

Lab 0: VSCode and Python Setup

Guide

For the first part of the course, we program in Pyret. The programming environment (where you write your programs) is online at <https://code.pyret.org>. You log into it with any Google account (you can use your Brown account or make another one if you prefer).

Starting in late October, we will switch to programming in Python. We want to get our Python programming tool (VSCode) installed now, before you're under the deadline pressure of a Python assignment.

Unfortunately, getting a Python programming environment installed and set up can be a bit tricky. This is because there are multiple versions of Python and many extensions that we'll need to use with Python: we have to make sure that all the extensions and your code are using a consistent version of Python.

Please don't judge your potential experience in the course by this setup process -- it isn't at all representative (even the prof and TAs often find this painful). We've just found in past years that it is better to get the tools ready now before assignments get underway.

The TAs will be running several (optional) lab hours during the first week of shopping period where you can come in and have them help you through the installation process. Of course, you are welcome to do this on your own as well (and put questions on EdStem). The instructions on this page give everything you'll need.

Hopefully, this entire process should take no more than 30 minutes.

Why are we using VSCode? Can we use something else?

Despite the popularity of Python, it is very hard to find a good tool in which to teach it, especially in a class that covers testing and explains the underlying information used to run programs. You are welcome to use another Python tool if you'd like, but you'll have to:

- use Python version 3.9 (check by running ``python3 --version`` from terminal/MacOS or command prompt/Windows)
- install the packages that we need for yourself (numpy, pytest, and pandas),
- make sure you can load csv files that you have downloaded to your computer
- adapt lecture presentations to your tool instead of VSCode.

Labs will run in VSCode. The TAs will only help with VSCode installation and configuration.

Setting up everything

At a high-level, there are four steps to the setup:

- Install VSCode (the tool where we'll write code)
- Install the Miniconda Python manager (this will also install Python)
- Configure Miniconda with the Python extensions we'll need
- Check that everything is working

The rest of this handout walks you through each step in detail.

Step 1: Install VSCode

Follow the instructions on [the official VSCode website](#) to set it up on your computer.

Step 2: Install Miniconda/Python

Follow the instructions for whichever kind of computer you have ([Windows](#) vs [Mac](#)).

Windows

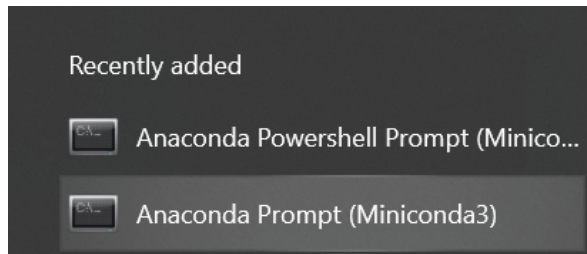
Go to [this page](#) to install Miniconda. **Use the Python 3.9 installation only (see the image below).** If you don't know if your computer is 64-bit or 32-bit, it is very likely 64-bit.

Windows installers

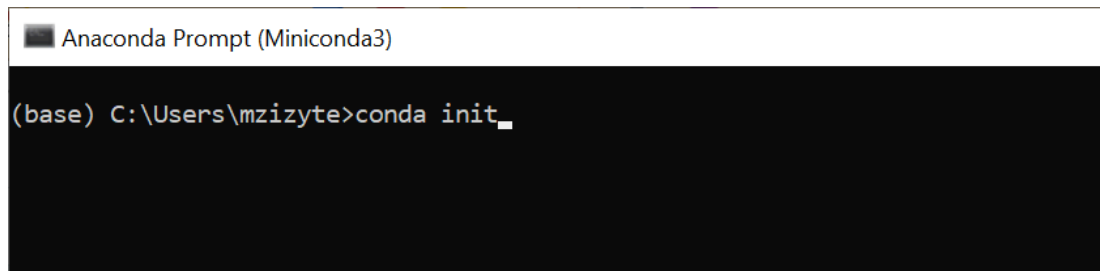
Windows			
Python version	Name	Size	SHA256 hash
Python 3.9	Miniconda3 Windows 64-bit	71.2 MiB	1acbc2e8277ddd54a5f724896c7edee112d068529588d9447
Python 3.8	Miniconda3 Windows 64-bit	70.6 MiB	94f24e52e316fa935ccf94b0c504ceca8e6abc6190c68378e
Python 3.7	Miniconda3 Windows 64-bit	69.0 MiB	b221ccdb2bbc5a8209a292f858ae05fd87f882f79be75b37d
Python 3.9	Miniconda3 Windows 32-bit	67.8 MiB	4fb64e6c9c28b88beab16994bfba4829110ea3145baa60bda

Open the installer and install Miniconda locally ("just for me"). You can use the default settings and just press "next" until you finish the installation.

