

Python Programming Environment Setup

Introduction

This document guides you to setup the Python environment on your computer and introduces some basics of Python. In specific, the basic tasks include

- Install Python3 (**Anaconda distribution**)
- Check out an IDE: **Spyder (*.py)**
- Check out the **Jupyter Notebook (.ipynb)**

Install Python on your computer

There are many ways to setup Python onto your computer. Here we are suggesting a popular and simple way, which is to **install a python distribution called Anaconda**.

Anaconda

Anaconda is a free and open-source Python distribution that includes many tools along with the Python programming language. Anaconda includes things like an environment manager, a download manager, and a graphical interface to access a variety of development environments. Anaconda has both free and fee-based versions. Download the Individual Edition from the following link: <https://www.anaconda.com/products/individual>. Click on “Download”, you will see options of Anaconda installer for different operating systems.

Anaconda Installers		
Windows 	MacOS 	Linux 
Python 3.8 64-Bit Graphical Installer (457 MB) 32-Bit Graphical Installer (403 MB)	Python 3.8 64-Bit Graphical Installer (435 MB) 64-Bit Command Line Installer (428 MB)	Python 3.8 64-Bit (x86) Installer (529 MB) 64-Bit (Power8 and Power9) Installer (279 MB)

For MacOS Users: The Graphical Installer is suggested. You'll notice it's going to begin downloading a package file.

For Windows Users: Depending on whether you are on a 64-bit Windows computer (likely) or 32-bit Windows, click on 64-bit or 32-bit graphical installer. You'll notice it's going to begin downloading an executable file.

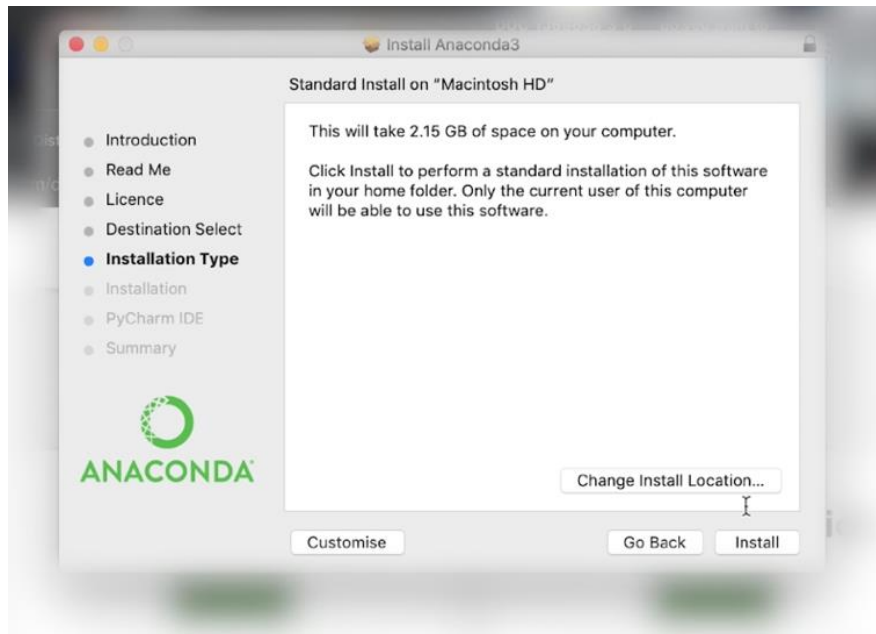
It'll take a while to download because it's quite a big file.

Then run the installation program.

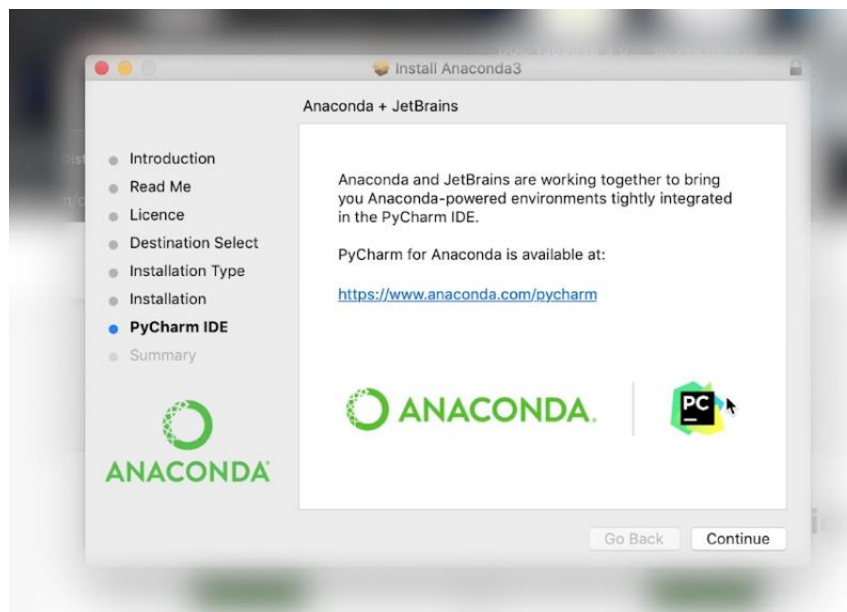
MacOS Anaconda Installation:

