

INTRODUCTION TO PYTHON

In this session, you will set up your
Python programming environment

Multiple TAs will be available today
to help you

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Reading and Watching

- PyCharm documentation
<https://www.jetbrains.com/help/pycharm/run-for-the-first-time.html>

2

References

- Conda
<https://conda.io/en/latest/>

The best version of Conda to install is the most recent 64-bit Graphical installer using miniconda

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Class Assumptions

- Everyone has had some (maybe limited) programming experience
- Not everyone has used Python
- Not everyone has used an Integrated Development Environment
- Class approach
 - Introduce use of Python slowly, working on real data and real political informatics problems
 - Monitor class progress with many “Are We on Track?” exercises
 - Adjust rate of material delivery based on class feedback

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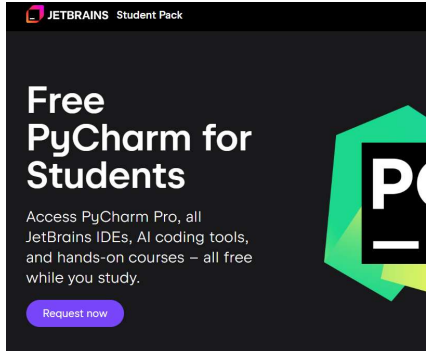
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PyCharm

- You can use the Educational Edition of PyCharm (based on the Community Edition) for your work, which you can access at <https://lp.jetbrains.com/pycharm-for-students/>

If you have not yet installed PyCharm, you can do it now

The most recent version is 2025.1.6



The advertisement for the JetBrains Student Pack features a dark background with a green and yellow geometric logo on the right. The text 'Free PyCharm for Students' is prominently displayed in white. Below it, smaller text states: 'Access PyCharm Pro, all JetBrains IDEs, AI coding tools, and hands-on courses – all free while you study.' A purple button with the text 'Request now' is located at the bottom left of the advertisement.

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PyCharm Setup

- You can use any Python Interactive Development Environment (IDE) you are comfortable with, but the course-supported IDE is PyCharm
- If you are using PyCharm, **A PyCharm project is a combination of libraries and your code**
 - Set up at least one PyCharm project for the course
 - Set your Python interpreter for that project as Python 3.14 or 3.13
 - Set Conda as your configuration manager
- If you have any difficulty in setting up PyCharm, we will provide TA support to help you complete it

You may need to install Conda from <https://conda.io/projects/conda/en/latest/user-guide/install/index.html#regular-installation>

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Install Python

- Check to see if Python is already installed
 - Right click on the start icon and select Windows PowerShell or use the PowerShell interface in PyCharm
 - Type `python -version` in the window
- If not already installed, go to python.org
- Download and install the installer (MSIX), but this might not work (if not, you should still be able to install in PyCharm)



Python is a programming language and integrate systems more

Get Started
Whether you're new to programming or an experienced developer, it's easy to learn and use Python.
Start with our Beginner's Guide

Download
Python source code and installers are available for download for all versions!
Latest: Python 3.14.2

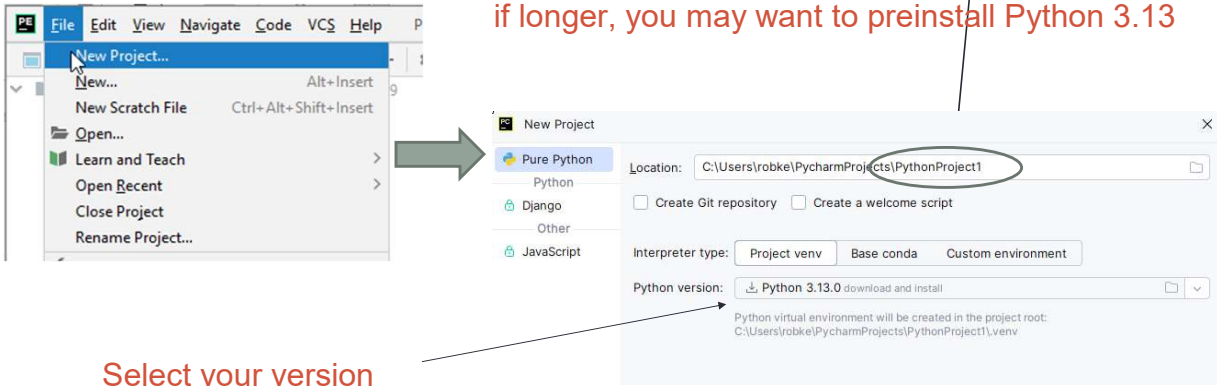
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Setting a Windows PyCharm Project