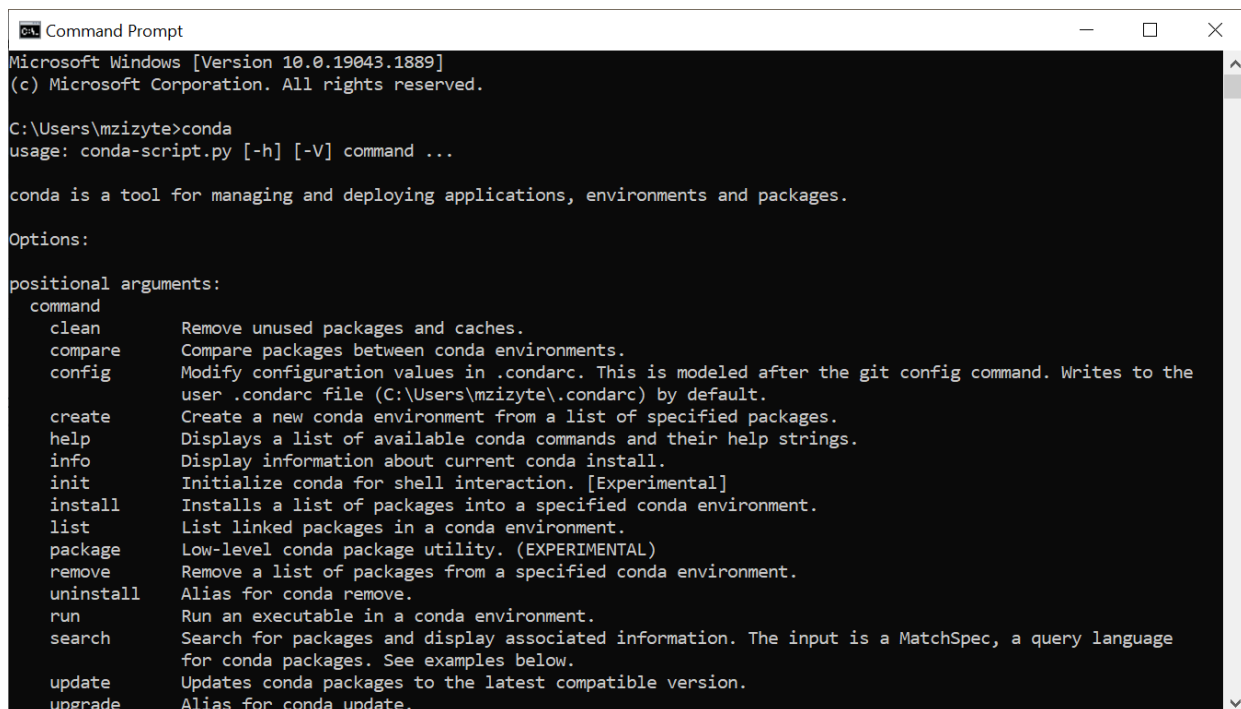
After you've run the installer, look for the Miniconda installation on your start menu and click to open it (it may appear as "Anaconda Prompt (Miniconda3)" as shown below)



In the command prompt that opens up, type `conda init` and press enter:



Once this is done running, close the window and open a new terminal. To do this, search for 'Command Prompt' on Windows in the start menu. Then, type `conda`, and press enter. If informative text appears, similar to the below, then you are set! Go on to [download the VSCode Python extension](#).



