Tutorial for Jupyter Notebook

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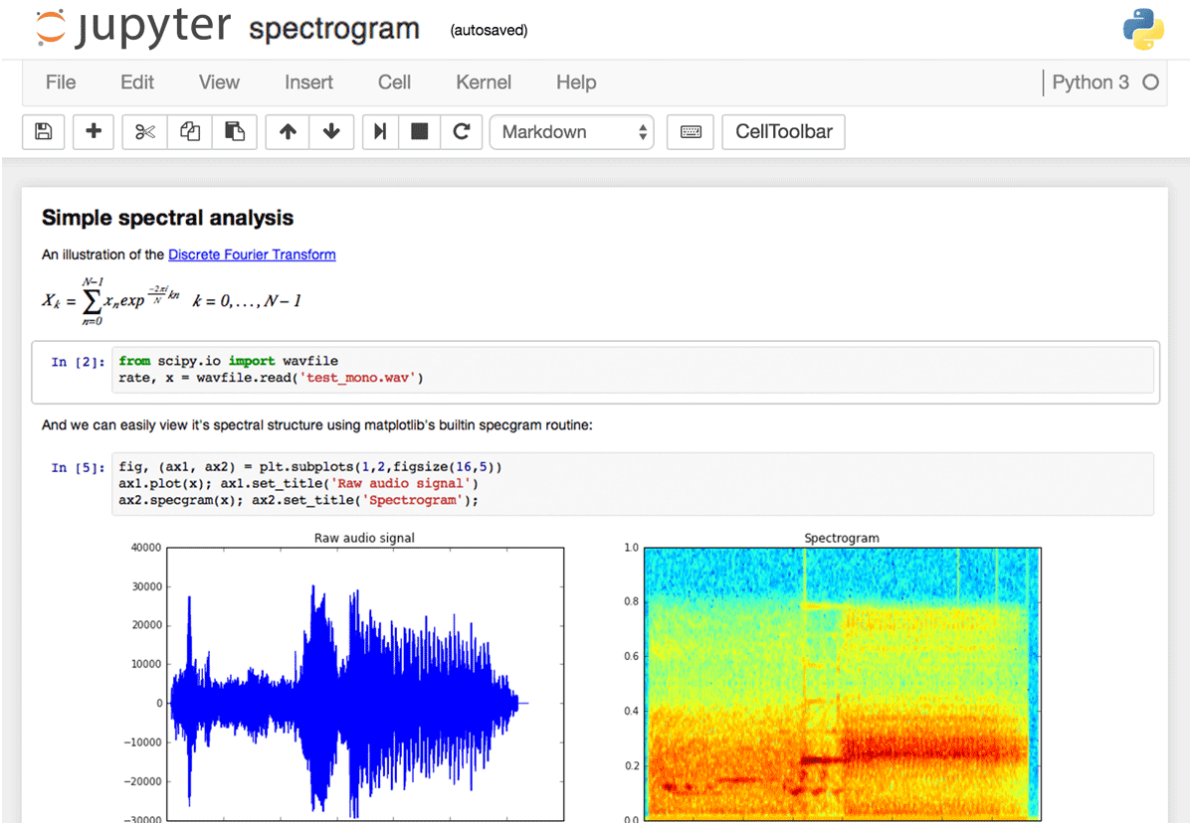
What is Jupyter Notebook

The Jupyter Notebook is an open-source web application that could put codes, equations, document and visualizations together.

You could run that in your browser. It supports many different kind of languages: Python, Julia, R, C++.... It's a great way for student and researchers to do the programming, data analysis and learn some exciting stuff like Machine Learning.



