Coding and Astronomy

Astronomy is a huge subject with many topics that are hard to visualise with tradiational activities. It is also one of the most data driven sciences, with telescopes and probes collecting an astronomical amount of data.

Coding is vital for all scientists especially for Astronomers. Their programming language of choice is Python. Python is easy to learn and the coding skills you gain in Python can be easily transferred to other programming languages.

Throughout this unit you will be working through interactive Python activities which you can access for free online. These are designed to last 1 - 2 hours and will have you analysing data from telescopes and modelling fundamental concepts in Astronomy.

Most of these activities will be guided. This means your instructor will lead you through the activity by modelling code on the board.

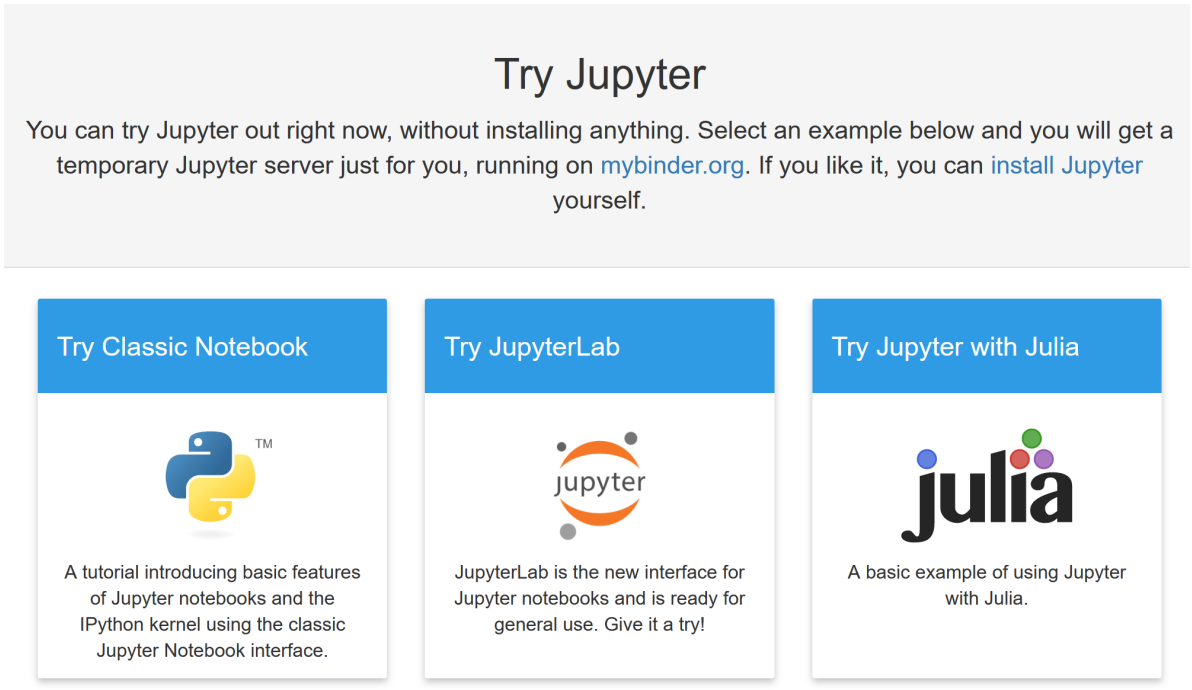
Not convinced? Find out how coding and analysing data is useful for Doctors here and biologists here.

How to Start:

Your instructor will send you all the necessary files before the lesson. Make sure you download them somewhere safe.

