Python 101

Lunch & Learn

Sacha Davis | May 15th, 2024

Introduction

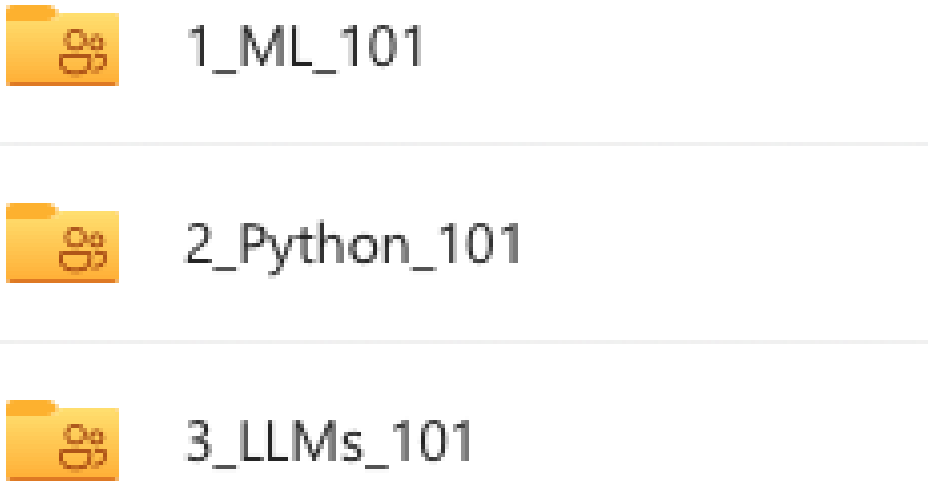
- University of Alberta:
  - 2020: B.Sc. Biological Sciences with minor in Computing Science
  - 2023: M.Sc. Computing Science (Thesis-Based)
- Co-Director of the Artificial Intelligence in Medical Systems Society (aimss.ca)
- Research, project management, ML engineering, community engagement, teaching, etc.



Sacha Davis
Co-op work experience Student
Sacha.Davis@albertahealthservices.ca

Next Lunch & Learn Sessions

- ~~April 17: Machine Learning 101~~
- May 15: Python 101
- June 19: Introduction to Generative AI (ChatGPT and beyond)



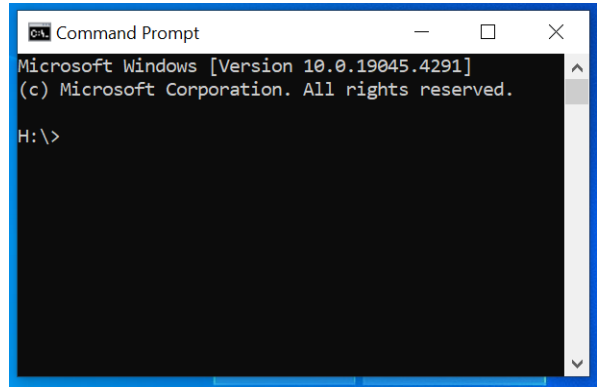
Presentation Goal #1:
Cover Python test environment set-up

Presentation Goal #2:
Live, interactive Python demonstration

Python "Getting Going"

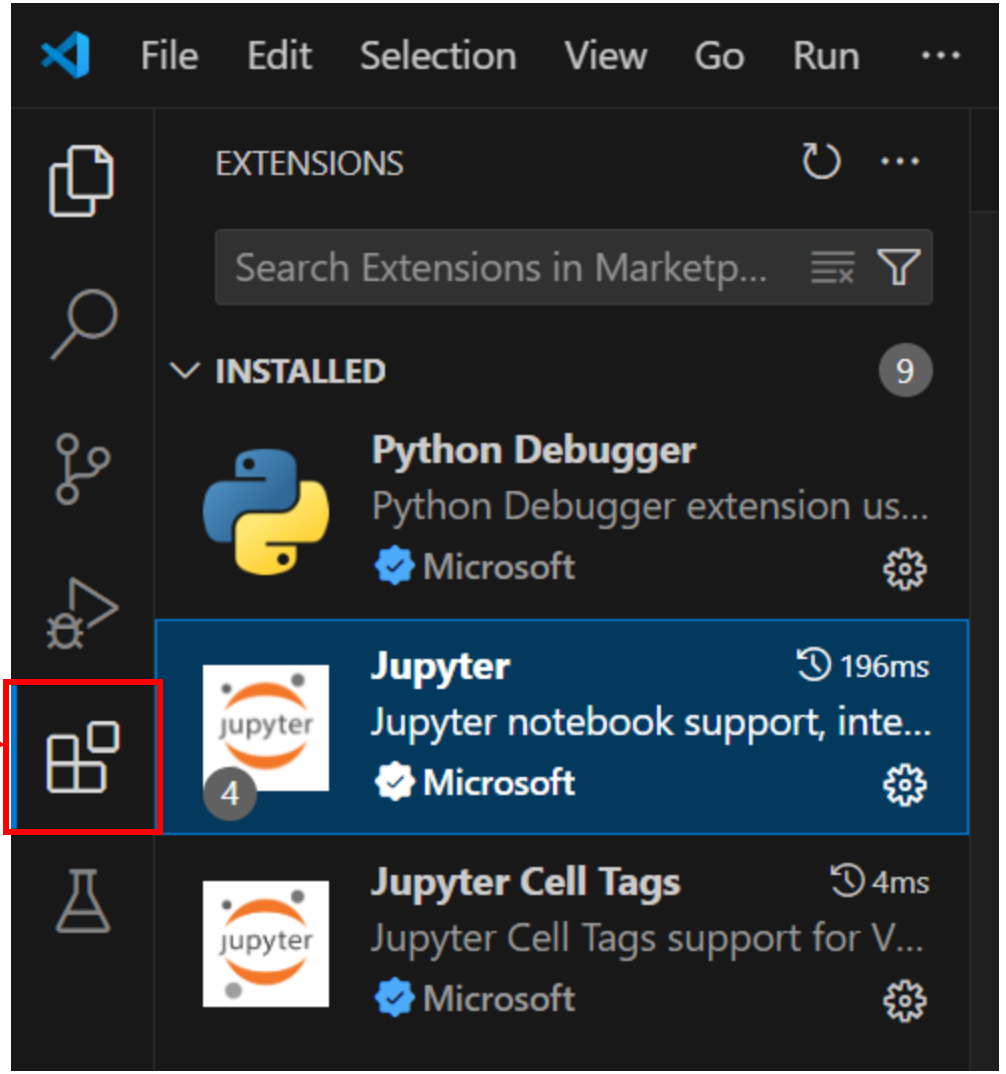
Intro

- Published initially in 1991, different versions over time
- Why Python?
  - Versatile
  - Extensive libraries
  - Integration capabilities
- How do you interact with Python?
  - Python interpreter – accessed through the command prompt
  - Python script – file ends with "`.py`"
  - Python notebook – file ends with "`.ipynb`"