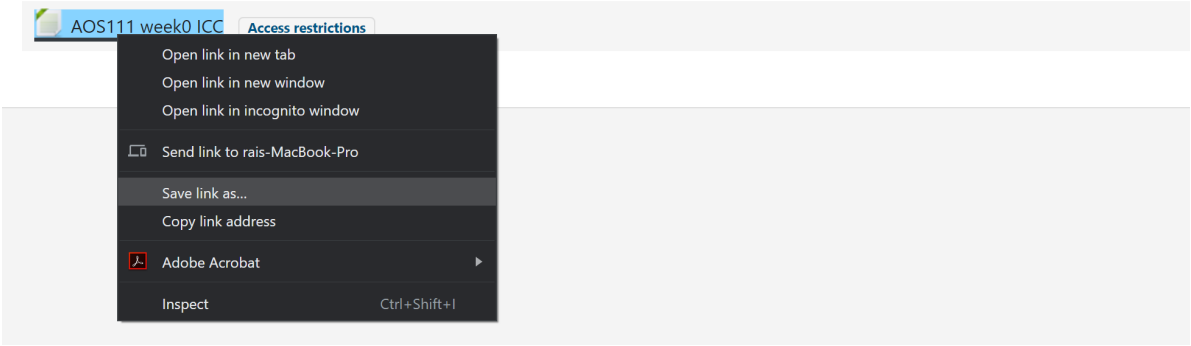
Download in-class-notebook from CCLE

Go to *In-class coding* on the CCLE, right click the document and save that to your local path. You could see the suffix name of this file is .ipynb which is a Jupyter Notebook.

Introduction to Machine Learning for Physical Sciences

Fall 2020 - A&O SCIC111-1 - BORTNIK

In-class coding



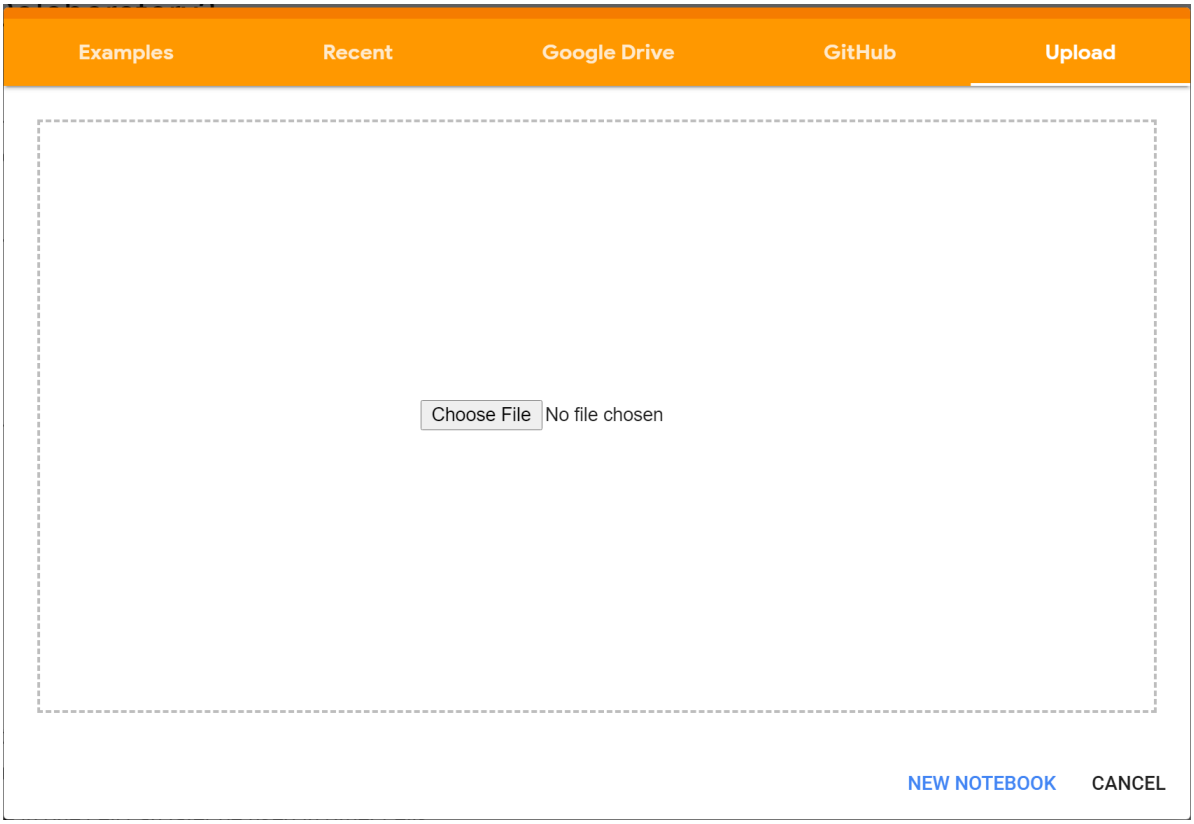
How to run my notebook

Use google-colab

The Google Colab allows anybody to write and execute arbitrary python code through the browser, and is especially well suited to machine learning, data analysis and education. More technically, Colab is a hosted Jupyter notebook service that requires no setup to use, while providing free access to computing resources including GPUs.