Enter your project name

Installing Python 3.13 might take a few minutes – if longer, you may want to preinstall Python 3.13



Select your version

Python virtual environment will be created in the project root:
C:\Users\robke\PycharmProjects\PythonProject1\venv

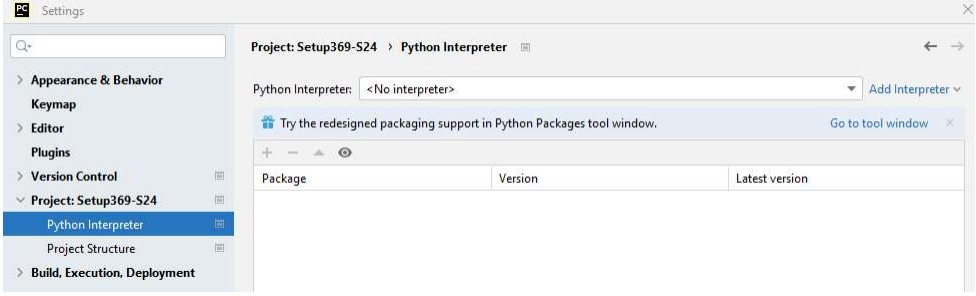
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Select Python Interpreter

- Do this if you preinstalled a Python version
- Select Settings from the File menu of PyCharm

You can make a Python interpreter and libraries unique to each project



You can also set the interpreter by clicking on the interpreter area of the PyCharm status bar (lower right of window)

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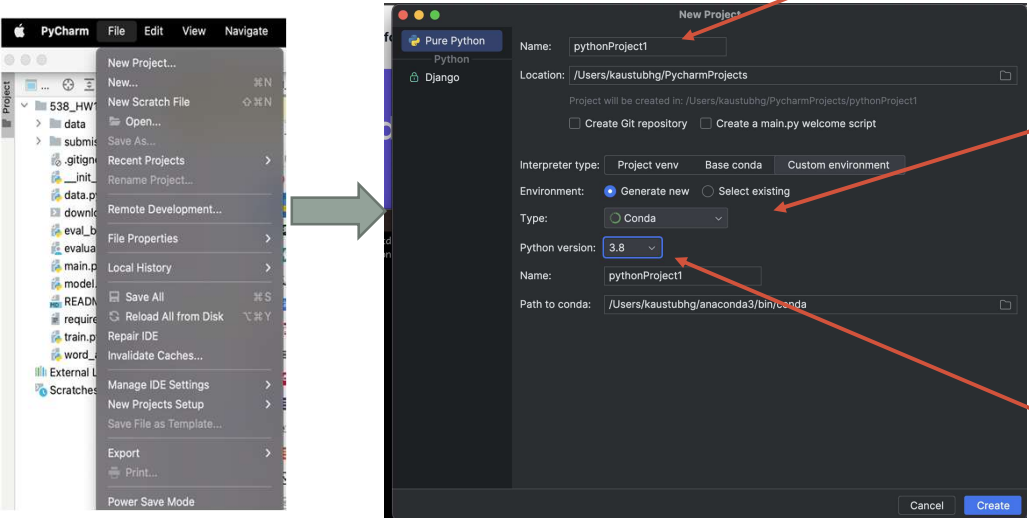
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Setting a Mac OS PyCharm Project

Enter your project name

Always use Conda!

version 3.14 is most recent



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Installing Python Libraries

- You will need to install Python libraries into your project during the semester
- Most (but not all) libraries will already be available in PyCharm
- You need to explicitly install most libraries in PyCharm (using Conda)
- Operates differently on Windows and on Mac OS

Think of a PyCharm project as a combination of Python interpreter, Python libraries, and your code

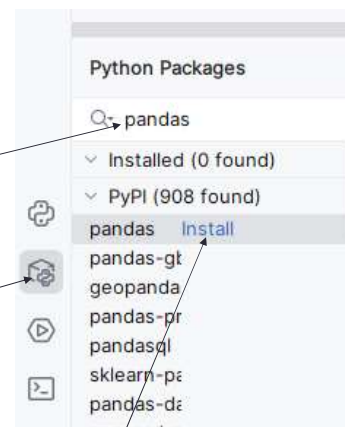
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Select the PyCharm Packages Pane