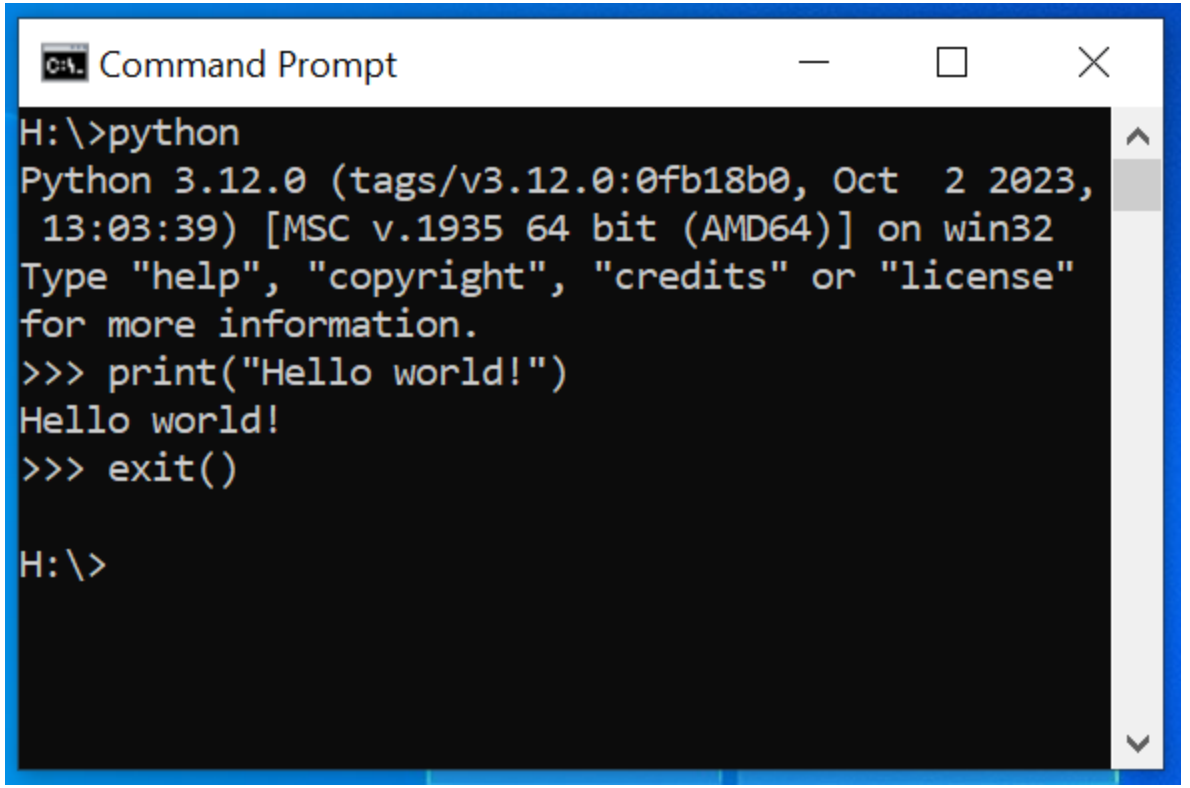
Python Installation

- Submit ticket to IT, ask for:
  - Python 3.12 (or the most recent version)
  - Microsoft Visual Studio Code
- Within VSCode:
  - Navigate to "extensions"
  - Search and install "Jupyter"
- This is basically all you need



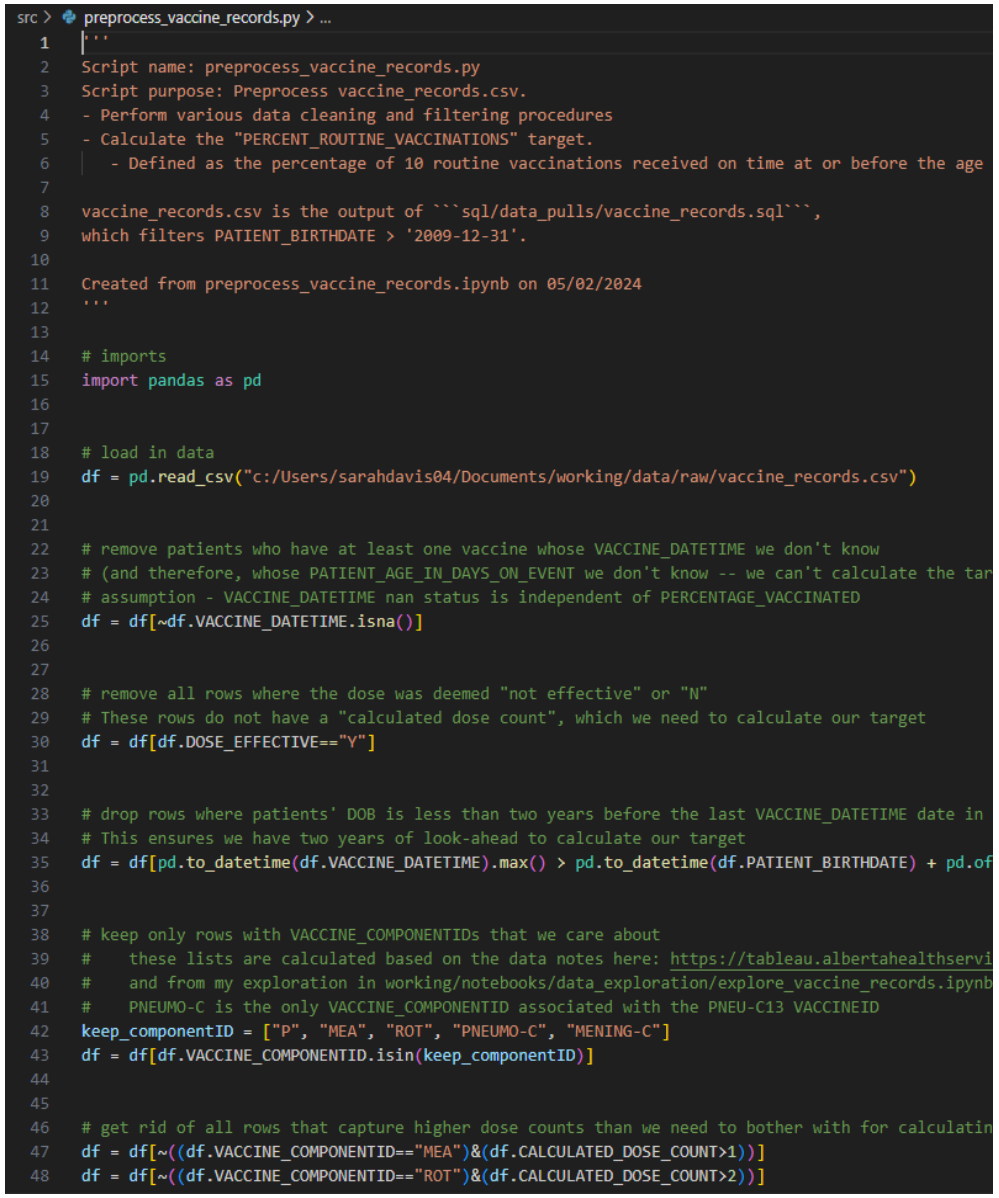
Python Interpreter

- To test the Python installation:
  - Open command prompt
  - To open the Python interpreter, type "`python`"
  - To close the Python interpreter, type "`exit()`"
- System PATH?