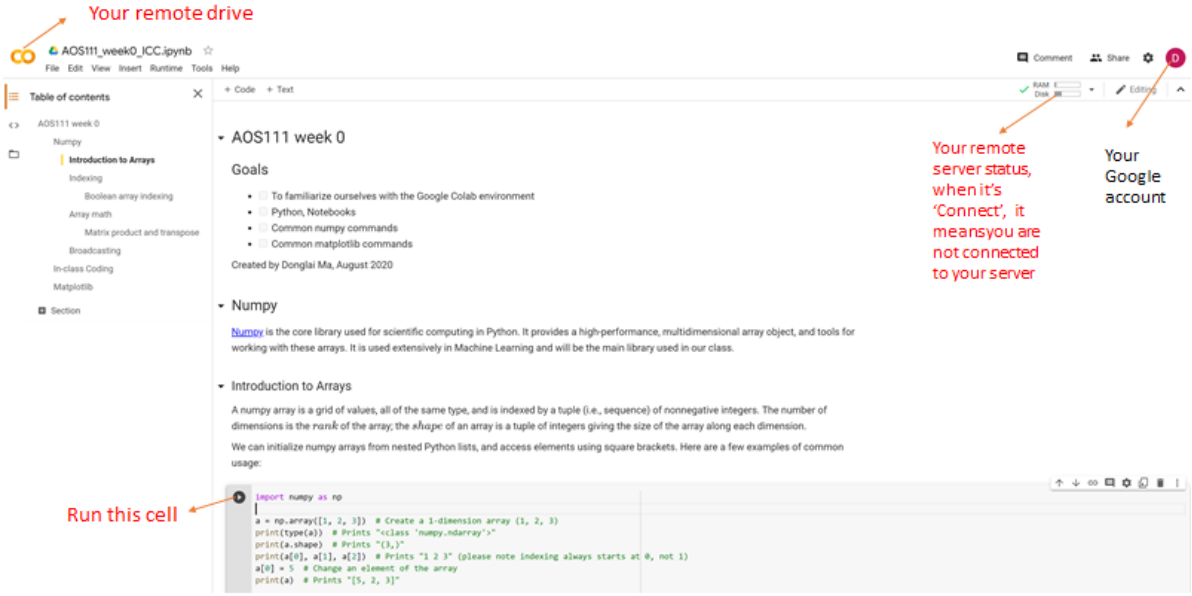
Here is more information about google colab.

1. Search google colab and open that with your google account, upload the jupyter notebook you download from CCLE



2. This is your notebook, you could go to files to check where you upload this file. All your files uploaded to google colab would be saved in your own google drive.

   Click run this cell and you will connect to the server automatically and you could now go through the document and get start!



