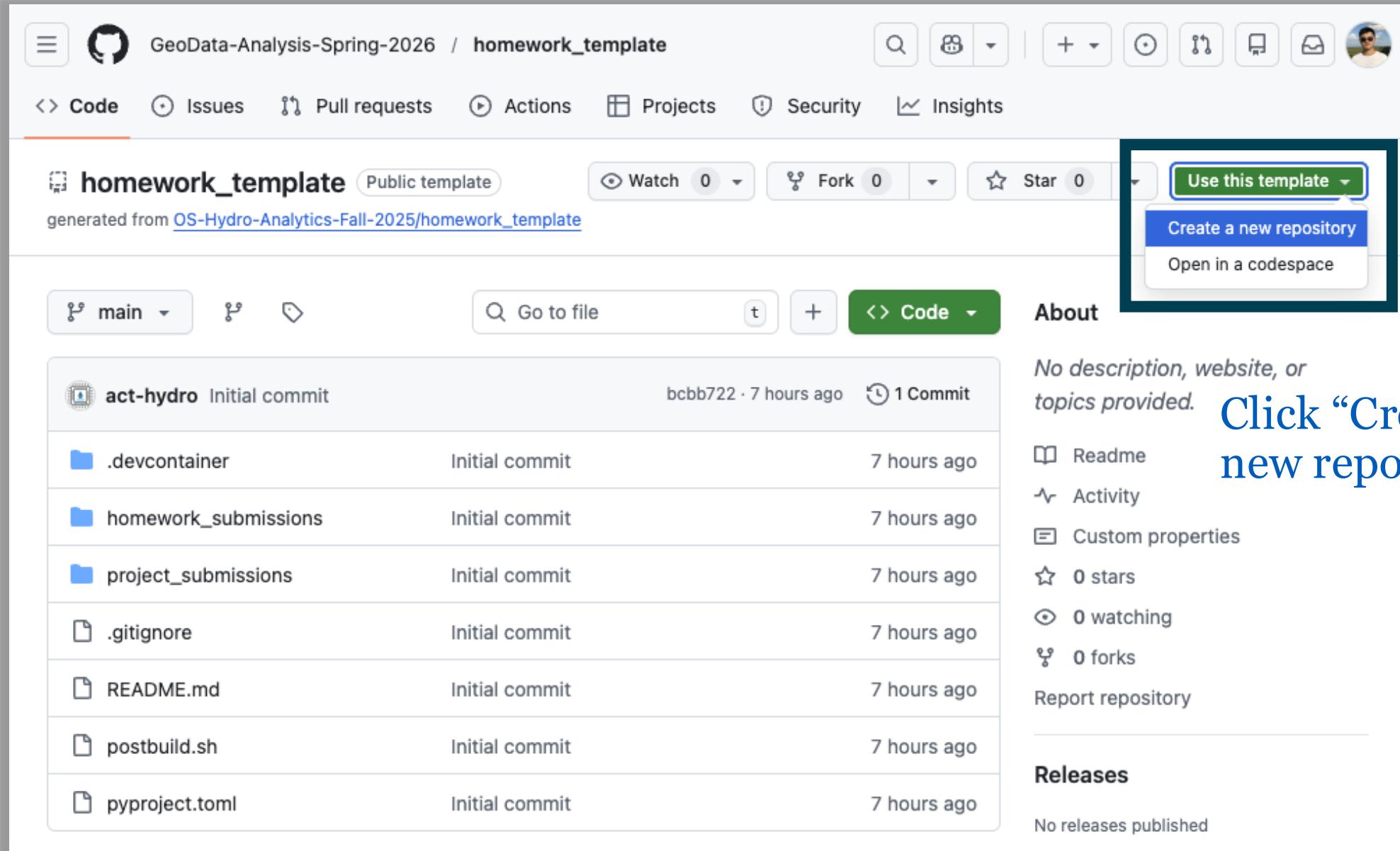
Organization

- <https://github.com/GeoData-Analysis-Spring-2026>



Sign up for GitHub account

- Instruction for signup
 - <https://docs.github.com/en/get-started/start-your-journey/creating-an-account-on-github#signing-up-for-a-new-personal-account>
- After signing up, please email your GitHub account ID to Yifan's email (ycheng46@buffalo.edu), email title "**ERT 429/529 Github ID**"



The screenshot shows a GitHub repository page for 'homework_template'. The repository is a public template generated from 'OS-Hydro-Analytics-Fall-2025/homework_template'. The main commit is by 'act-hydro' and is titled 'Initial commit'. The repository contains several files: '.devcontainer', 'homework_submissions', 'project_submissions', '.gitignore', 'README.md', 'postbuild.sh', and 'pyproject.toml'. All files were committed 7 hours ago. On the right side, there is an 'About' section with a summary: 'No description, website, or topics provided.' Below this, there is a list of repository statistics: Readme, Activity, Custom properties, 0 stars, 0 watching, 0 forks, and a 'Report repository' link. A callout box highlights the 'Use this template' button, which has three options: 'Create a new repository' (selected), 'Open in a codespace', and 'Use this template'.

GeoData-Analysis-Spring-2026 / homework_template

Code Issues Pull requests Actions Projects Security Insights

homework_template Public template

generated from [OS-Hydro-Analytics-Fall-2025/homework_template](#)

main

Go to file

Code

act-hydro Initial commit bccb722 · 7 hours ago 1 Commit

.devcontainer Initial commit 7 hours ago

homework_submissions Initial commit 7 hours ago

project_submissions Initial commit 7 hours ago

.gitignore Initial commit 7 hours ago

README.md Initial commit 7 hours ago

postbuild.sh Initial commit 7 hours ago

pyproject.toml Initial commit 7 hours ago

Use this template

Create a new repository

Open in a codespace

No description, website, or topics provided.

Click “Create a new repository”

Readme

Activity

Custom properties

0 stars

0 watching

0 forks

Report repository

Releases

No releases published

Create a new repository

Repositories contain a project's files and version history. Have a project elsewhere? [Import a repository](#). Required fields are marked with an asterisk (*).

Start with a template

Templates pre-configure your repository with files.



GeoData-Analysis-Spring-2026/homework_template

Off

Include all branches

If enabled, all branches from the template repository will be included.

1 General

Owner *



GeoData-Analysis-Spring-2026

Repository name *

homework_YourUserName

✓ homework_YourUserName is available.

Great repository names are short and memorable. How about [symmetrical-pancake](#)?

Description

0 / 350 characters

2 Configuration

Choose visibility *

Choose who can see and commit to this repository

Private

Create repository

Make sure to select
“GeoData-Analysis-
Spring-2026”

Create a new repository

Repositories contain a project's files and version history. Have a project elsewhere? [Import a repository](#). Required fields are marked with an asterisk (*).

Start with a template

Templates pre-configure your repository with files.



GeoData-Analysis-Spring-2026/homework_template

Off

Include all branches

If enabled, all branches from the template repository will be included.

1 General

Owner *



Repository name *

homework_YourUserName

homework_YourUserName is available.

Great repository names are short and memorable. How about [symmetrical-pancake](#)?

Description

0 / 350 characters

2 Configuration

Choose visibility *

Choose who can see and commit to this repository

Private

Create repository

Make sure to select
“OS-Hydro-Analytics-
Fall-2025”

Name your repo as
“homework_YourUserName”

Create a new repository

Repositories contain a project's files and version history. Have a project elsewhere? [Import a repository](#). Required fields are marked with an asterisk (*).

Start with a template

Templates pre-configure your repository with files.

 GeoData-Analysis-Spring-2026/homework_template ▾

Off

Include all branches

If enabled, all branches from the template repository will be included.

1 General

Owner *

 GeoData-Analysis-Spring-2026 ▾

Repository name *

homework_YourUserName

 homework_YourUserName is available.

Great repository names are short and memorable. How about [symmetrical-pancake](#)?

Description

0 / 350 characters

2 Configuration

Choose visibility *

Choose who can see and commit to this repository

 Private ▾

Create repository

Make sure to select
“OS-Hydro-Analytics-
Fall-2025”

Name your repo as
“homework_YourUserName”

Choose visibility
“Private”

Create a new repository

Repositories contain a project's files and version history. Have a project elsewhere? [Import a repository](#). Required fields are marked with an asterisk (*).

Start with a template

Templates pre-configure your repository with files.

 GeoData-Analysis-Spring-2026/homework_template ▾

Off

Include all branches

If enabled, all branches from the template repository will be included.

1 General

Owner *

 GeoData-Analysis-Spring-2026 ▾

Repository name *

homework_YourUserName

 homework_YourUserName is available.

Great repository names are short and memorable. How about [symmetrical-pancake](#)?

Description

0 / 350 characters

2 Configuration

Choose visibility *

Choose who can see and commit to this repository

 Private ▾

Create repository

Make sure to select
“OS-Hydro-Analytics-
Fall-2025”

Name your repo as
“homework_YourUser
Name”

Choose visibility
“Private”

Smash “Create repo”

Create a new repository

Repositories contain a project's files and version history. Have a project elsewhere? [Import a repository](#). Required fields are marked with an asterisk (*).

Start with a template
Templates pre-configure your repository with files.

GeoData-Analysis-Spring-2026/homework_template

Include all branches
If enabled, all branches from the template repository will be included.
 Off

1 General

Owner *
GeoData-Analysis-Spring-2026

Repository name *
homework_YourUserName
homework_YourUserName is available.

Great repository names are short and memorable. How about [symmetrical-pancake](#)?