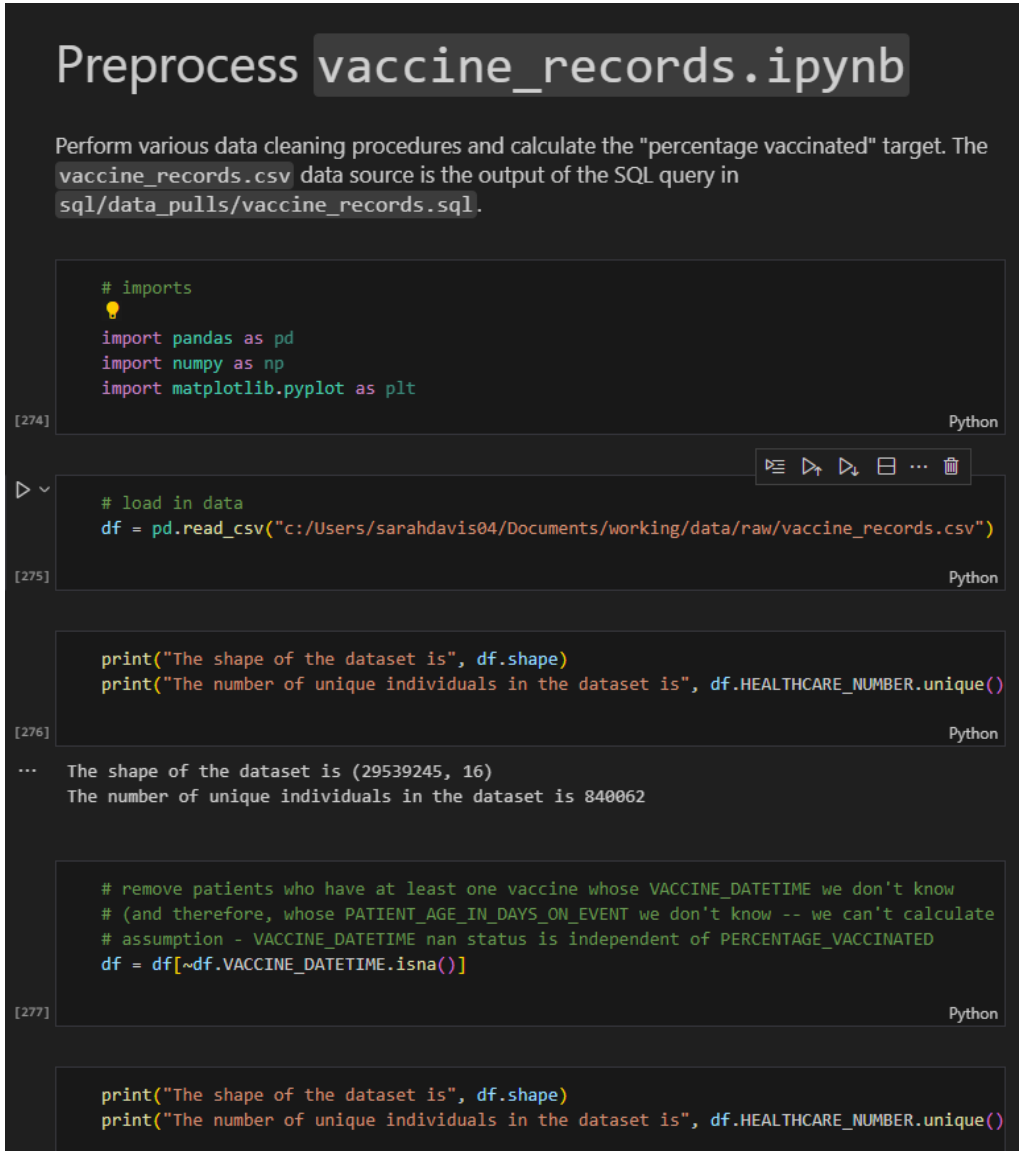
Python Scripts

- **Format**: `.py`
- **Environment**: Run via command line, edited in IDEs like Visual Studio Code or text editors
- **Structure**: A continuous block of code
- **Execution**: Entire script is run at once
- **Interactivity**: Not interactive
- **Use Cases**: Suitable for production environments, automation tasks, and full applications -- i.e., when you want an input and an output