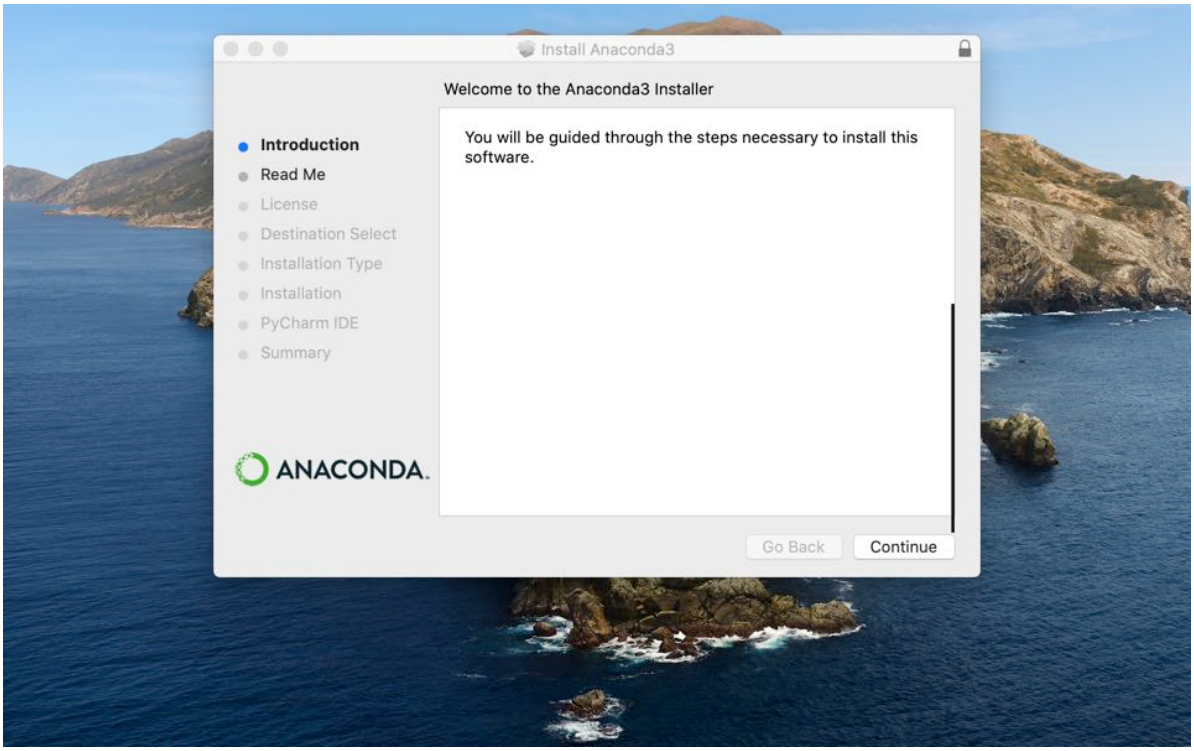
Use Anaconda

Anaconda is a free and open-source distribution that aims to simplify package management and deployment. I personally strongly recommend that you learn to use it.

Download Anaconda

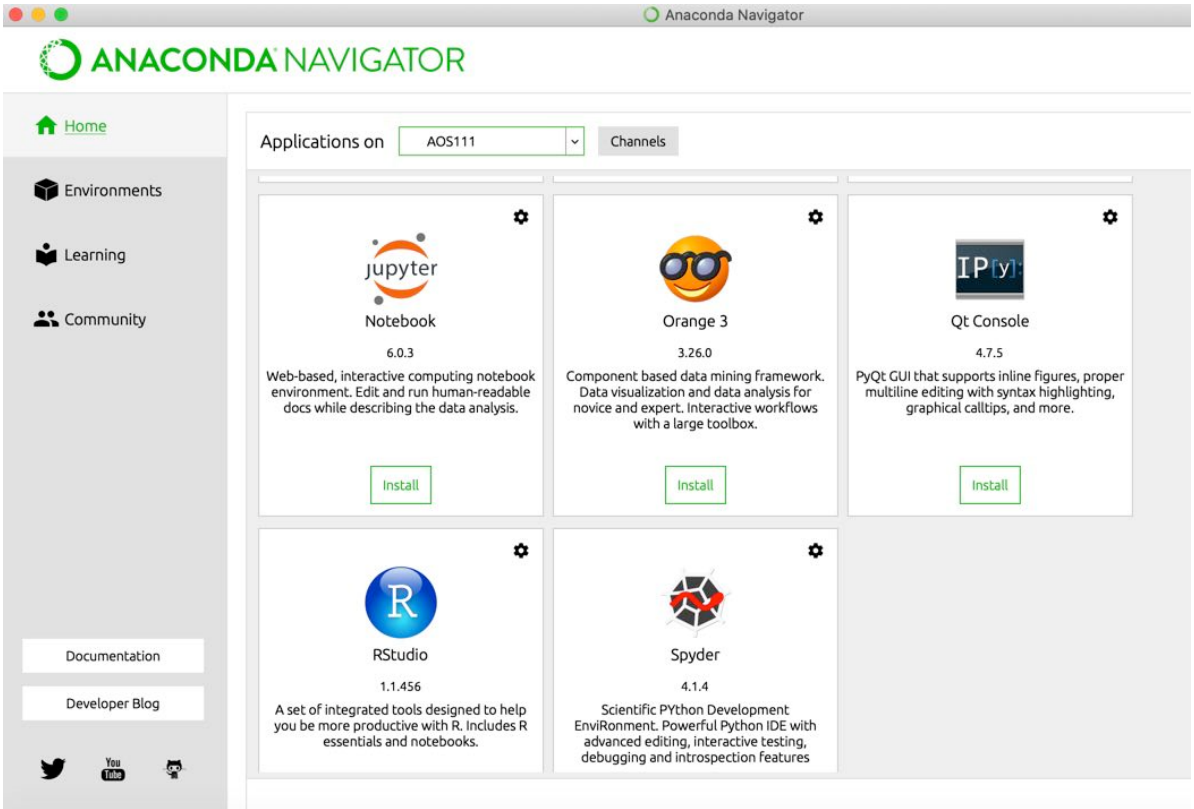
Go to https://www.anaconda.com/products/individual to download the right version for your computer.