MacOS

Go to [this page](#) to install Miniconda. **Make sure you download Python version 3.9!**

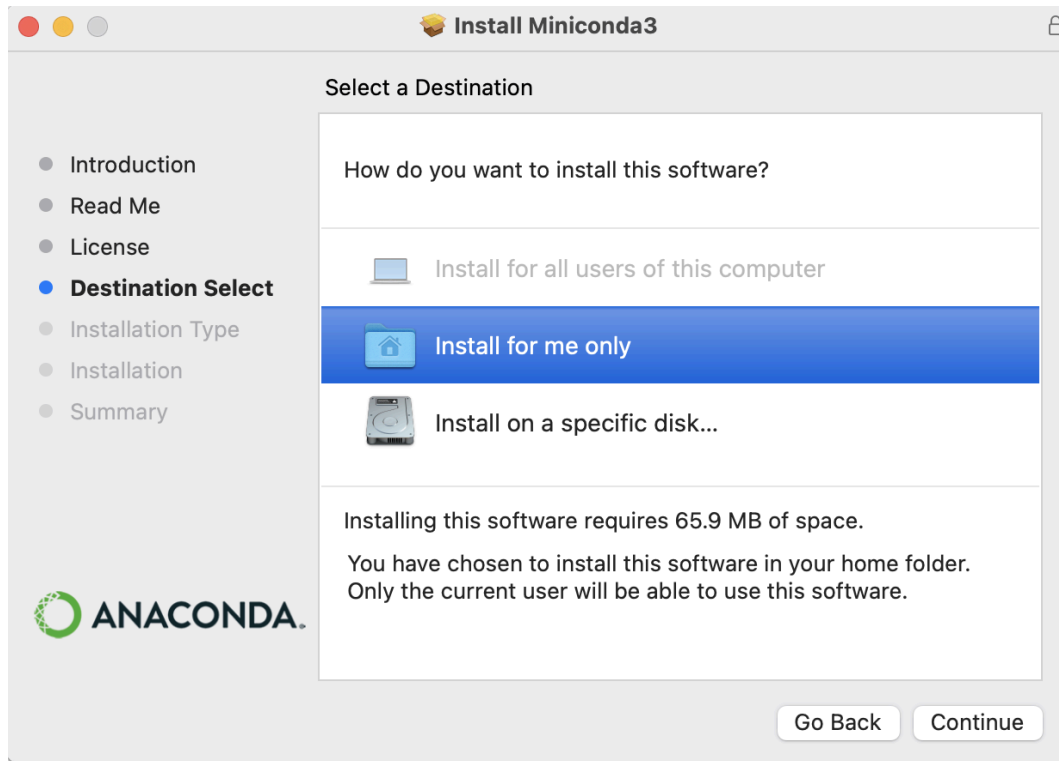
- If you are on an Mac with an M1 processor download 'Miniconda3 macOS Apple M1 ARM 64-bit pkg'
- If you are on an Mac with an Intel processor download 'Miniconda3 macOS Intel x86 64-bit pkg'

(you can check what kind of processor you have in 'About This Mac')

macOS installers

macOS			
Python version	Name	Size	SHA256 hash
Python 3.9	Miniconda3 macOS Intel x86 64-bit bash	56.0 MiB	007bae6f18dc7b6f2ca6209b5a0c9bd2f283154152f82becf787aac709a51633
	Miniconda3 macOS Intel x86 64-bit pkg	62.7 MiB	cb56184637711685b08f6eba9532cef6985ed7007b38e789613d5dd3f94ccc6b
	Miniconda3 macOS Apple M1 ARM 64-bit bash	52.2 MiB	4bd112168cc33f8a4a60d3ef7e72b52a85972d588cd065be803eb21d73b625ef
	Miniconda3 macOS Apple M1 ARM 64-bit pkg	63.5 MiB	0cb5165ca751e827d91a4ae6823bfda24d22c398a0b3b01213e57377a2c54226
Python 3.8	Miniconda3 macOS Intel x86 64-bit bash	56.4 MiB	f930f5b1c85e509ebbf9f28e13c697a082581f21472dc5360c41905d10802c7b
	Miniconda3 macOS Intel x86 64-bit pkg	63.1 MiB	62eda1322b971d43409e5dde8dc0fd7bfe799d18a49fb2d8d6ad1f6833448f5c
	Miniconda3 macOS Apple M1 ARM 64-bit bash	52.5 MiB	13b992328ef088a49a685ae84461f132f8719bf0cab43792fc9009b0421f611
	Miniconda3 macOS Apple M1 ARM 64-bit pkg	63.8 MiB	e92fd40710f7123d9e1b2d44f71e7b2101e3397049b87807ccf612c964beef35
Python 3.7	Miniconda3 macOS Intel x86 64-bit bash	66.0 MiB	323179e4873e291f07db041f3d968da2ffc102dcf709915b48a253914d981868
	Miniconda3 macOS Intel x86 64-bit pkg	72.7 MiB	9278875a235ef625d581c63b46129b27373c3cf5516d36250a1a3640978280cd