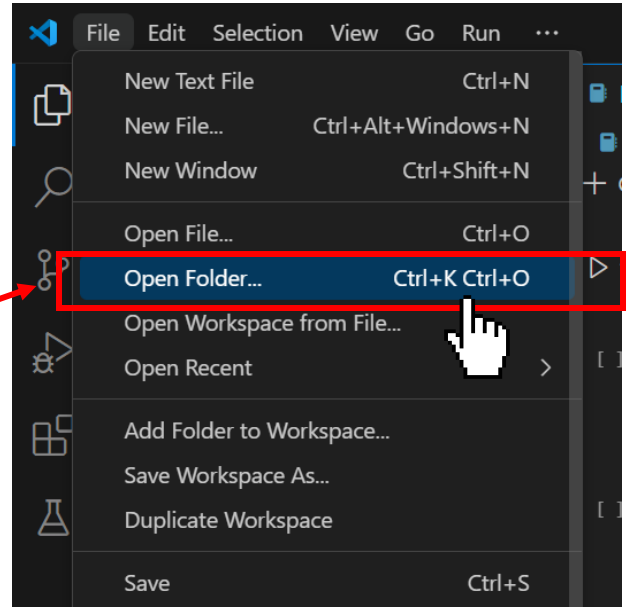
Python Notebooks

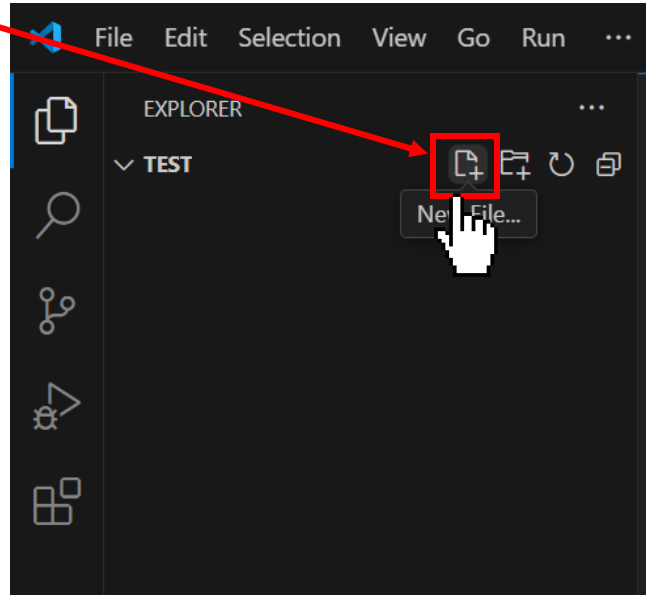
- **Format**: `.ipynb`
- **Environment**: Edited and run in a web browser or IDE
- **Structure**: Divided into cells, which can contain code, text (markdown), or visualizations
- **Execution**: Cells can be run individually and in any order
- **Interactivity**: High
- **Use Cases**: Ideal for data analysis, teaching, quick prototyping, and step-by-step tutorials

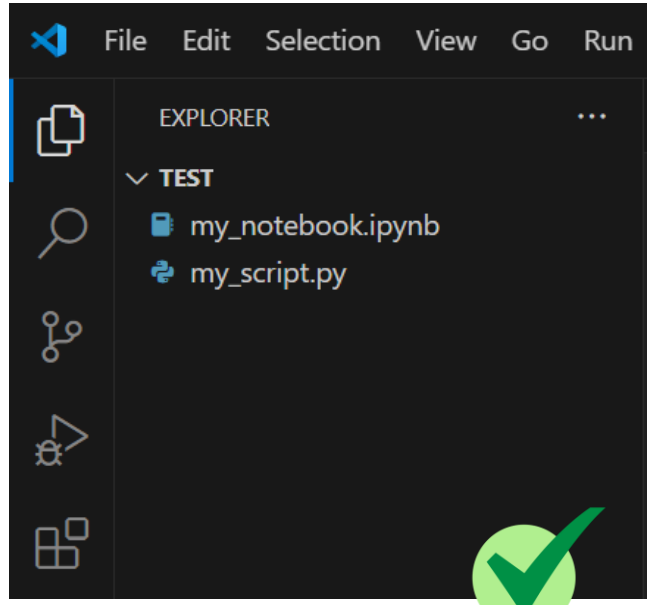


Setting Up Your Environment

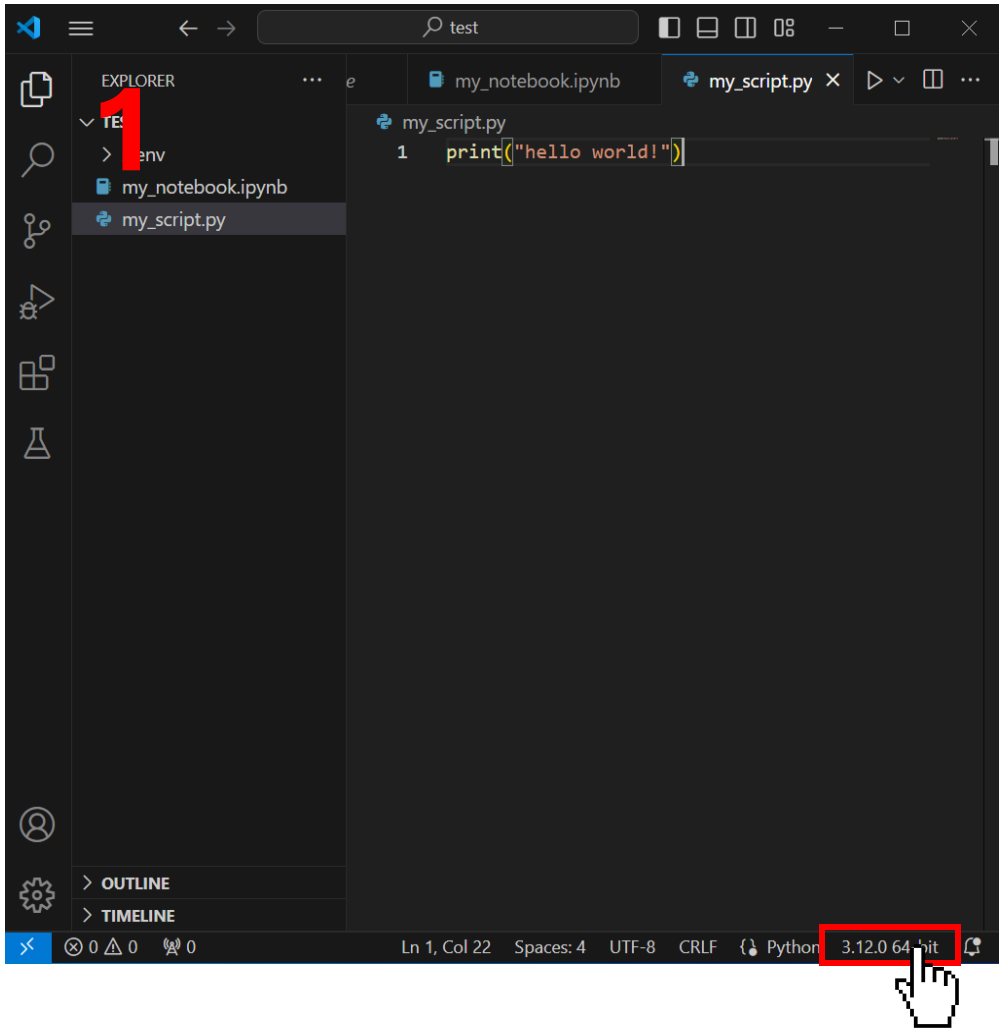
1. Create folder in File Explorer
2. Open VSCode
3. Open folder in VSCode
4. Create two new files
   - `my_script.py`
   - `my_notebook.ipynb`