To start the installation, click the downloaded package file, and click continue.

The standard install on your home folder is suggested. So just click the install.



Skim this Pycharm advertisement.

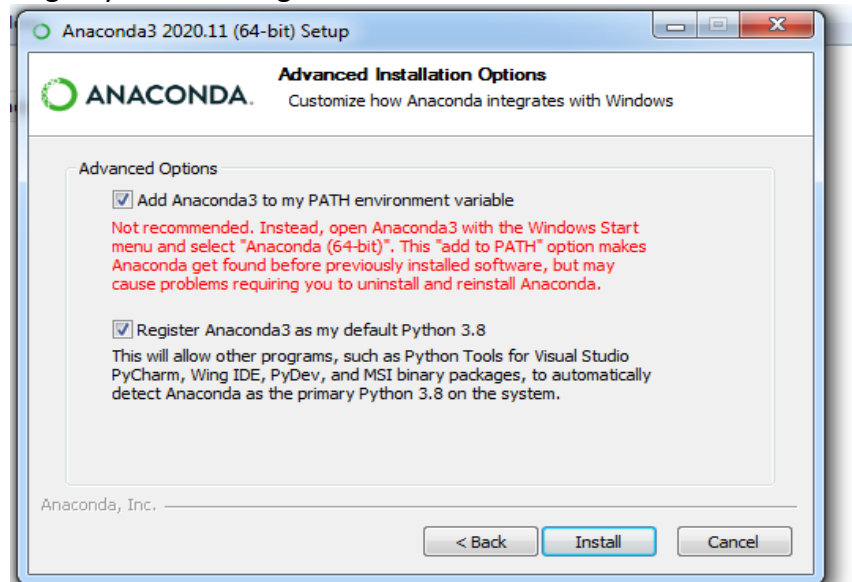


Assuming you get no errors during this process once it's finished you should have Anaconda and Python on your system.

Windows Anaconda Installation:

Once the executable file has finished downloading, run it to begin the installation.

Important step for Windows users: you'll notice the top checkbox, by default, is unchecked (see image below). This checkbox controls whether Anaconda (and Python) will assimilate with PowerShell (command prompt). If you check the box, and continue with the installation, you will be able to start Python/Jupyter through PowerShell. You will also be able to change the working directory and save location of your files more easily. If you do not check this box, **you will not be able to start Python/Jupyter from your native PowerShell and it will be difficult to save files other than in sub-directories of your Anaconda default-path.** Therefore, it is suggested that you check the top checkbox. However, it is also okay to leave the box unchecked, as long as you are willing to deal with the aforementioned restrictions.