Description
0 / 350 characters

2 Configuration

Choose visibility *
Choose who can see and commit to this repository

Private

Create repository



By now, you should have your own homework directory

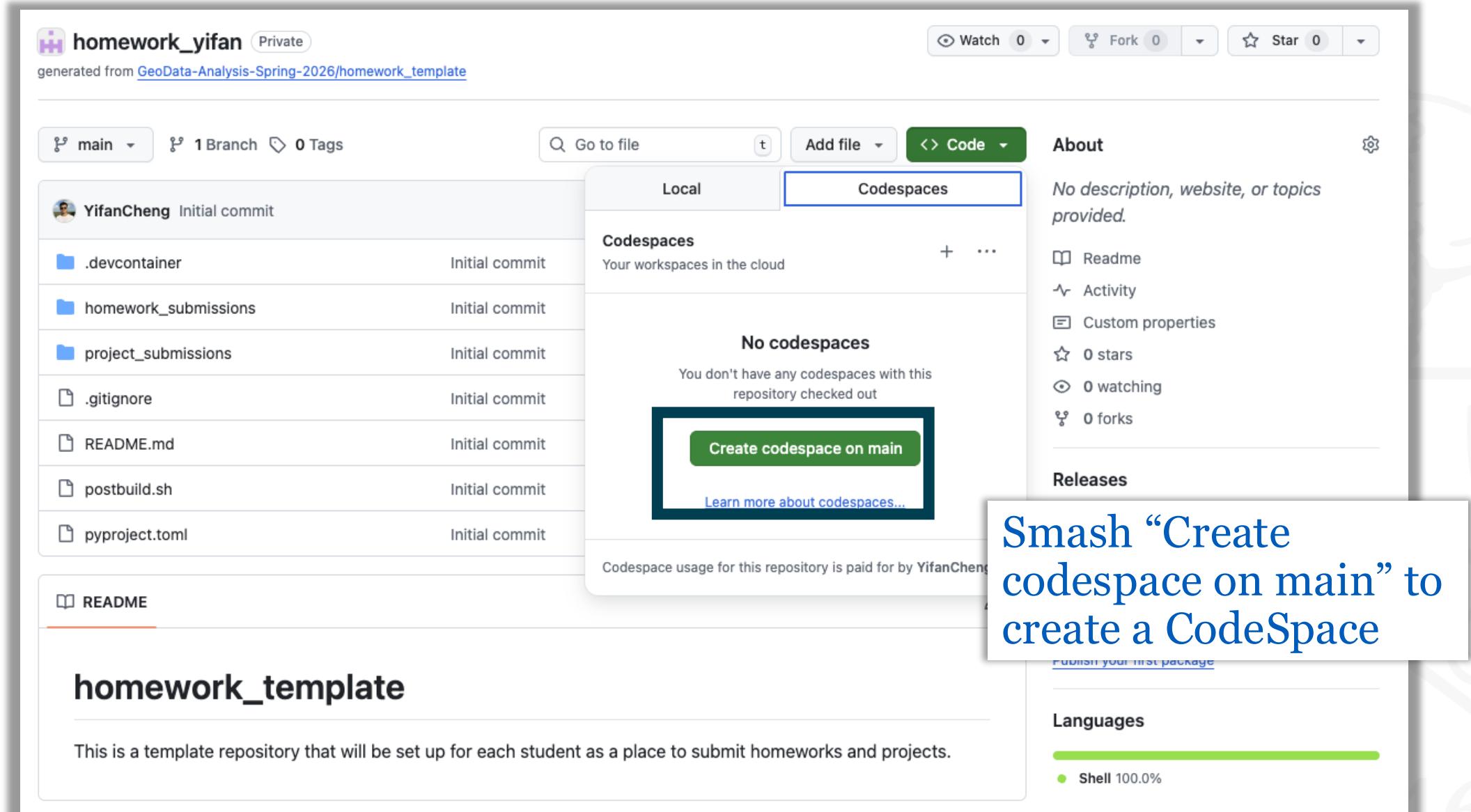
https://github.com/GeoData-Analysis-Spring-2026/homework_YourUserName

You will need to replace the highlighted part using your own username



GitHub CodeSpaces



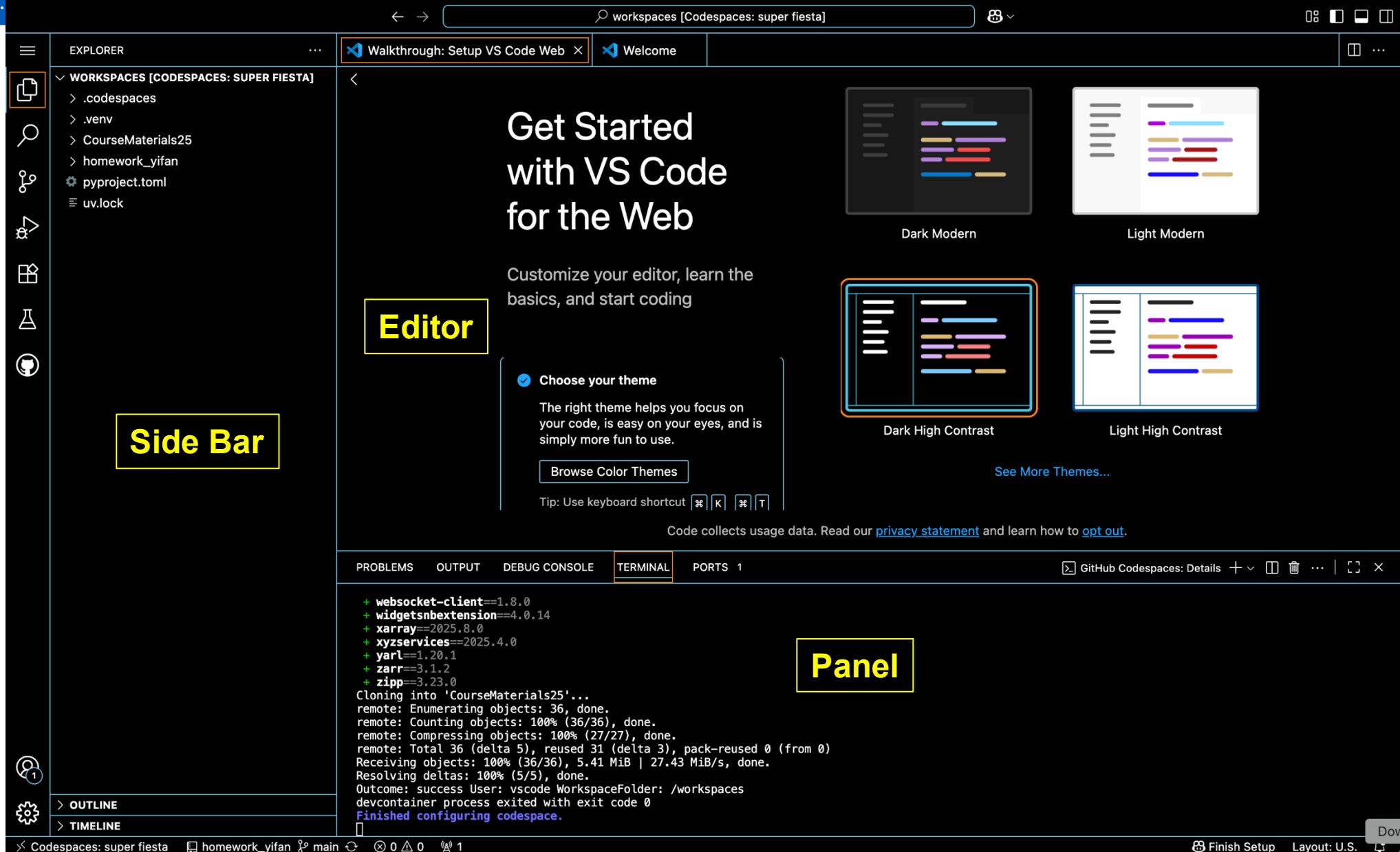


The screenshot shows a GitHub repository page for a private repository named "homework_yifan". The repository was generated from the "GeoData-Analysis-Spring-2026/homework_template". The main branch is "main", there is 1 branch, and 0 tags. The repository contains several files and folders: ".devcontainer", "homework_submissions", "project_submissions", ".gitignore", "README.md", "postbuild.sh", and "pyproject.toml", all of which are initial commits. A "README" file is also present.

The "Code" dropdown menu is open, showing the "Codespaces" tab selected. A modal window titled "Codespaces" displays the message "No codespaces" and "You don't have any codespaces with this repository checked out". It features a prominent green button labeled "Create codespace on main" and a link "Learn more about codespaces...". Below the modal, a note states "Codespace usage for this repository is paid for by YifanCheng".

The "About" section on the right side of the page indicates that there is no description, website, or topics provided. It lists statistics: 0 stars, 0 watching, and 0 forks. A "Releases" section is also present.