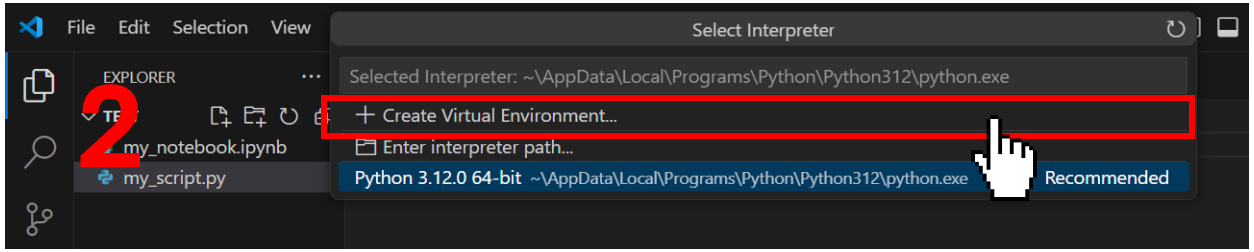


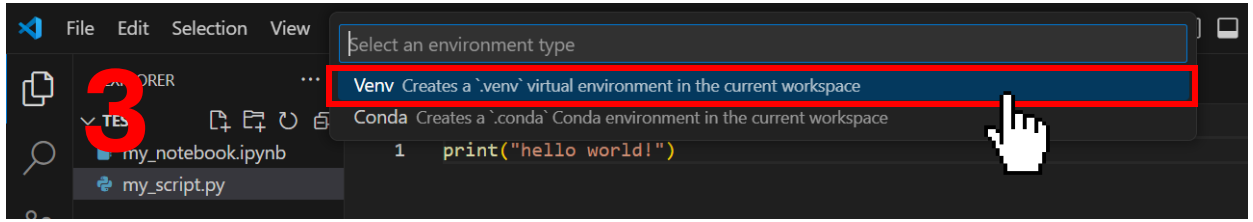


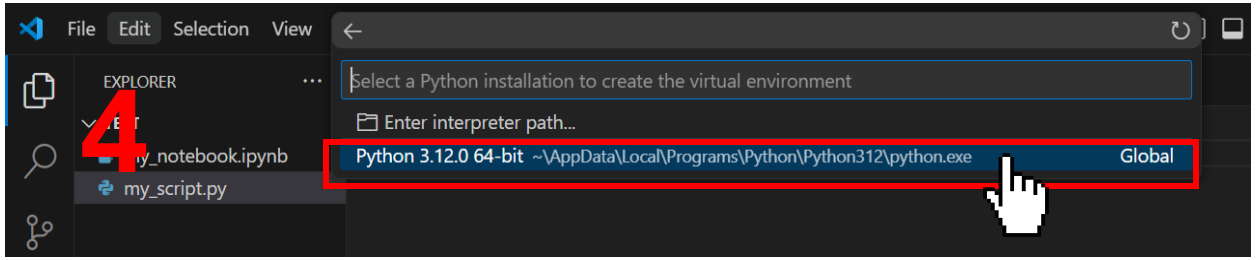


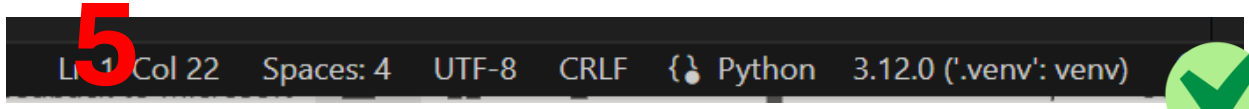
Setting Up Your Environment



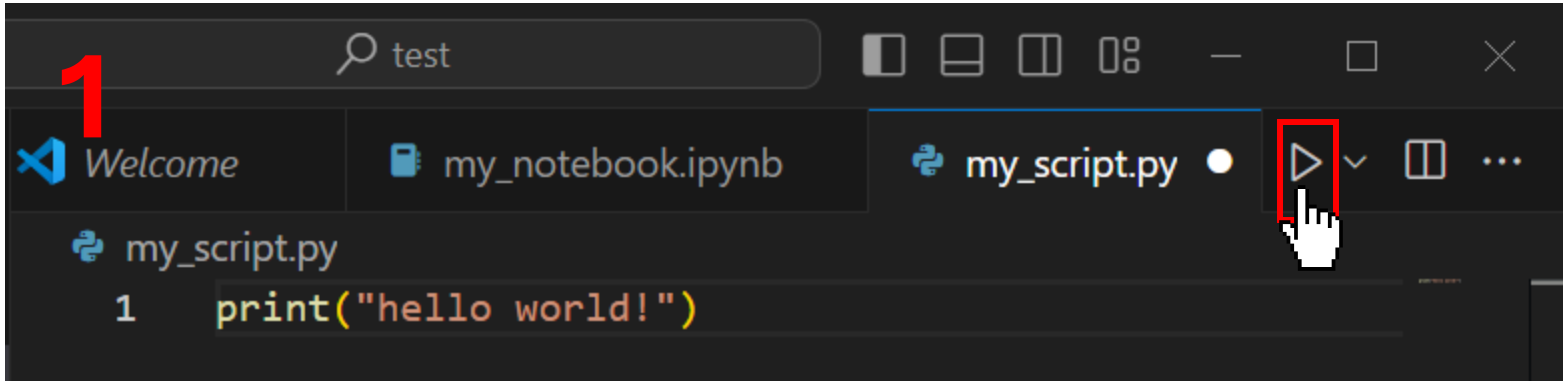


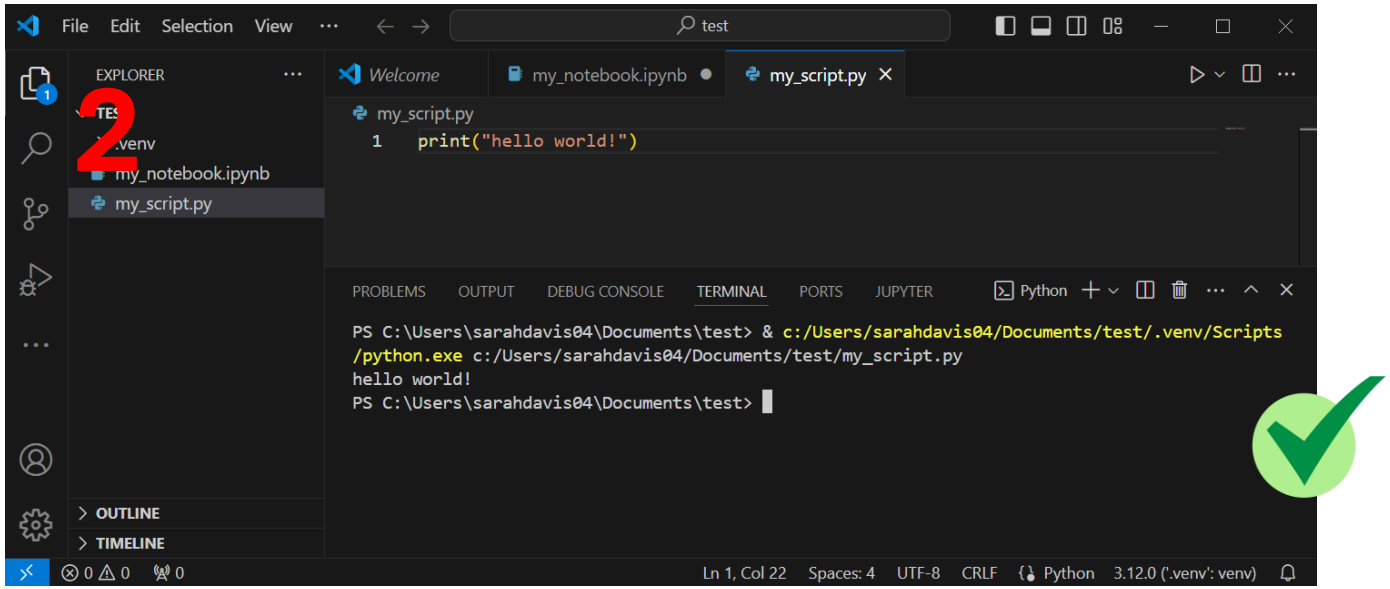