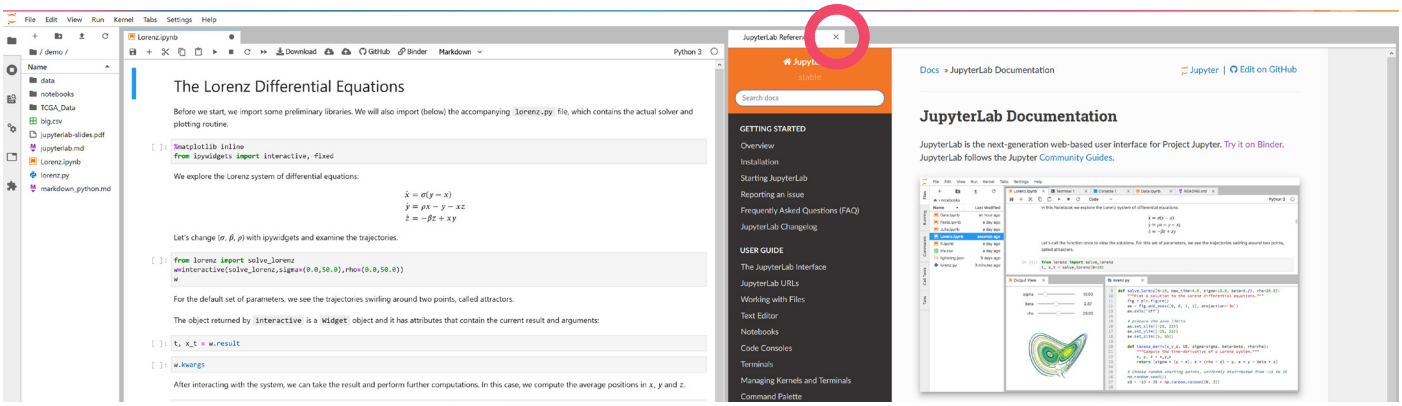
You can run all the interactive files (which end in .ipynb) using Jupyter online.
Go to Jupyter.org/try.

You should see this:



Click on the middle option - Try JupyterLab. This may take a minute to load. If it fails go back and try again.

Once it loads you should see this:



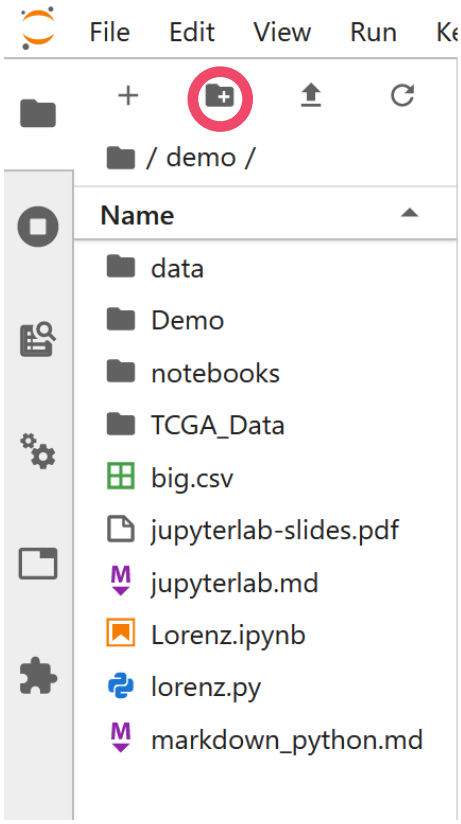
Press the x on the Reference tab (shown by the pink circle above), we won't need this.

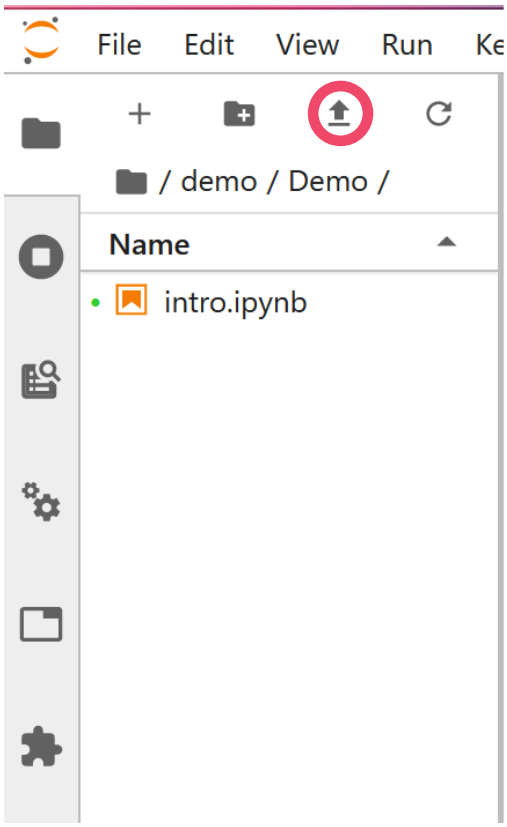
Now perform the following steps:

1. Make a new folder (name doesn't matter)
2. Go into the folder
3. Upload the files from your instructor
4. Double Click on the .ipynb file (it should have an orange symbol)

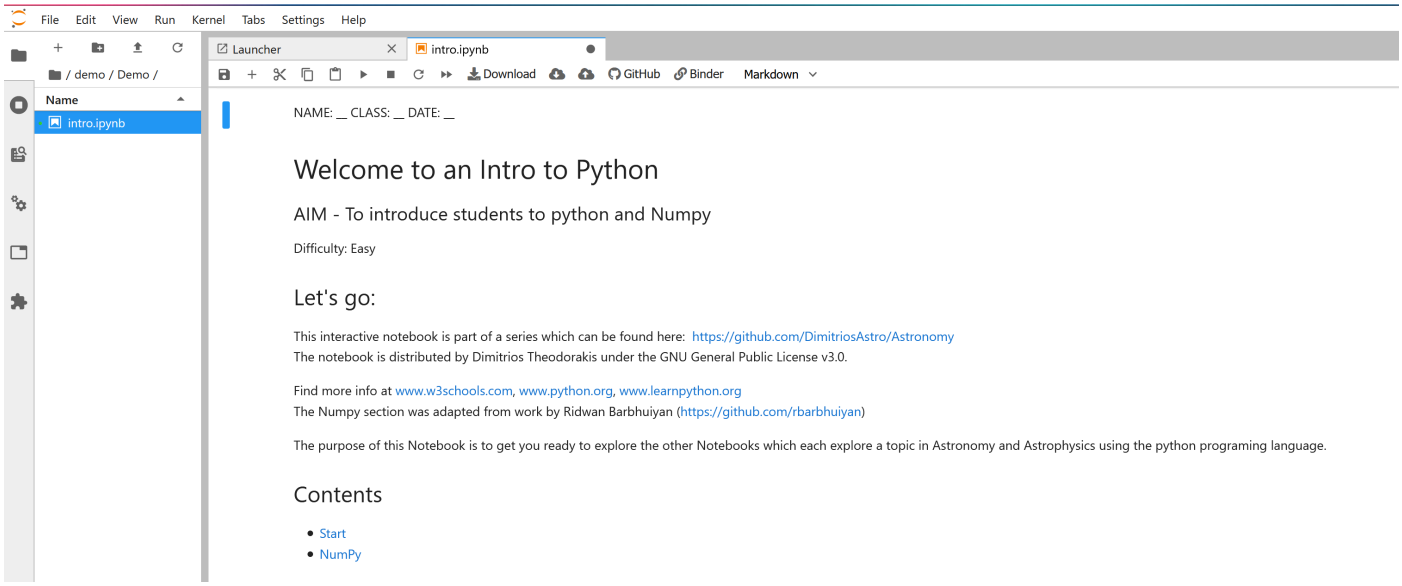
The image on the bottom left highlights the New Folder button.

The image on the bottom right highlights the Upload button.





After you've clicked on the .ipynb file it should look something like this:



To save your work for later use the save icon or go to File --> Save.
Then download the file using the download icon or go to File --> Download.

You can also export your notebook so that you have a copy as a pdf that you can open on your omputer (but can't edit).

Make sure to dwonload any figures, images, and the main .ipynb file that you have worked on before closing the tab. If you don't save your work periodically or you lose internet connection your work will be gone forever!

Useful Websites:

Jupyter.org - we are using Jupyter to run our code online
StackOverflow.com is a form where you can ask coding related questions
w3schools.com has excellent tutorials and references for Python
learnpython.org - more Python tutorials
The Hitchhiker's Guide to Python - even more Python tutorials

NumPy - numerical Python package docs
Matplotlib - Python plotting library
Pandas - data analysis library
Astropy - astronomy library

Anaconda - a local version of Python
Visual Studio Code - free code editor

And finally the Python Docs can be found here.