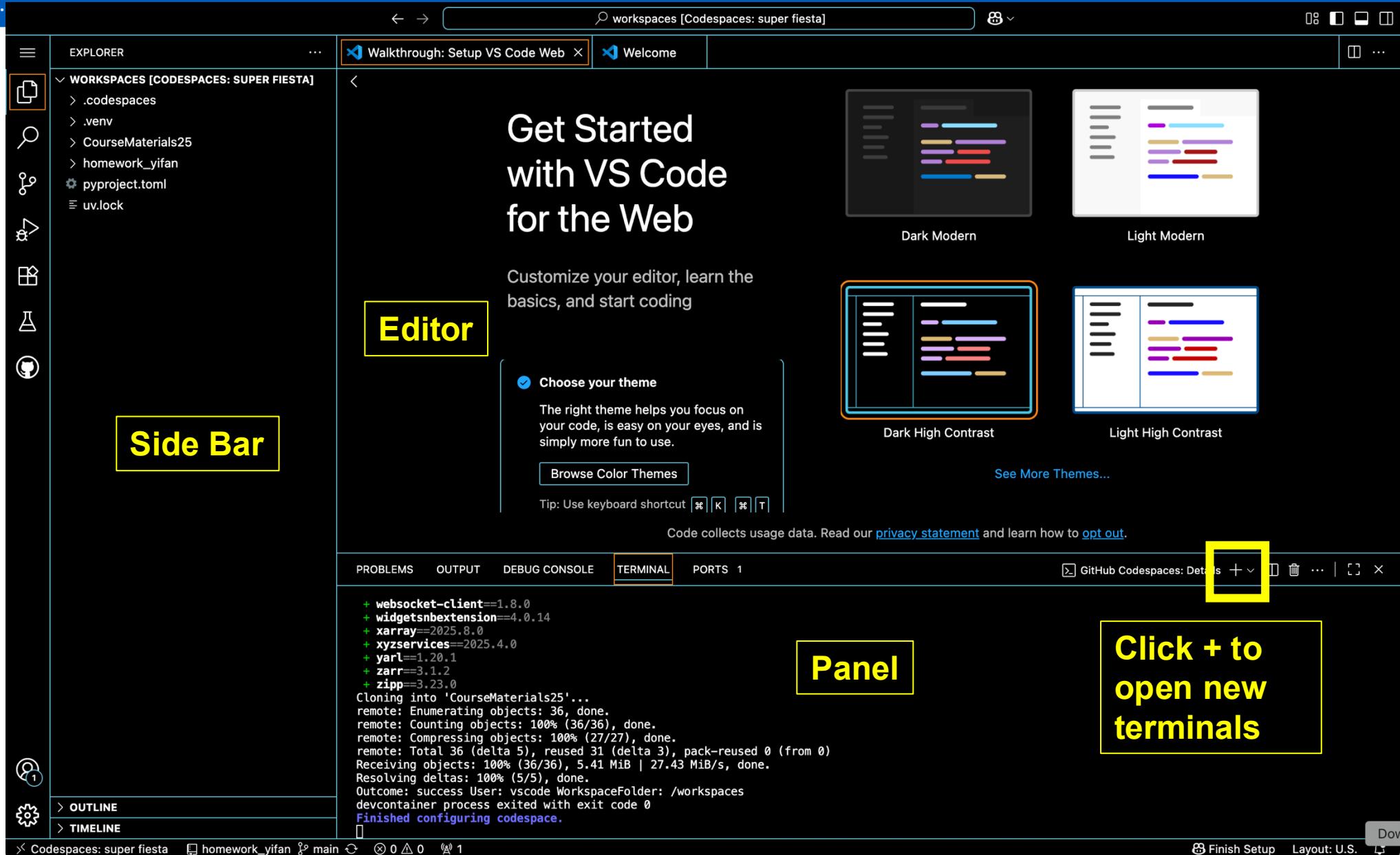
A large blue callout bubble with white text is overlaid on the "Create codespace on main" button, containing the text: "Smash ‘Create codespace on main’ to create a CodeSpace".



The screenshot shows the VS Code Web interface with several UI elements highlighted:

- Side Bar**: Located on the left side, it contains icons for file operations like Open, Save, Find, and others, along with sections for WORKSPACES [CODESPACES: SUPER FIESTA] and a list of files: .codespaces, .venv, CourseMaterials25, homework_yifan, pyproject.toml, and uv.lock.
- Editor**: The main workspace area featuring a large title "Get Started with VS Code for the Web". Below it, a callout box highlights the "Choose your theme" section, which includes four theme options: Dark Modern, Light Modern, Dark High Contrast, and Light High Contrast. A "Browse Color Themes" button and a keyboard tip ("Tip: Use keyboard shortcut ⌘ K ⌘ T") are also present.
- Panel**: A terminal panel at the bottom showing the output of a cloning process into a workspace folder. The output includes:

```
+ websocket-client==1.8.0
+ widgetsnbextension==4.0.14
+ xarray==2025.8.0
+ xyzservices==2025.4.0
+ yarl==1.20.1
+ zarr==3.1.2
+ zipp==3.23.0
Cloning into 'CourseMaterials25'...
remote: Enumerating objects: 36, done.
remote: Counting objects: 100% (36/36), done.
remote: Compressing objects: 100% (27/27), done.
remote: Total 36 (delta 5), reused 31 (delta 3), pack-reused 0 (from 0)
Receiving objects: 100% (36/36), 5.41 MiB | 27.43 MiB/s, done.
Resolving deltas: 100% (5/5), done.
Outcome: success User: vscode WorkspaceFolder: /workspaces
devcontainer process exited with exit code 0
Finished configuring codespace.
```



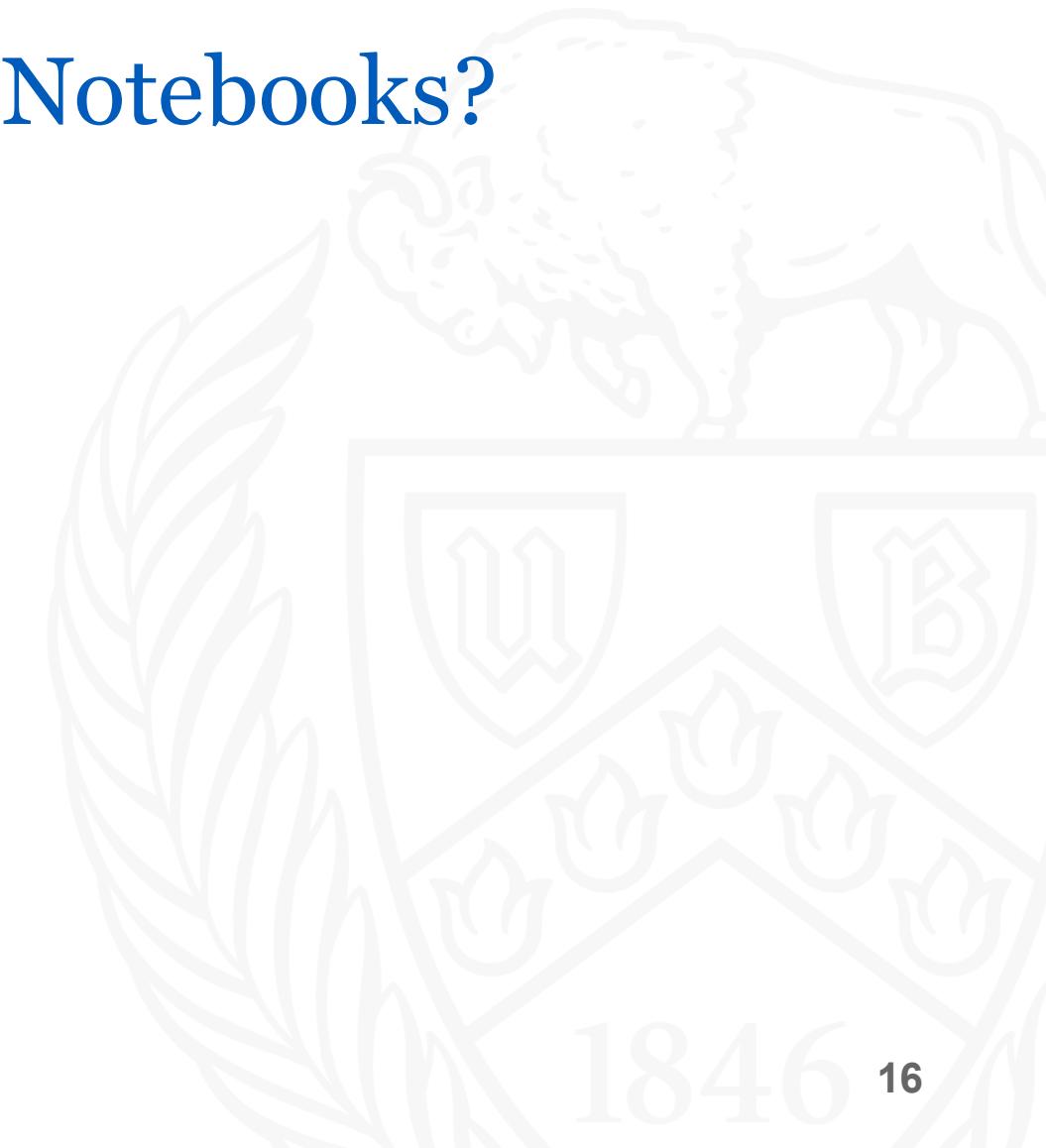
The screenshot shows the VS Code Web interface with several UI elements highlighted:

- Side Bar**: The left sidebar containing icons for file operations like Open, Save, Find, and others.
- Editor**: The main workspace area featuring a "Get Started with VS Code for the Web" guide. It includes a "Choose your theme" section with four color scheme options: Dark Modern, Light Modern, Dark High Contrast, and Light High Contrast. A callout box points to the "Dark High Contrast" theme, which is highlighted with an orange border. A "Browse Color Themes" button and a keyboard tip ("Tip: Use keyboard shortcut ⌘ K ⌘ T") are also visible.
- Panel**: A callout box pointing to the "TERMINAL" tab in the bottom navigation bar, which is currently active.
- Terminal**: The terminal panel showing command-line output for cloning a repository and configuring a codespace. A callout box contains the text: "Click + to open new terminals".