Running Your Script

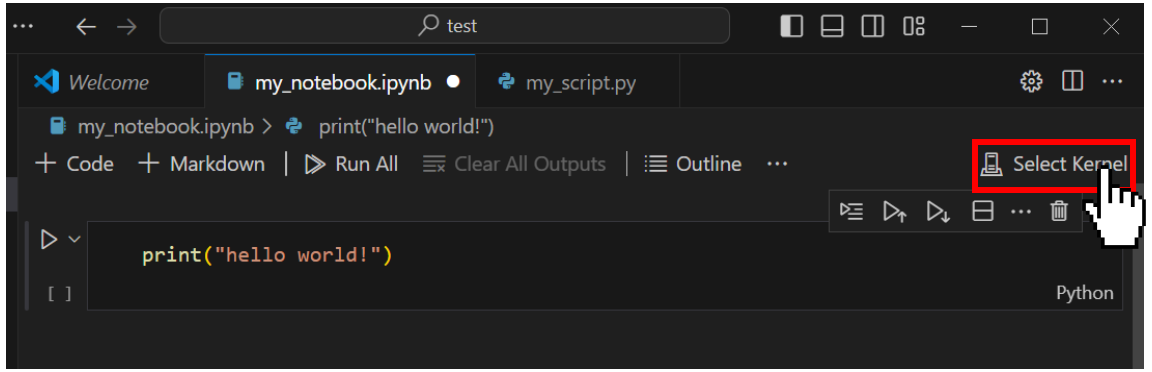




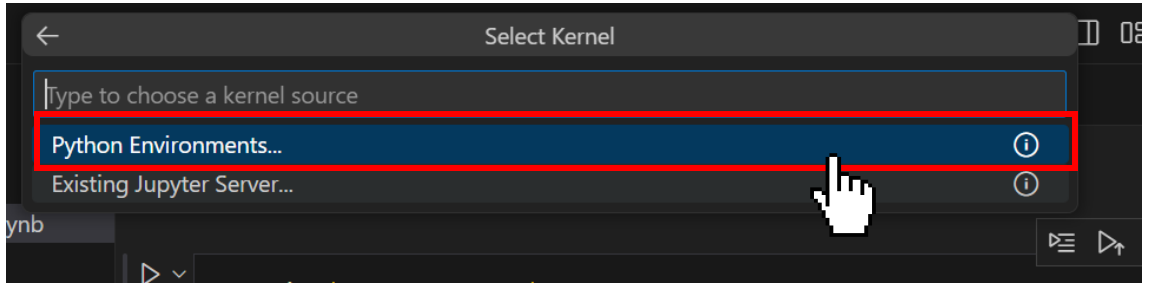
Running Your Notebook

- Select "venv" as your Kernel
- Click the ▷
  - First time, it might prompt you to install the 'ipykernel' package
  - Click yes
- Done!