Here I am showing an example to install that on a Mac system. Same steps on windows.

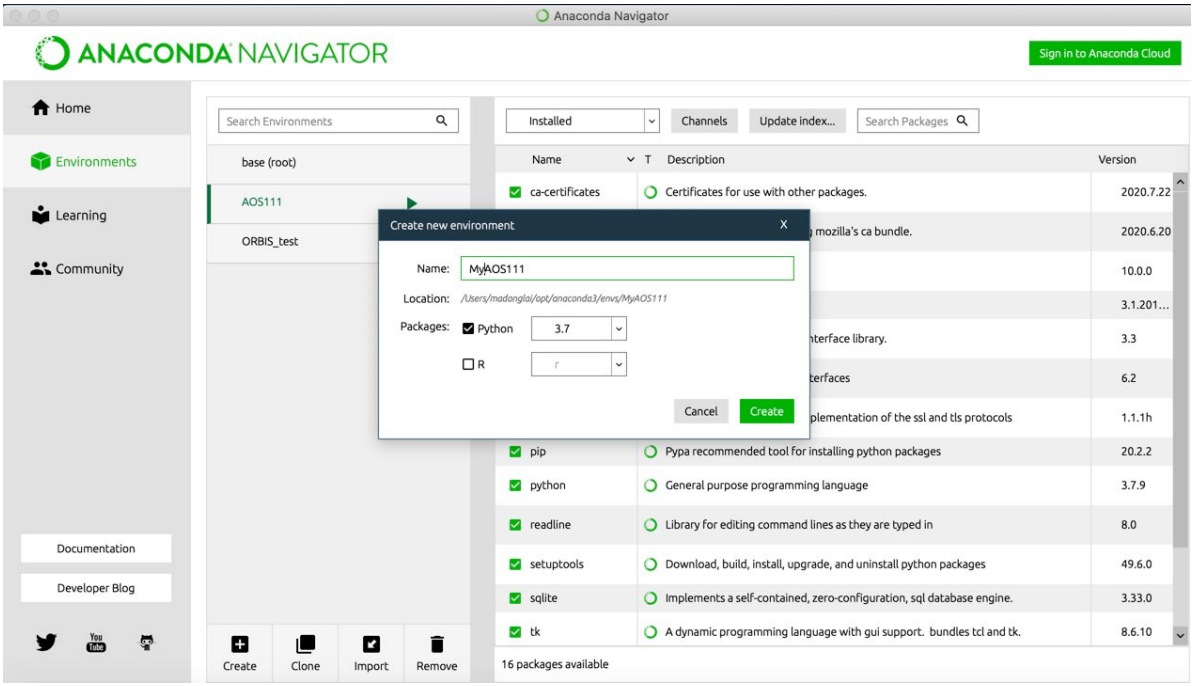


Set your programming environment

Open the anaconda navigator and it looks like this



Go to the Environments and create a new environment or use your base environment



Notice we are using Python version after 3.6.