- You select the library packages you need for your project

2. Type the name of the package you would like to install

1. Click on the Python Packages tab to open the Packages pane



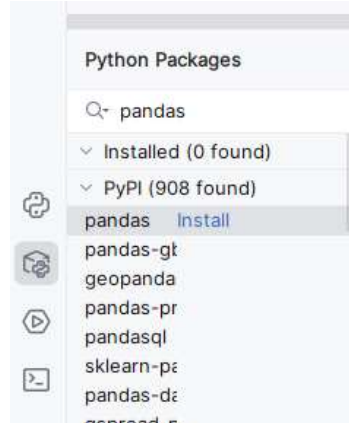
3. Click install to install

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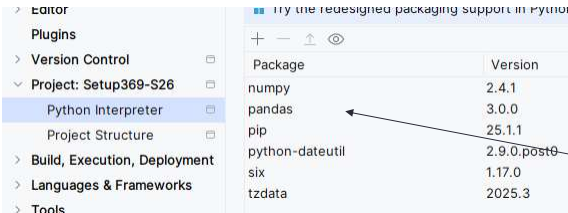
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PyCharm Packages Pane

- We entered “pandas” in the search window and clicked “install” and PyCharm installed the correct libraries
- Conda ensures that related packages are installed



The screenshot shows the 'Python Packages' pane in PyCharm. A search bar at the top contains the text 'pandas'. Below the search bar, there are two sections: 'Installed (0 found)' and 'PyPI (908 found)'. In the 'PyPI' section, the package 'pandas' is highlighted, and an 'Install' button is visible next to it. Other packages listed include 'pandas-gt', 'geopanda', 'pandas-pr', 'pandasql', 'sklearn-p', and 'pandas-d'.



The screenshot shows the 'Project: Setup369-S26' settings in PyCharm. The 'Python Interpreter' tab is selected, showing a list of installed packages and their versions. An arrow points from the 'pandas' package in this list to the 'pandas' package in the 'Python Packages' pane.

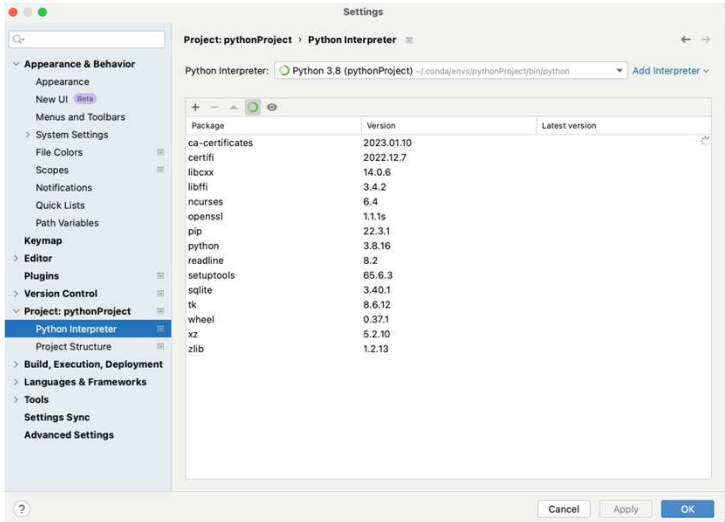
Package	Version
numpy	2.4.1
pandas	3.0.0
pip	25.1.1
python-dateutil	2.9.0.post0
six	1.17.0
tzdata	2025.3

When we look at Settings, we see that needed packages are added to the project

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Installing Python libraries on Mac OS ...



The screenshot shows the 'Settings' dialog in PyCharm. The 'Project: pythonProject' tab is selected, and the 'Python Interpreter' sub-tab is active. It shows the current Python interpreter as 'Python 3.8 (pythonProject)' and a list of installed packages with their versions. The 'Add Interpreter' button is visible at the top right of the package list.

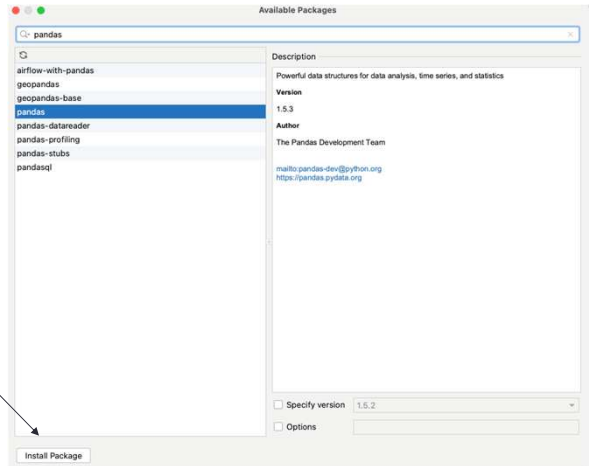
Package	Version	Latest version
ca-certificates	2023.01.10	
certifi	2022.12.7	
libcxx	14.0.6	
libffi	3.4.2	
ncurses	6.4	
openssl	1.1.1s	
pip	22.3.1	
python	3.8.16	
readline	8.2	
setuptools	65.6.3	
sqlite	3.40.1	
tk	8.6.12	
wheel	0.37.1	
xz	5.2.10	
zlib	1.2.13	