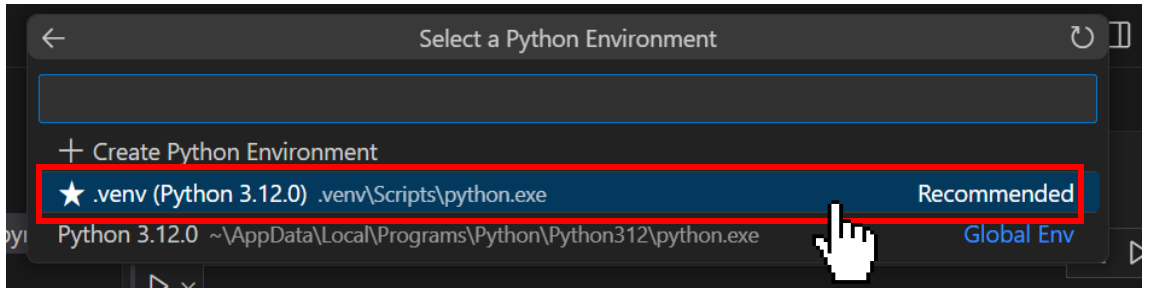
1



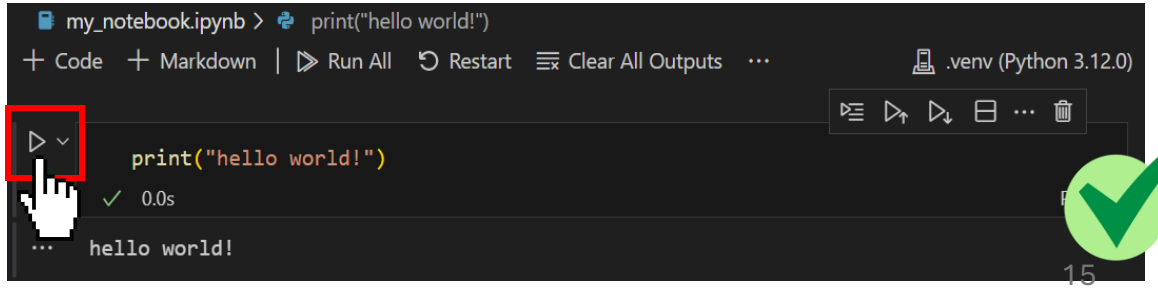
2



3



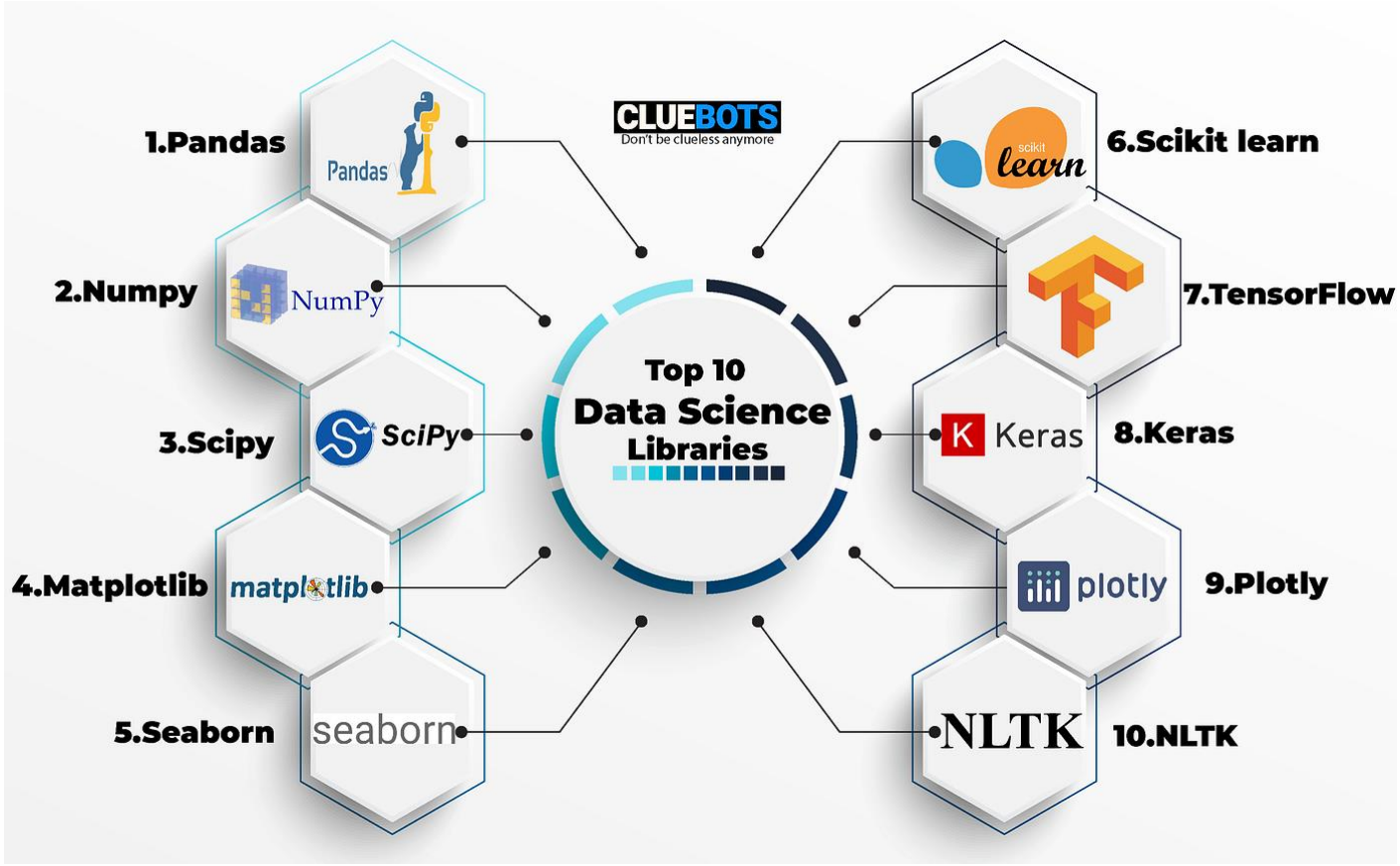
4



What is a Python Library?

A library is downloadable code which allows you to use additional functionality in your Python scripts.

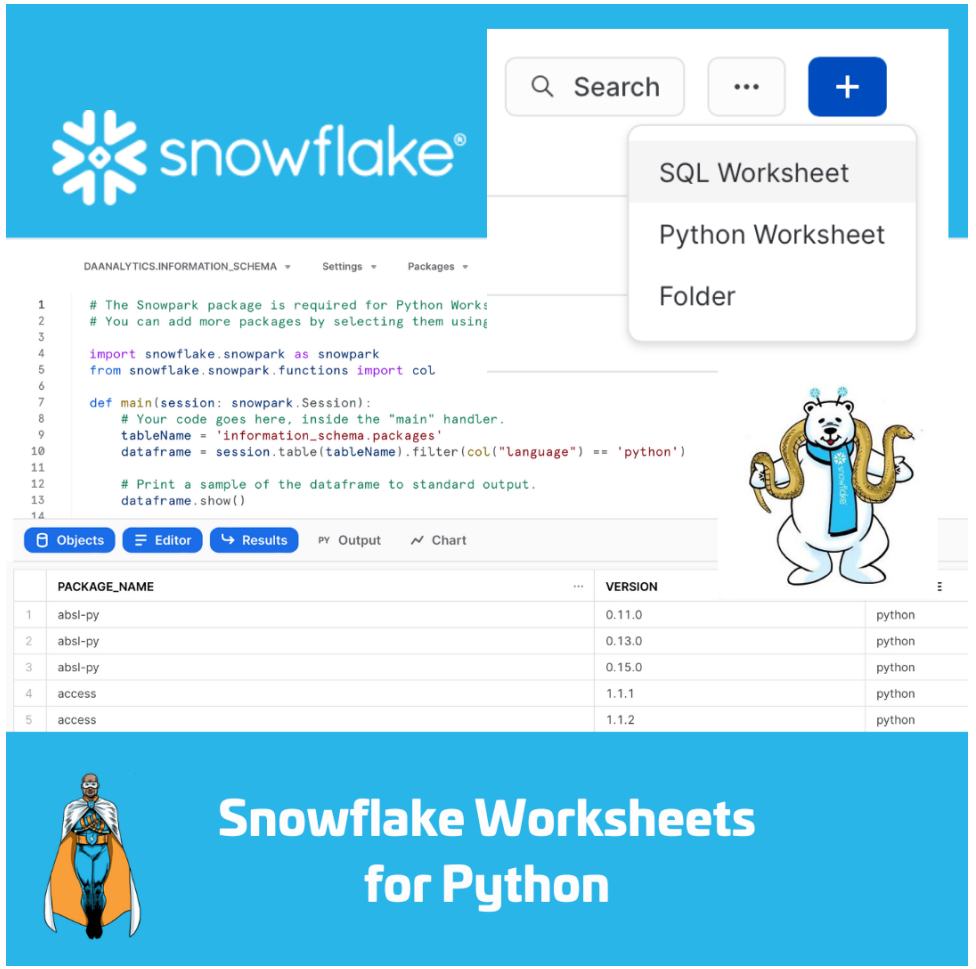
Most libraries can be installed through PIP (Preferred Installer Program) if you're using Python >= 3.4



[Source]