Once the installer has downloaded, open it and follow the instructions in the installer. **If prompted to select a destination, choose 'Install for me only'.** If no prompt appears, just continue on.



For Both Mac and Windows

Once you've completed all of the steps you should get a success message/window (example below). To be sure you're all set, you can open 'Terminal' (in Launchpad) on MacOS or 'Command Prompt' on Windows in the start menu, and type in "conda." If you get an informative message like the one below, you're all set!

Note: It is possible that your installation was a success, but it does not show. For example, if you opened your terminal before installing conda, you may need to open a new terminal.

```
sethsabar — -zsh — 80x24
Last login: Wed Aug 31 13:27:42 on console
sethsabar@seths-mbp ~ % conda
usage: conda [-h] [-V] command ...

conda is a tool for managing and deploying applications, environments and packages.

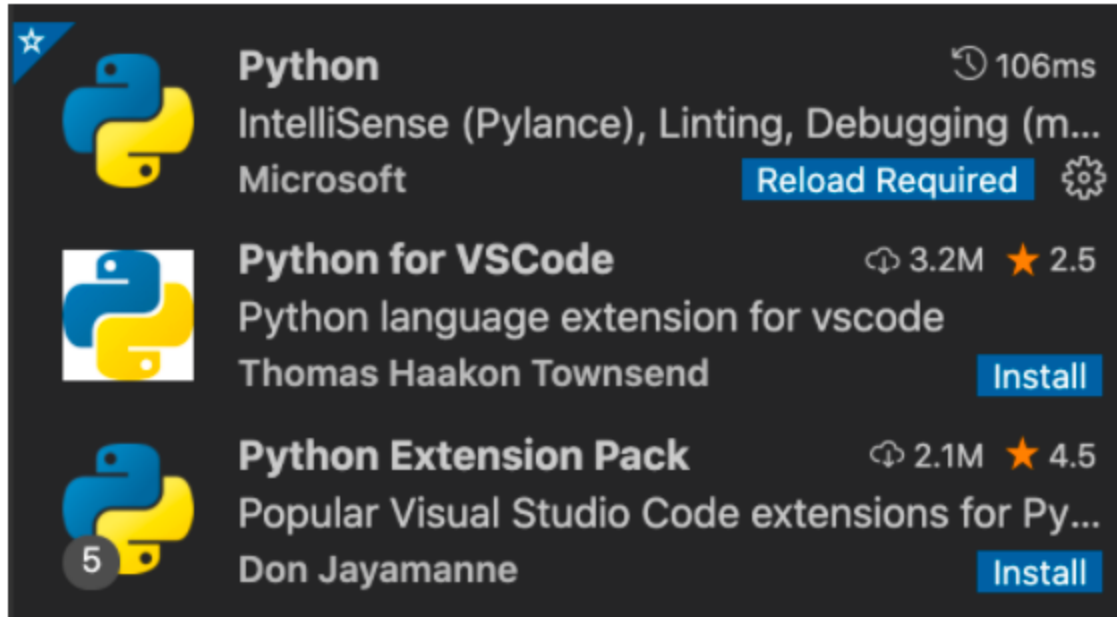
Options:

positional arguments:
  command
  clean                Remove unused packages and caches.
  compare              Compare packages between conda environments.
  config               Modify configuration values in .condarc. This is modeled
                      after the git config command. Writes to the user .condarc
                      file (/Users/sethsabar/.condarc) by default.
  create               Create a new conda environment from a list of specified
                      packages.
  help                 Displays a list of available conda commands and their help
                      strings.
  info                 Display information about current conda install.
  init                 Initialize conda for shell interaction. [Experimental]
  install              Installs a list of packages into a specified conda
                      environment.
```

Step 3a: Download the VSCode Python Extension

For both Mac/Windows: Open VSCode (as you would any other application on your laptop).