Other visible UI elements include:

- Top bar: Workspaces [Codespaces: super fiesta], search bar, and window controls.
- Bottom bar: PROBLEMS, OUTPUT, DEBUG CONSOLE, TERMINAL (active), PORTS 1, GitHub Codespaces: Details, and other window controls.
- Status bar: Shows the current workspace (Codespaces: super fiesta), file paths (homework_yifan, main), and other system information.

How to create folders & Jupyter Notebooks?





The screenshot shows the Microsoft Codespaces interface. On the left is the Explorer sidebar, which lists project files including .codespaces, .venv, CourseMaterials, homework, .devcontainer, hw1, .hidden, project_submissions, .gitignore, postbuild.sh, pyproject.toml, README.md, pyproject.toml, and uv.lock. A yellow callout box with the text "Click this to create new folder" points to the "New Folder" icon in the Explorer sidebar.

The main area displays a Jupyter notebook titled "homework1.ipynb". The code cell [2] contains:

```
%matplotlib inline  
  
import numpy as np  
import pandas as pd  
import xarray as xr  
import matplotlib.pyplot as plt
```

The code cell [3] contains:

```
print(1+2)
```

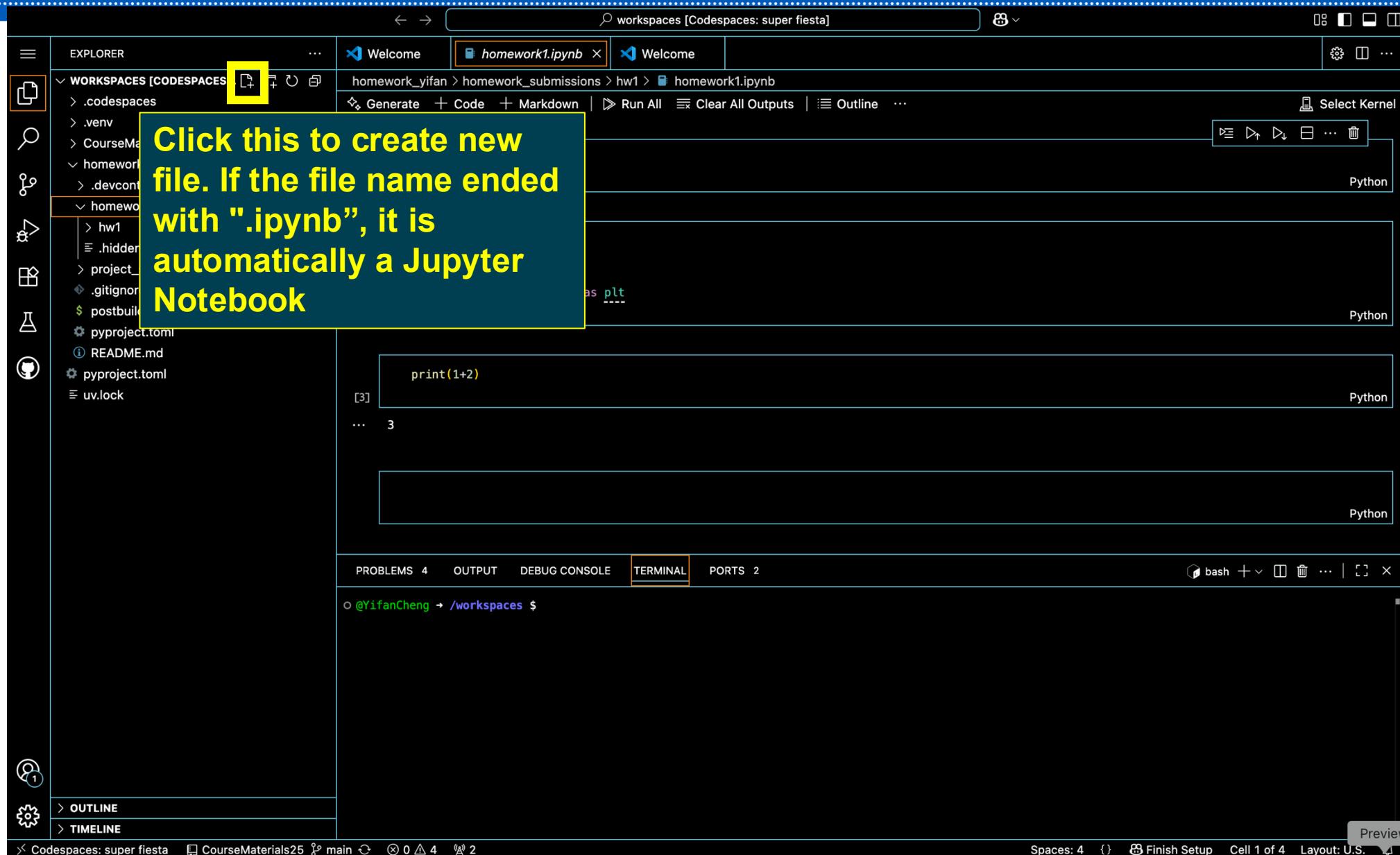
The output of cell [3] is:

```
3
```

Below the notebook, the terminal window shows:

```
@YifanCheng ~ /workspaces $
```

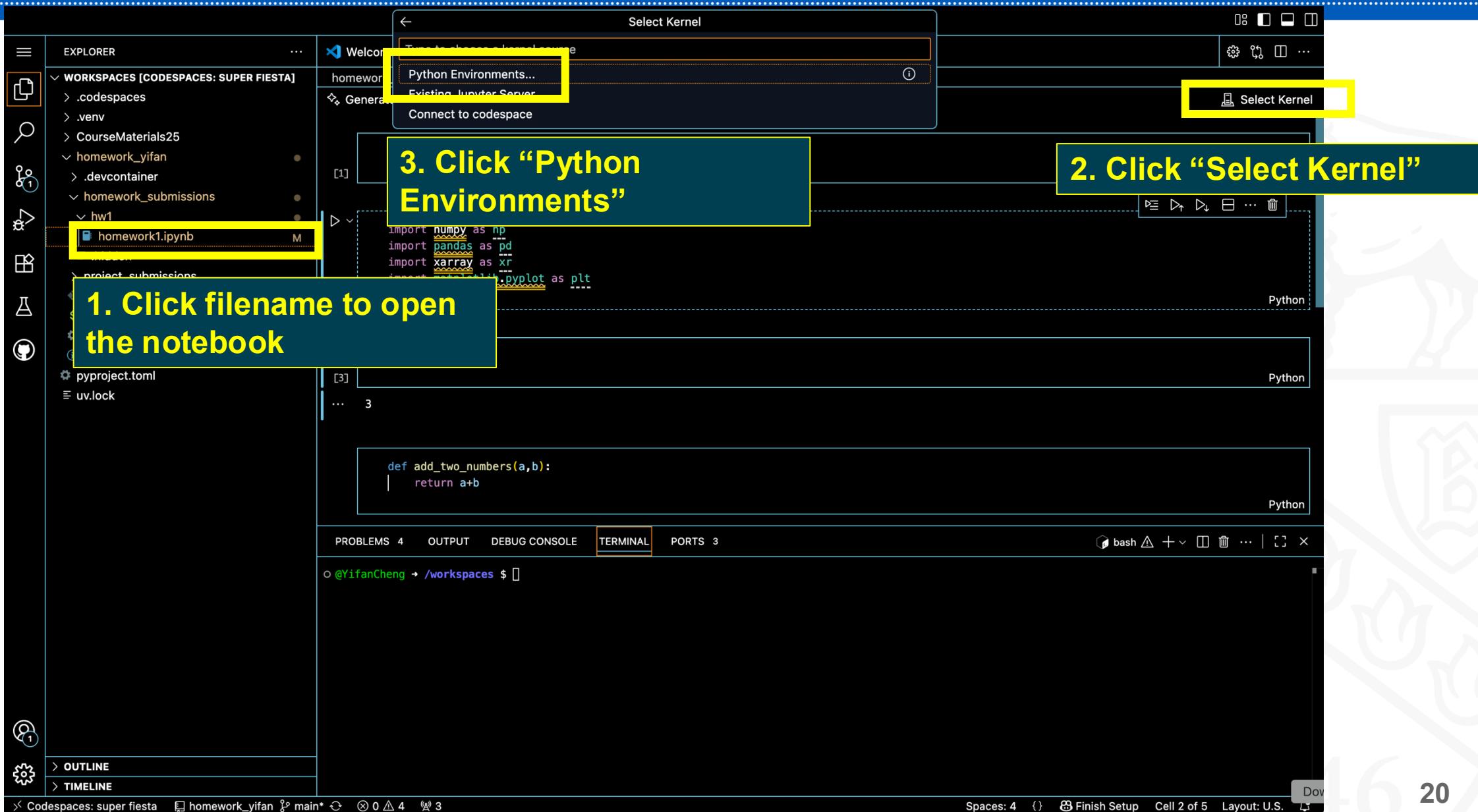
At the bottom, the status bar indicates "Spaces: 4" and "Cell 1 of 4 Layout: U.S.". The page number "17" is located in the bottom right corner.