Back to the home page and install your jupyter notebook. Now you could launch that and open your week 0 notebook file!

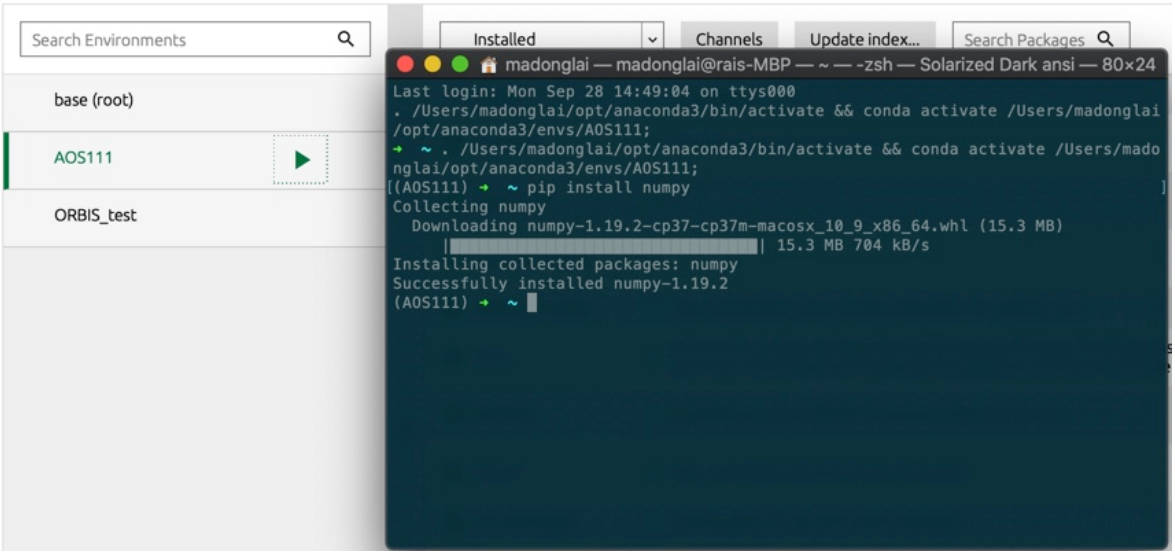
Install your package

If you want to run the code, there are still something need to prepared.

```
In [1]: import numpy as np

a = np.array([1, 2, 3])  # Create a 1-dimension array (1, 2, 3)
print(type(a))  # Prints "<class 'numpy.ndarray'>"
print(a.shape)  # Prints "(3,)"
print(a[0], a[1], a[2])  # Prints "1 2 3" (please note indexing always starts at 0, not 1)
a[0] = 5  # Change an element of the array
print(a)  # Prints "[5, 2, 3]"

b = np.array([[1, 2, 3], [4, 5, 6]])  # Create a 2-dimension array
print(b.shape)  # Prints "(2, 3)"
print(b[0, 0], b[0, 1], b[1, 0])  # Prints "1 2 4"

# # Get a row of this 2d array
# print(b[0])                         # Prints "[1 2 3]"
# print(type(b[0]))                   # Prints "<class 'numpy.ndarray'>"
# print(b[0].shape)                   # Prints "(3,)"

# # How would you get a column of the array b?
```

```
---------------------------------------------------------------------------
ModuleNotFoundError                       Traceback (most recent call last)
<ipython-input-1-d304aae7a394> in <module>
----> 1 import numpy as np
      2
      3 a = np.array([1, 2, 3])  # Create a 1-dimension array (1, 2, 3)
      4 print(type(a))  # Prints "<class 'numpy.ndarray'>"
      5 print(a.shape)  # Prints "(3,)"

ModuleNotFoundError: No module named 'numpy'
```

There is no modules in a new environment, you can back to your anaconda navigator, run the terminal of the environment you are using, your could see there is a (AOS111) in the terminal and that's your environment's name.



Use pip to install your package, you also need the matplotlib for week 0. You could think pip is also a module which helps you to install those new packages.

```
pip install numpy
```

There are multiple ways to play with your python package and environment! As your future programming ability improves, you will understand more about how those modules, environments work and why they are important.