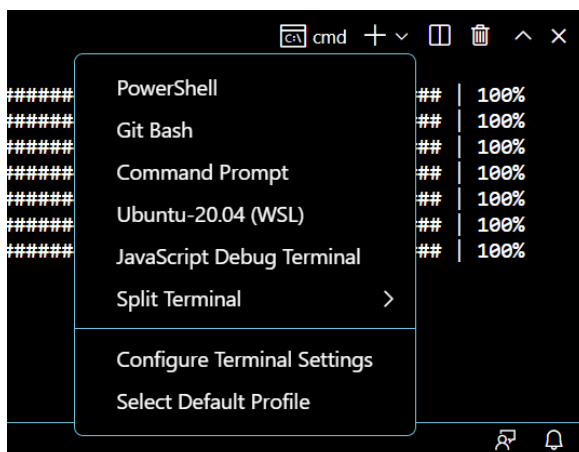
1. Click on the “Extensions” tab on VSCode (located in the left sidebar, looks like a four-square grid with a piece popping out).
2. Search “Python” in the ‘Search Extensions in MarketPlace’. You’ll see three options popping up at the top.
3. Select the one that includes the word “Pylance” in the description, and install it (the first option in the following screenshot).



Step 3b: Set up Conda in VSCode

In VSCode, open a new terminal (Terminal → New Terminal) and run the following commands one-by-one. If you get an error after any of the commands, resolve them (by posting on Ed or asking a TA) before moving on to the next command. Also note that you may be prompted to choose yes/no to Proceed after running some of these commands. Choose yes (just press the y key).

*If you are in **Windows**, make sure in the terminal that you are running this in the command prompt ("cmd") and not Powershell, otherwise conda will not be recognized and these commands will not run. To do this press the drop down menu next to the "+" and click on "Command Prompt" (see below). If correct, "cmd" should be seen in the bar on the top right of the terminal.*



```
conda config --append channels conda-forge
```

```
conda update -n base -c defaults -c conda-forge conda
```

```
conda create -n cs111-env python=3.9
```

```
conda activate cs111-env
```

```
conda install -c conda-forge Pillow pytest numpy requests pandas
```

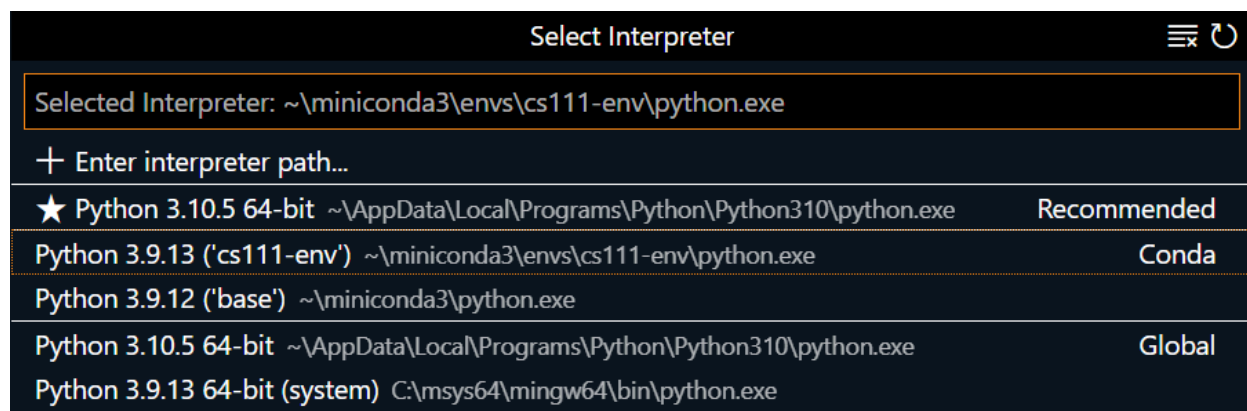
This creates a new environment called cs111-env that uses Python version 3.9 and installs all the necessary Python packages.