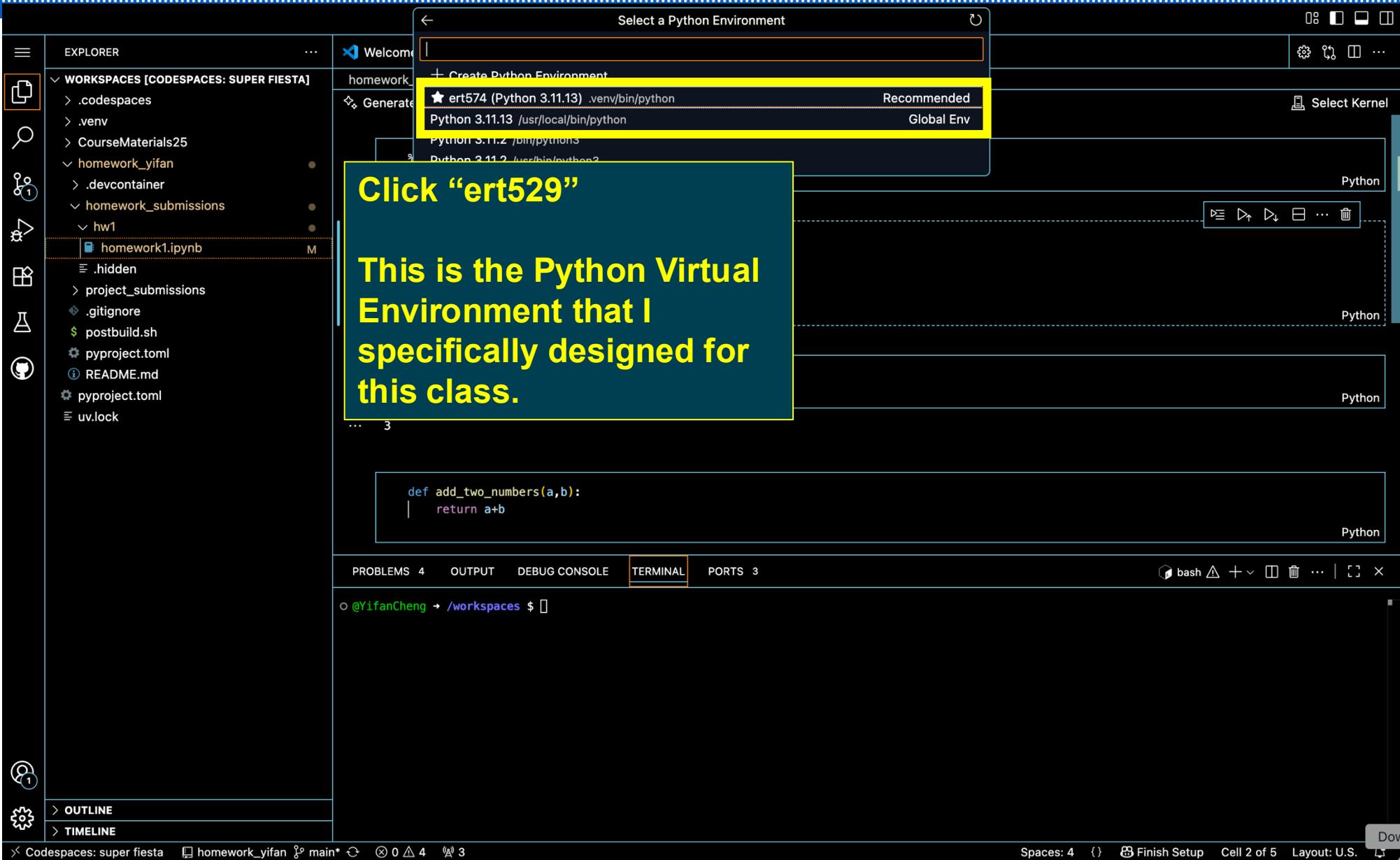


The screenshot shows the Microsoft Codespaces interface with the following details:

- EXPLORER** sidebar: Shows the workspace structure. A yellow box highlights the "WORKSPACES [CODESPACES]" section, which contains ".codespaces", ".venv", "CourseMaterials", "homework", and ".devcontainer". The "homework" folder is expanded, showing "hw1", ".hidden", "project_1", ".gitignore", "postbuild.sh", "pyproject.toml", "README.md", "pyproject.toml", and "uv.lock".
 - A large yellow callout box with the text: "Click this to create new file. If the file name ended with ".ipynb", it is automatically a Jupyter Notebook" is positioned over the "homework" folder.
- WORKSPACES [CODESPACES]**: A tab bar with three tabs: "Welcome", "homework1.ipynb" (which is currently active), and "Welcome".
- homework1.ipynb** notebook panel:
 - Code cell: `print(1+2)` (output: 3)
 - Empty cell placeholder: `as plt`
 - Output cell placeholder: `Python`
- TERMINAL**: A terminal window showing the command: `@YifanCheng ~ /workspaces $`.
- STATUS BAR**: Shows "Spaces: 4", "Finish Setup", "Cell 1 of 4", "Layout: U.S.", and "Preview".

How to open a Notebook and how to run a Jupyter Notebook?

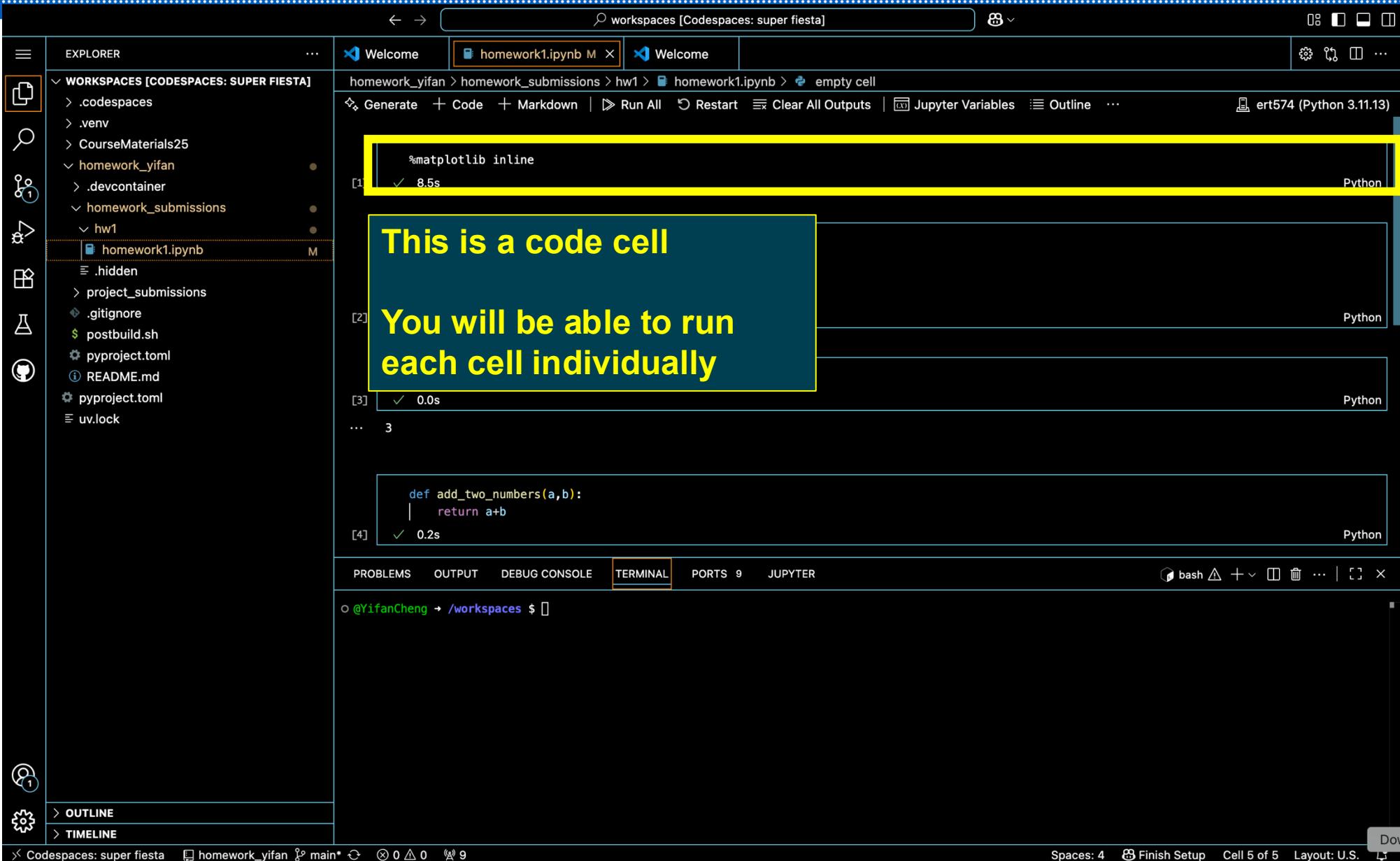




The screenshot shows the VS Code interface with a dark theme. On the left is the Explorer sidebar, which lists workspaces, files, and folders. In the center, a tooltip box with a yellow border contains the text: "Click 'ert529'" and "This is the Python Virtual Environment that I specifically designed for this class." The tooltip is positioned over the "Select a Python Environment" dialog. The dialog shows several environments: "ert574 (Python 3.11.13) .venv/bin/python" (Recommended), "Python 3.11.13 /usr/local/bin/python", "Python 3.11.2 /bin/python3", and "Python 3.11.2 /usr/bin/python3". Below the tooltip, there is a code editor window with the following Python code:

```
def add_two_numbers(a,b):
    return a+b
```

The terminal tab is selected in the bottom navigation bar, showing the command line prompt: "@YifanCheng ~ /workspaces \$". The status bar at the bottom provides information about the current workspace, tabs, and other settings.