Snowflake

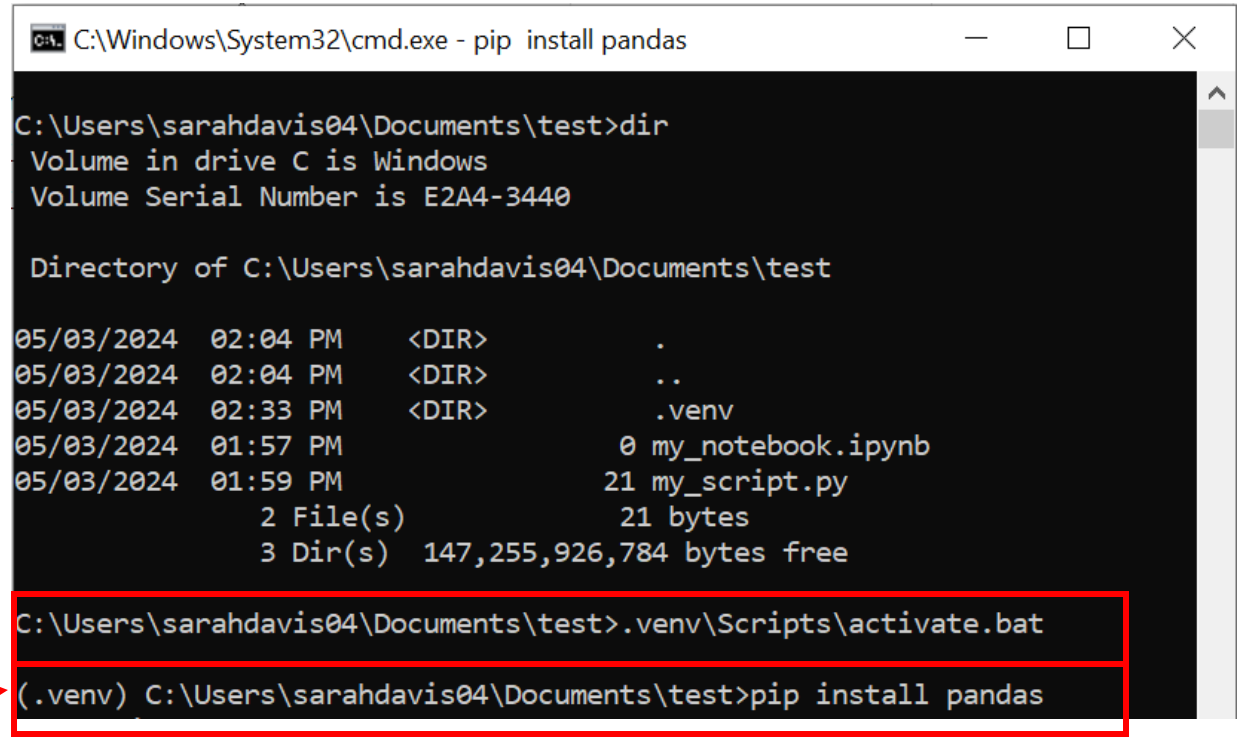
- Snowflake also has worksheets/Notebooks
- Takes care of versioning and libraries
- VSCode has a Snowflake connector
- Data access: can either be pulled locally to your machine, or accessed in the Snowflake cloud environment



[Source]

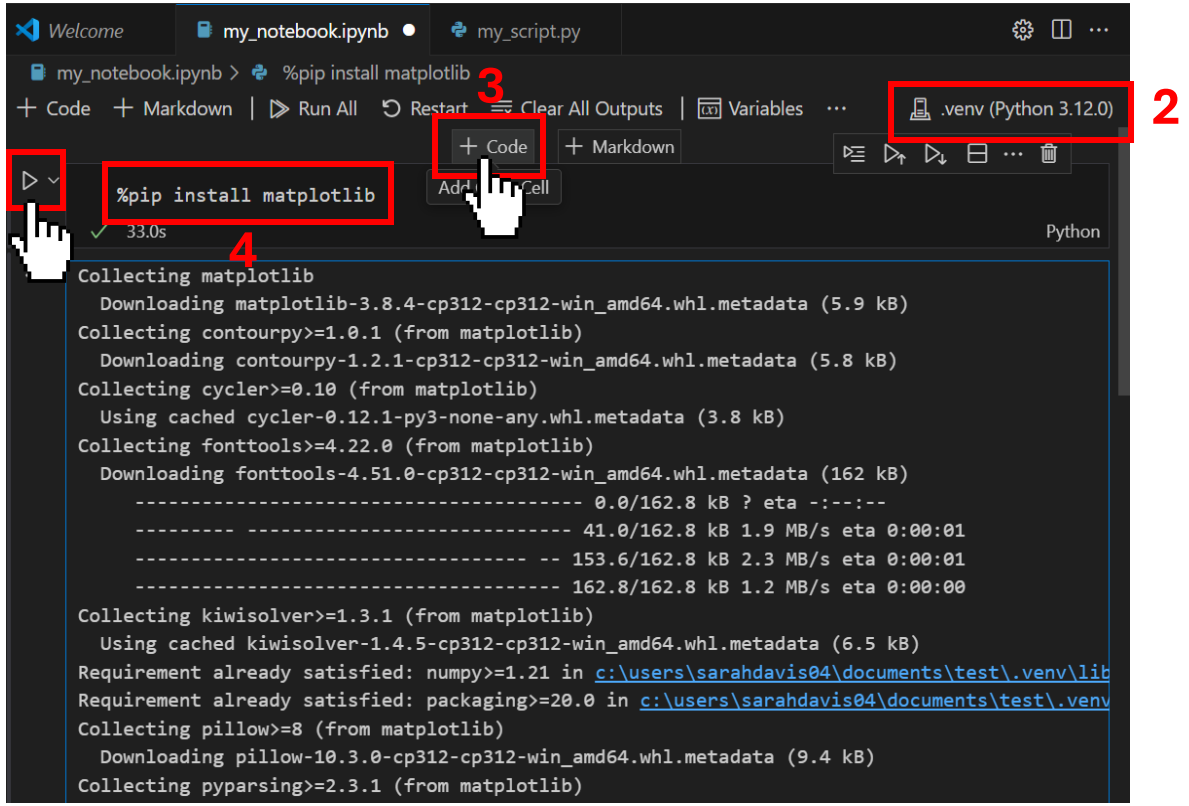
Installing Python Libraries: Method #1

1. Close VSCode
2. Open command prompt
3. Change directory to folder with `.venv`
4. Activate `.venv`
5. Use pip command for installation (replace "pandas" with your chosen library)
6. Reopen VSCode



Installing Python Libraries: Method #2

1. Open an `.ipynb` file in VSCode
2. Make sure the notebook is using the correct `.venv`
3. Create a new cell
4. Write pip command for installation (replace "matplotlib" with your chosen library)
   - Starts with a special "%" character so it's treated as a command
5. Run the cell



Python Demonstration

Learning Python: Quick Tips

- Read lots of code from other people, code tracing, adding your own comments
- Notebooks are your best friend
- Never underestimate how far Googling can get you – Python has the largest coding community in the entire world
  - Almost every problem is already solved on Stack Overflow
- ChatGPT – ask for it to write you one line of code at a time, then ask it to explain if you don't understand
  - Write tests to make sure it's doing what you want it to!

Scan to get the application form to your inbox!



aimss.ca/conference

Thank you!

Questions?



Sacha Davis
Co-op work experience Student
Sacha.Davis@albertahealthservices.ca