Step 4: Make sure everything works

If you didn't previously have a Python file open, create a new (text) file. You'll be asked what language to use. Choose Python. Check the text at the bottom right corner of the VSCode window, if it does not say **'cs111-env': conda** click on the text (the version number) to the right of the word Python and select cs111-env in the Select Interpreter bar.

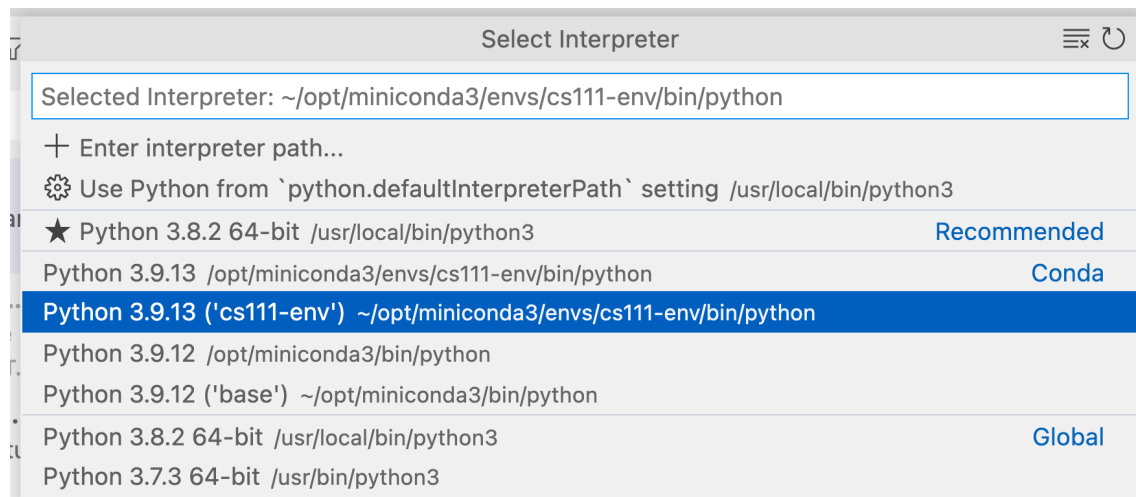
WINDOWS:

Ln 1, Col 1 Spaces: 4 UTF-8 CRLF Python 3.9.13 ('cs111-env': conda) 🔍 🔔



MAC:

UTF-8 LF Python 3.9.13 ('cs111-env': conda)  

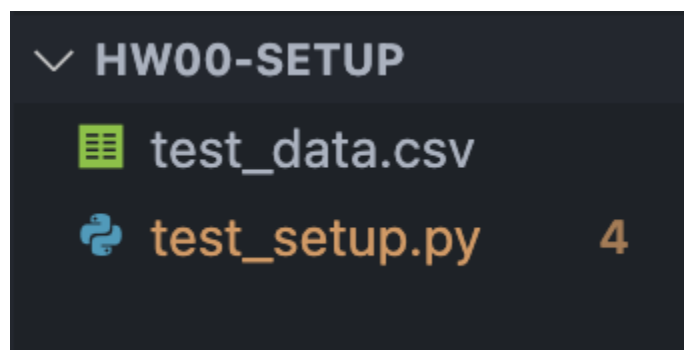


Every time that you are working on a CS111 (Python) assignment, make sure the text at the bottom-right corner of the VSCode window says ('cs111-env': conda).

Download the files to test your setup

Download the testing files that we've linked [here](#). They will download as a ".zip" file. Double-click on it to open it. A new folder named HW00-SETUP should appear which contains test_data.csv and test_setup.py.