The screenshot shows a Jupyter Notebook interface within a Microsoft Visual Studio Code workspace. The workspace path is `homework_yifan > homework_submissions > hw1 > homework1.ipynb`. The notebook contains several code cells:

- Cell [1]:

```
%matplotlib inline
```

 (Python) - Executed 8.5s ago.
- Cell [2]: A large blue box highlights this cell with the text: "This is a code cell" and "You will be able to run each cell individually".
- Cell [3]:

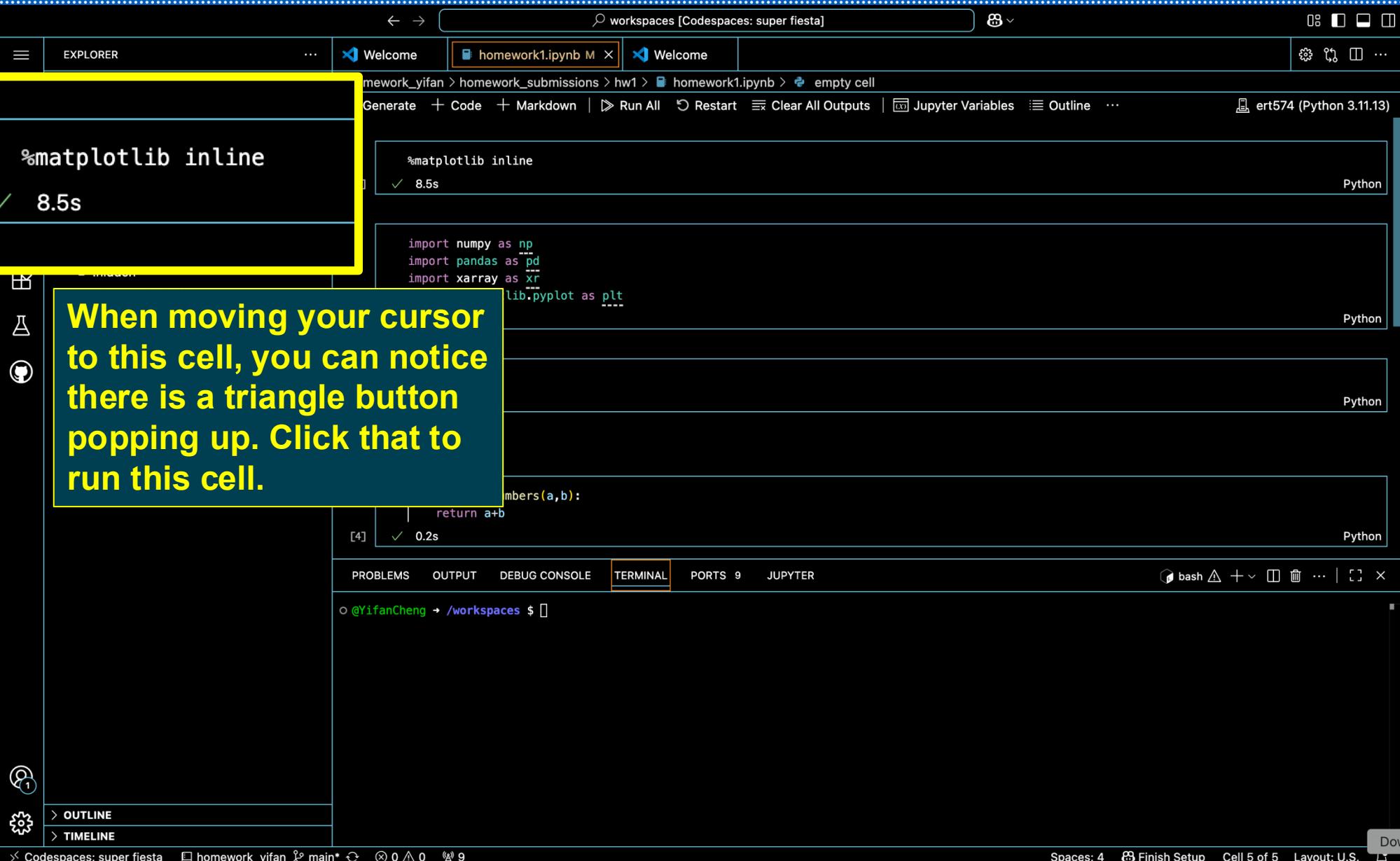
```
def add_two_numbers(a,b):
```

 (Python) - Executed 0.0s ago.
- Cell [4]:

```
| return a+b
```

 (Python) - Executed 0.2s ago.

The interface includes a sidebar with icons for Explorer, Search, Open, Project, File, Settings, and Help. The bottom status bar shows the workspace name, file path, and various status indicators like battery level and signal strength.



The screenshot shows a Jupyter Notebook interface within a Codespace. A yellow box highlights the first code cell, which contains the command `%matplotlib inline`. A yellow circle with a dashed border highlights the play button icon (`>`) in the cell toolbar. A yellow tooltip box with black text is overlaid on the interface, stating: "When moving your cursor to this cell, you can notice there is a triangle button popping up. Click that to run this cell." The notebook has three cells total, with the first one being executed and taking 8.5s. The second cell imports numpy, pandas, xarray, and matplotlib. The third cell defines a function `members(a,b)` that returns `a+b`.

Practice #1

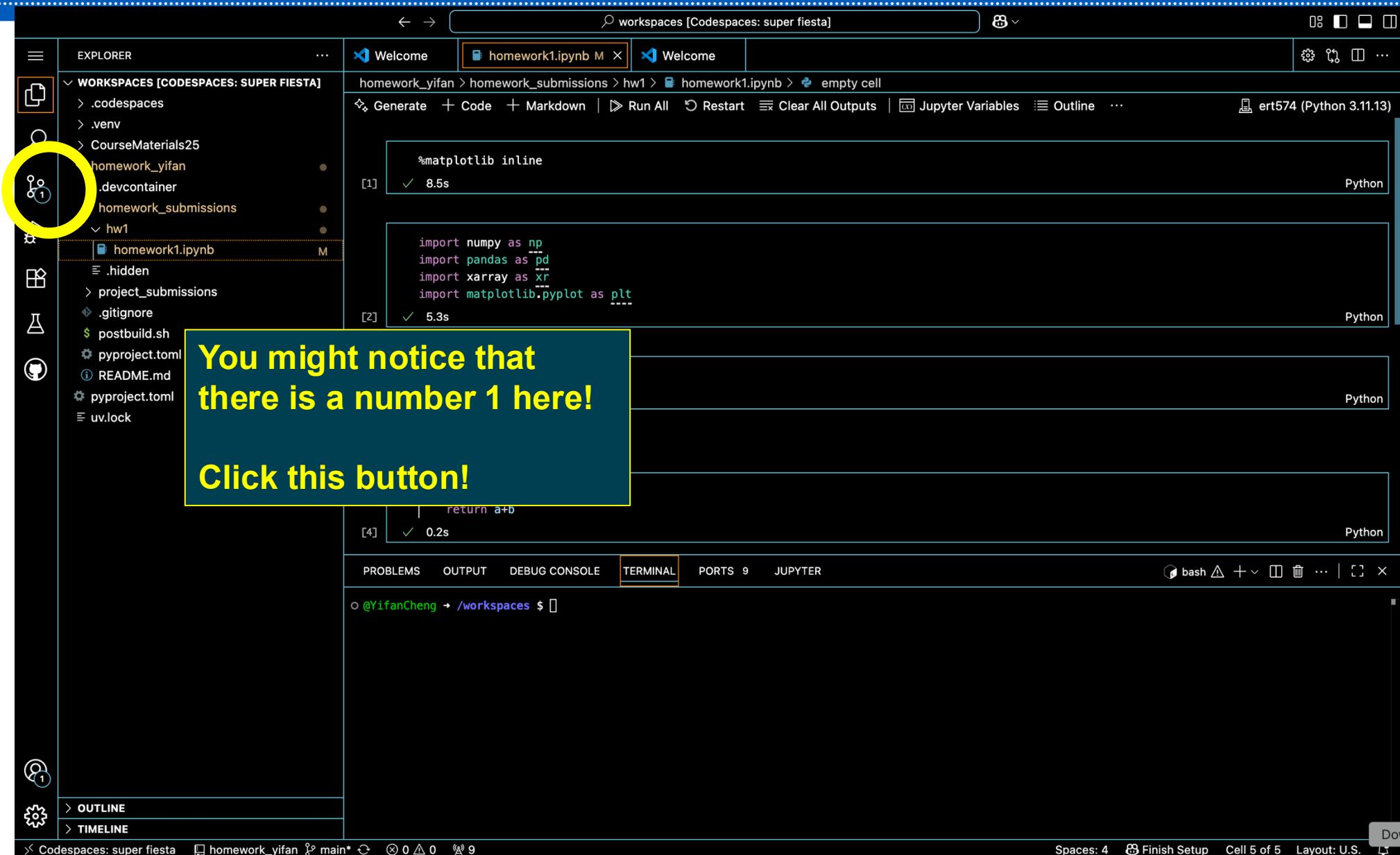
- Create a folder named “practice” under the folder “homework_submissions”
- Within the “practice” folder, create a Jupyter Notebook named “practice.ipynb”
- In “practice.ipynb”,
 - In one cell, write a function that adds up two variables, **a** and **b**, and assigns the sum to the variable **result**. You may seek help from *CoPilot*.
 - In another cell, assign **a=3**, **b=2**, print the sum of **a** and **b**

How can we “Submit” the homework?

“Submitting” means that your instructor will be able to access the Jupyter Notebook that you worked on.

We will need to

- 1.“commit” the changes locally in GitHub CodeSpaces
- 2.“push” the committed changes to GitHub



You might notice that there is a number 1 here!