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... Installing Python libraries on Mac OS

- Enter the desired library name in the search bar



Click Install Package

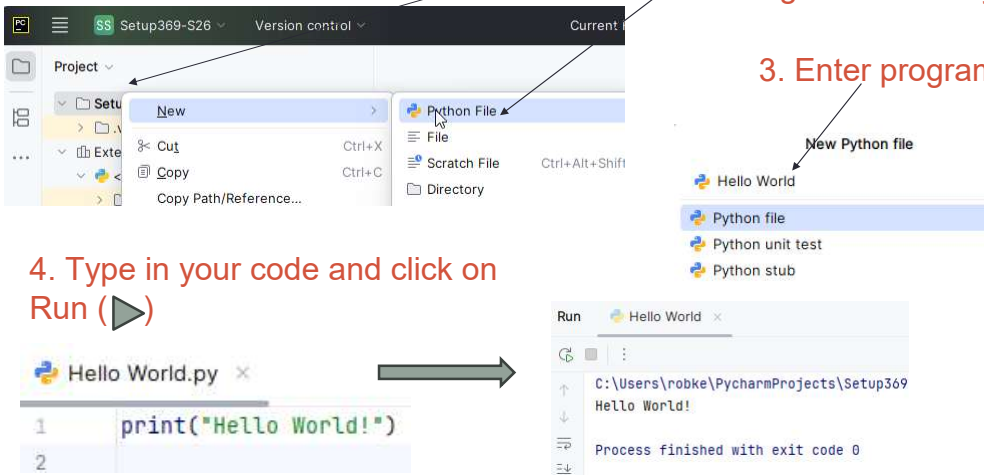
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Your First Python Program

- Print "Hello World!" to your console

- Right click on the project name
- Navigate to New Python File
- Enter program name
- Type in your code and click on Run (▶)



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Python Libraries

- The next Python track uses the os library
- Libraries you need are often pre-loaded into PyCharm, but you need to add them to your PyCharm project
- You also need to identify the library in your code with the import statement

```
import os
```

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Python Standard Library

- Collection of modules accessible to a Python program to simplify the programming process and removing the need to rewrite commonly used commands.
- They can be used by importing them
- Including:
 - time
 - sys
 - **os**
 - math
 - random

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Library Documentation

- Python library documentation is available for all the libraries you use
- os library documentations is available at <https://docs.python.org/3/library/os.html#os-file-dir>

Link to the os library documentation and get familiar with the style. If needed, library extracts will be given to you in your exam API

`os.chdir(path)`

Change the current working directory to *path*.

This function can support [specifying a file descriptor](#). The desc an open file.

This function can raise [OSError](#) and subclasses such as [FileNotFoundError](#).

Raises an [auditing event](#) `os.chdir` with argument *path*.

Changed in version 3.3: Added support for specifying path :

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Are We on Track?

- Let's check to see if you are set up with your Python development environment
- Write a Python program to display your current working directory
- Hint: you will need the os library package. The os package is included in the Python interpreter, but you still need to import it into your program

This is the output on my system, your cwd will be different

Sample Output

```
C:\Users\robke\AppData\Local\Programs\Python\Python312\py
The current working directory is
C:\Users\robke\PycharmProjects\Setup369-S24

Process finished with exit code 0
```

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Were We on Track?

- Did you see this output?

```
C:\Users\robke\AppData\Local\Programs\Python\Python312\python.exe C:\Users\robke\PycharmProjects\Setup369-S24\getcwd.py
The current working directory is
Traceback (most recent call last):
  File "C:\Users\robke\PycharmProjects\Setup369-S24\getcwd.py", line 2, in <module>
    print(os.getcwd())
          ^^
NameError: name 'os' is not defined. Did you forget to import 'os'?

Process finished with exit code 1
```

This statement will display the current working directory, but you forgot to import the library that contains getcwd

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Were We on Track?

- To display your current working directory, you need to import the os library, then print the response to the function call, getcwd()

```
import os
print("The current working directory is ")
print(os.getcwd())
```

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