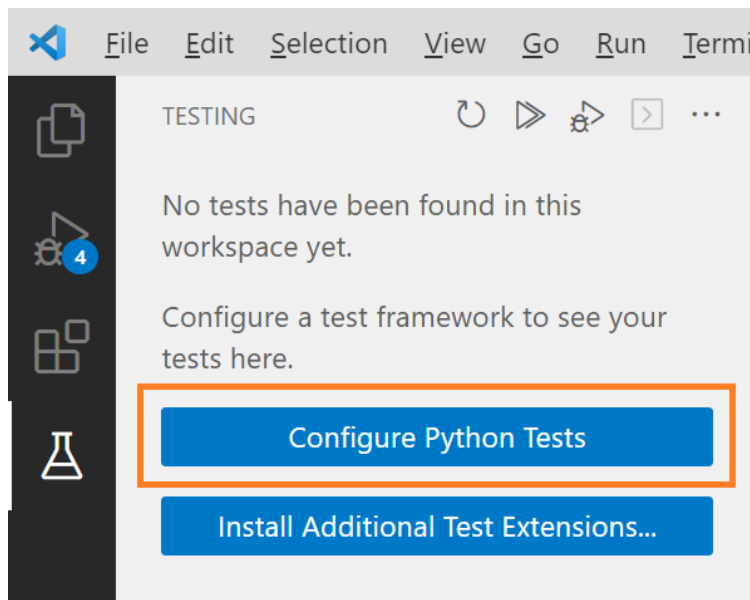
Open the HW00-SETUP folder in VSCode (File → Open folder and navigate to the HW00-setup folder). The left side of your window should now look like this:



Make sure that you've selected the conda environment as your interpreter as described earlier in this step, otherwise these next instructions won't work!

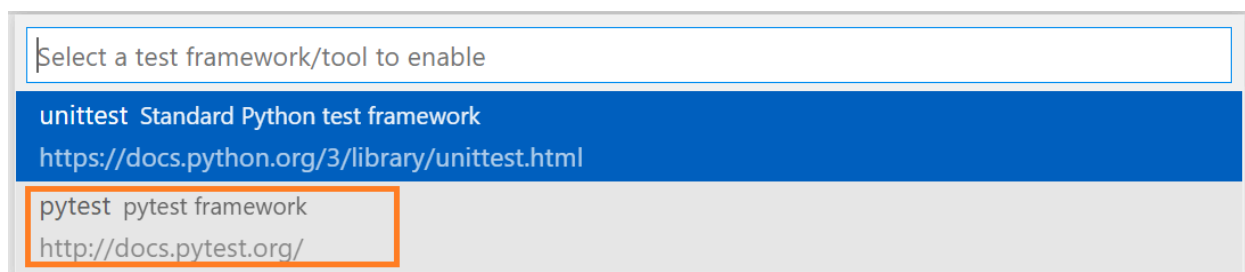
The command line should have `(cs111-env)` before your username, indicating that you are in our cs111 conda virtual environment.

Ensure you have a Python file open in VSCode. Next, navigate to the testing panel by clicking on the beaker (in the left sidebar):

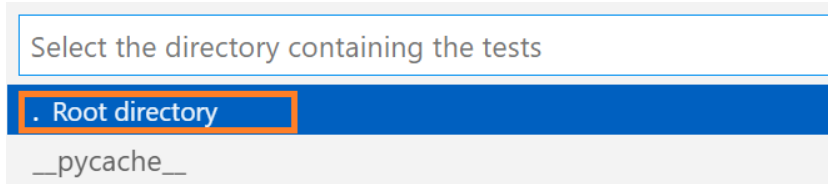


If this is your first time using pytest (likely in 111), you may have to select the correct configuration:

PLEASE click 'pytest' and NOT 'unittest'