Click this button!

WORKSPACES [CODESPACES: SUPER FIESTA]

- .codespaces
- .venv
- CourseMaterials25
- homework_yifan
- .devcontainer
- homework_submissions
- hw1
- homework1.ipynb M
- .hidden
- project_submissions
- .gitignore
- postbuild.sh
- pyproject.toml
- README.md
- pyproject.toml
- uv.lock

homework_yifan > homework_submissions > hw1 > homework1.ipynb > empty cell

Generate + Code + Markdown | Run All | Restart | Clear All Outputs | Jupyter Variables | Outline ...

ert574 (Python 3.11.13)

[1] %matplotlib inline
8.5s Python

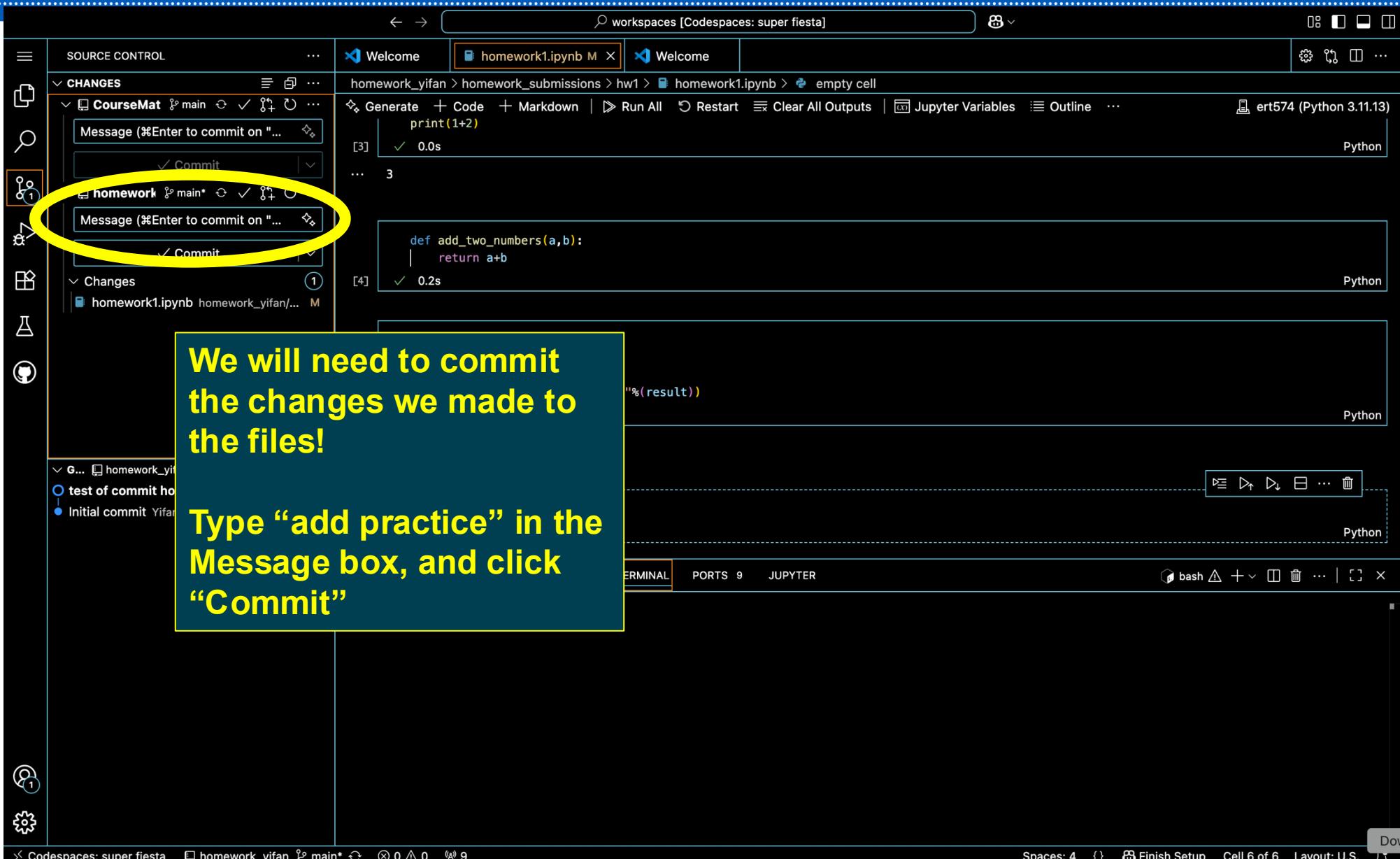
[2] import numpy as np
import pandas as pd
import xarray as xr
import matplotlib.pyplot as plt
5.3s Python

[4] return a+b
0.2s Python

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS 9 JUPYTER

@YifanCheng → /workspaces \$

Spaces: 4 Finish Setup Cell 5 of 5 Layout: U.S.

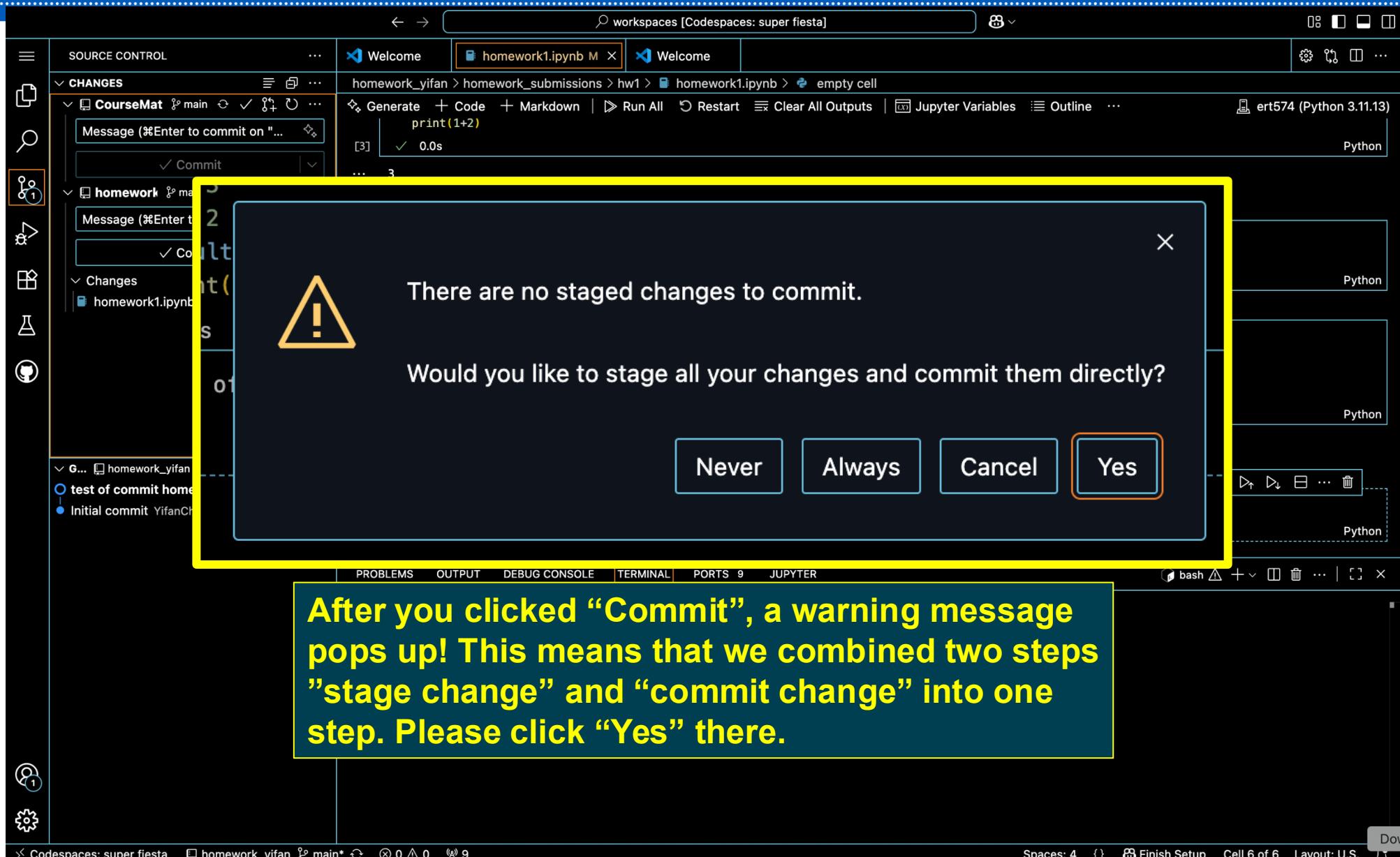


The screenshot shows a Jupyter Notebook interface within a Codespace. On the left, the Source Control panel displays a 'Changes' section with two commits. The top commit is for 'CourseMat' and the bottom one is for 'homework'. A yellow circle highlights the 'Message' input field for the 'homework' commit. A large callout box with a dark blue background and white text contains the following instructions:

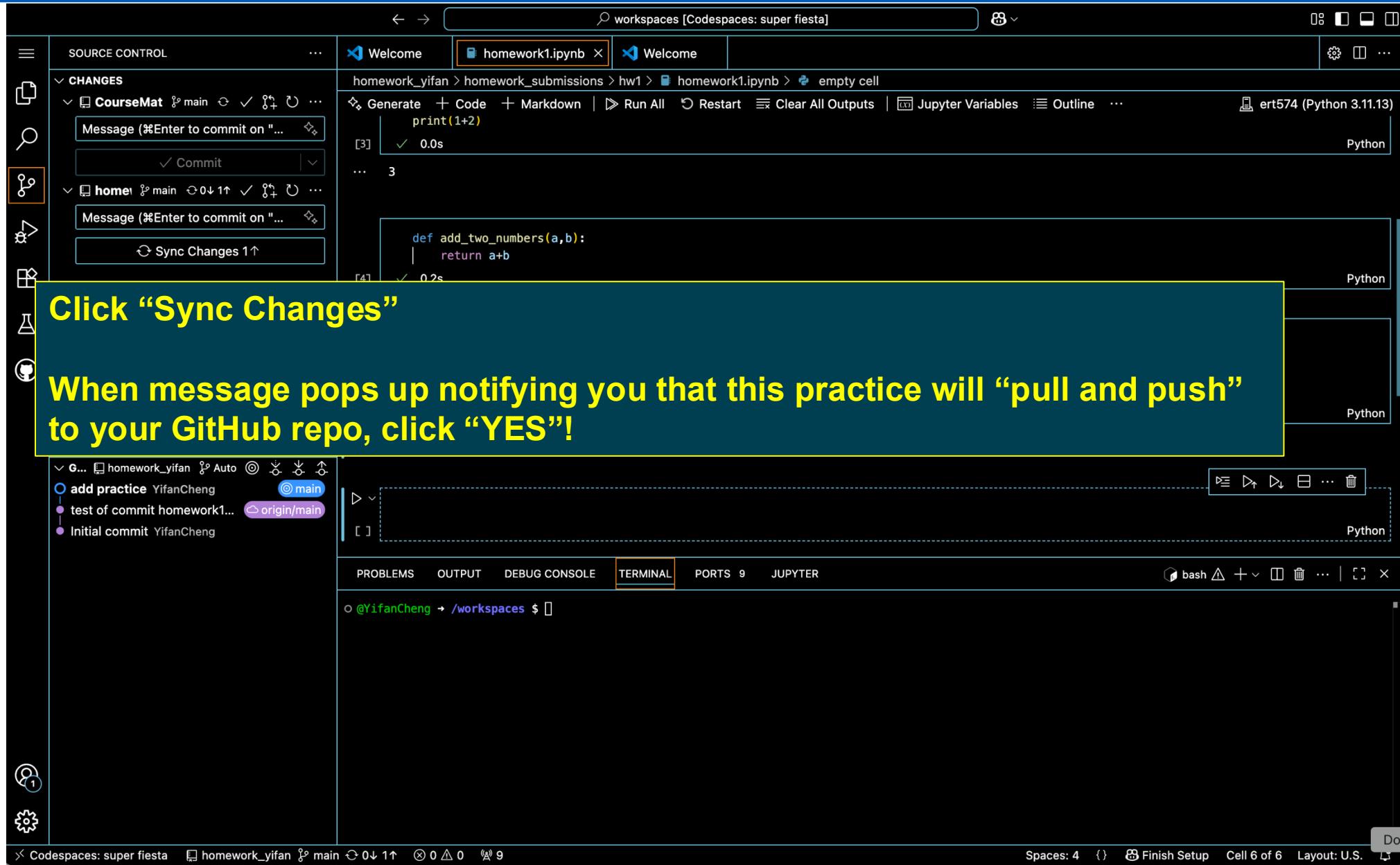
We will need to commit the changes we made to the files!

Type “add practice” in the Message box, and click “Commit”

The main notebook area shows a Python cell with the code `print(1+2)` and its output `3`. Another cell below it contains the code `def add_two_numbers(a,b): return a+b` and its output `0.2s`. The bottom of the screen shows the terminal, ports, and Jupyter sections.



After we commit the changes, it means that the changes has been documented locally in CodeSpaces. We still need to “push” the changes to GitHub repo.

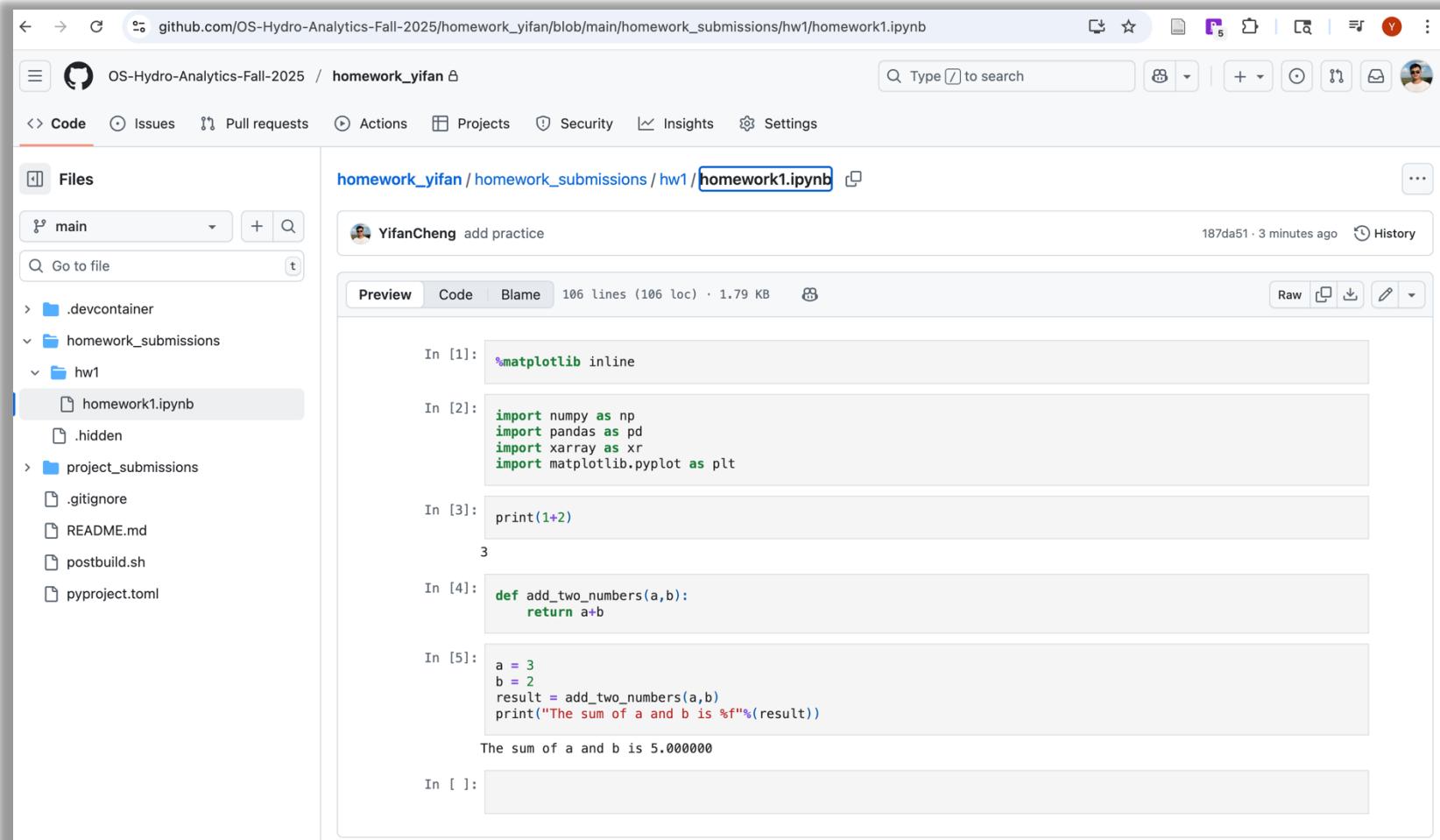


The screenshot shows the Microsoft Codespaces interface. On the left is a sidebar with icons for Source Control, Changes, and other tools. The main area has a search bar at the top. Below it, there are two tabs: "Welcome" and "homework1.ipynb". The "homework1.ipynb" tab is active, displaying a Jupyter notebook cell with the code `print(1+2)`. The output shows `3` and `0.0s`. Another cell below contains the function definition `def add_two_numbers(a,b): return a+b`, also with an output of `0.0s`. The bottom part of the interface features a terminal window showing a GitHub repository with three commits: "add practice", "test of commit homework1...", and "Initial commit". The terminal also shows a prompt: `@YifanCheng ~ /workspaces $`. A large yellow callout box highlights the "Sync Changes" button in the sidebar and the message "When message pops up notifying you that this practice will ‘pull and push’ to your GitHub repo, click ‘YES’!".

Click “Sync Changes”

When message pops up notifying you that this practice will “pull and push” to your GitHub repo, click “YES”!

Now, go to your homework repo



The screenshot shows a GitHub repository page for 'OS-Hydro-Analytics-Fall-2025' with the path 'homework_yifan/homework_submissions/hw1/homework1.ipynb'. The repository has 187da51 · 3 minutes ago · History. The notebook file contains the following code:

```
%matplotlib inline
import numpy as np
import pandas as pd
import xarray as xr
import matplotlib.pyplot as plt
print(1+2)
3
def add_two_numbers(a,b):
    return a+b
a = 3
b = 2
result = add_two_numbers(a,b)
print("The sum of a and b is %f"%(result))
The sum of a and b is 5.000000
```

You should see that the edits you made in the Jupyter Notebooks have been updated to GitHub Page!

Practice #2

- Go to your CodeSpaces, find the “**README**” file under your own homework folder (the folder should have the name, i.e., “homework_YourUserName”)
- Edit the **README** file to include the following information
 - 1. Name
 - 2. Email address
 - 3. Your coding experiences
- After making the changes, push the changes to your GitHub repo.