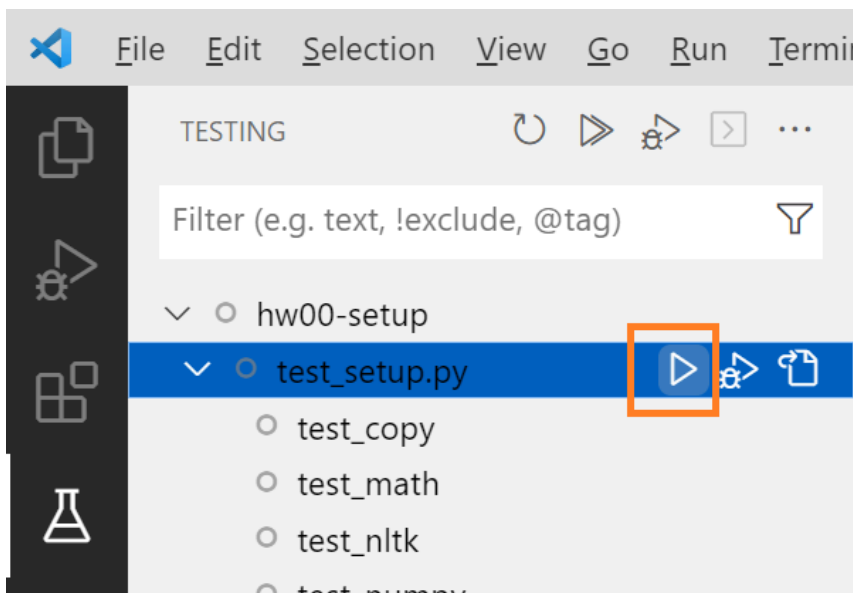


PLEASE click '. Root directory.'

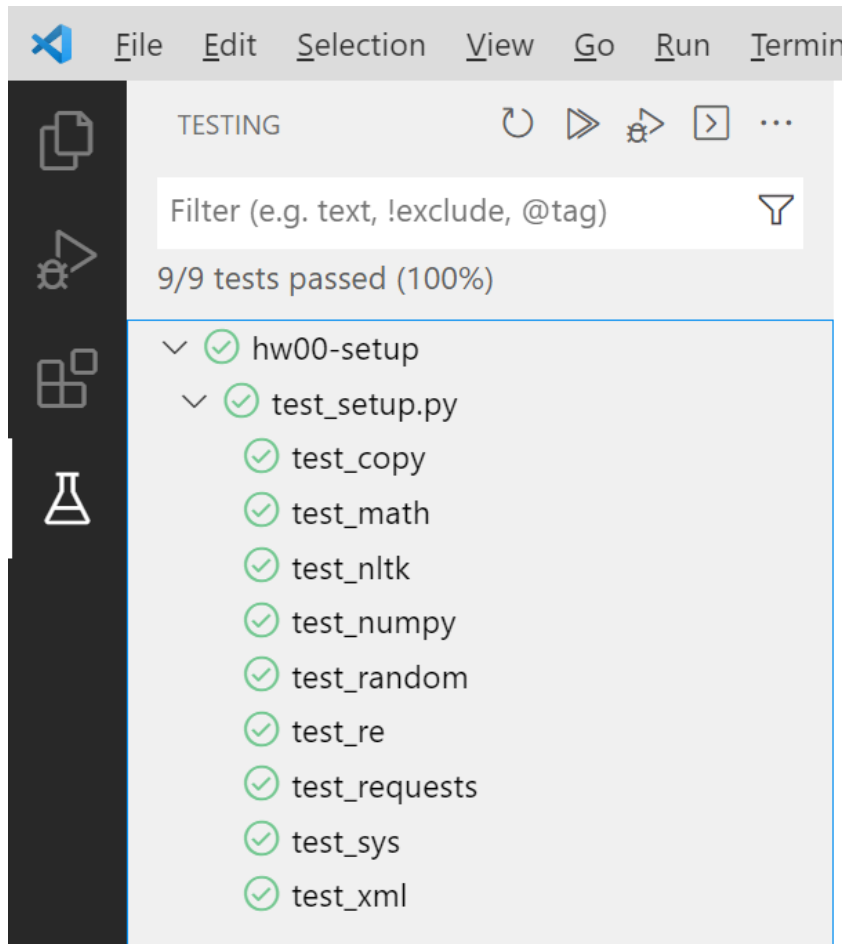


Troubleshooting: If pytest is having problems finding your tests, make sure the only files you see in the left panel are those from the HW00-SETUP folder. Also, double-check that you are using the cs111-env environment. If there is a folder called `__pycache__` anywhere in your workspace (the VSCode term for the collection of directories that you currently have open), you can also try deleting `__pycache__` to see if it helps (don't worry, you don't need it).

Once VSCode has found the tests, run them by clicking the "run tests" arrow to the right of `test_setup.py`



If the tests all pass (all have green checkmarks), you are good to go!



Note: if ever you need to install other Python packages in this environment, you may simply use the command

```
conda install -c conda-forge [package name]
```

Please let us know if you find any mistakes, inconsistencies, or confusing language in this or any other CS111 document by filling out the [anonymous feedback form](#)! (you do have to sign in, but we don't see it)