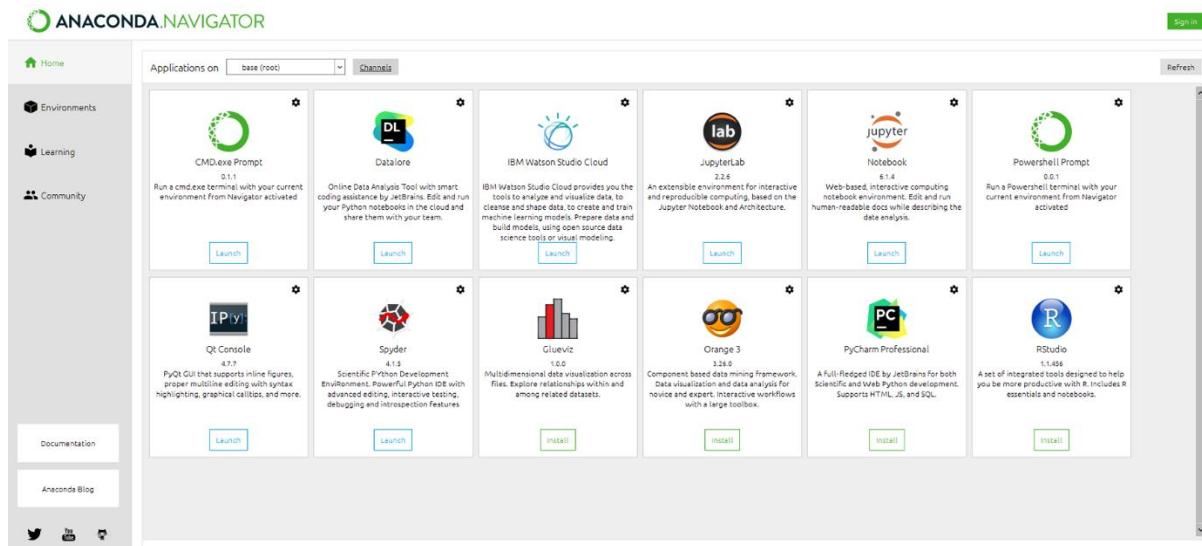
Once the installation is complete, skip the tutorial and skip learning more about Anaconda (uncheck the boxes). Click finish and you should now have a working Anaconda installation!

Now, Python (anaconda distribution) should be installed on your computer. Next, we're going to take a closer look at Anaconda Navigator.

Anaconda Navigator

The Anaconda Navigator is essentially a graphical interface for the various development environments that Anaconda comes with. When you start Anaconda Navigator, make sure you're on the homepage and you can see all applications there.

Quite Note: You may need to run Anaconda as an administrator on some computers, specifically some work computers. It may take a while to open. Eventually you should see this graphical interface pop up for the Anaconda Navigator.



You'll notice that it contains launchers such as Jupyter Notebook, a PowerShell and Spyder. **Jupyter Notebook** and **Spyder** will be the main development environments we work with. We'll be looking at Jupyter a little bit later on, but we're going to focus our attention now on Spyder.

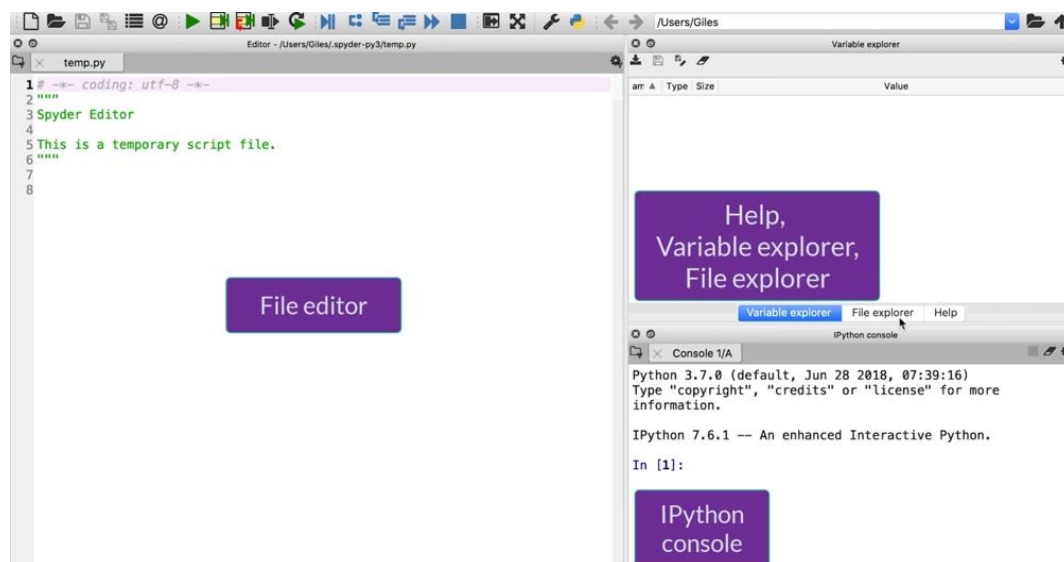
Spyder

IDE

There are tons of IDEs, and Spyder is one of them. IDE stands for integrated development environment. It's a coding tool that allows you to write, test, and debug your code in an easier way, as they typically offer code completion or code insight by highlighting, resource management, debugging tools and so on.

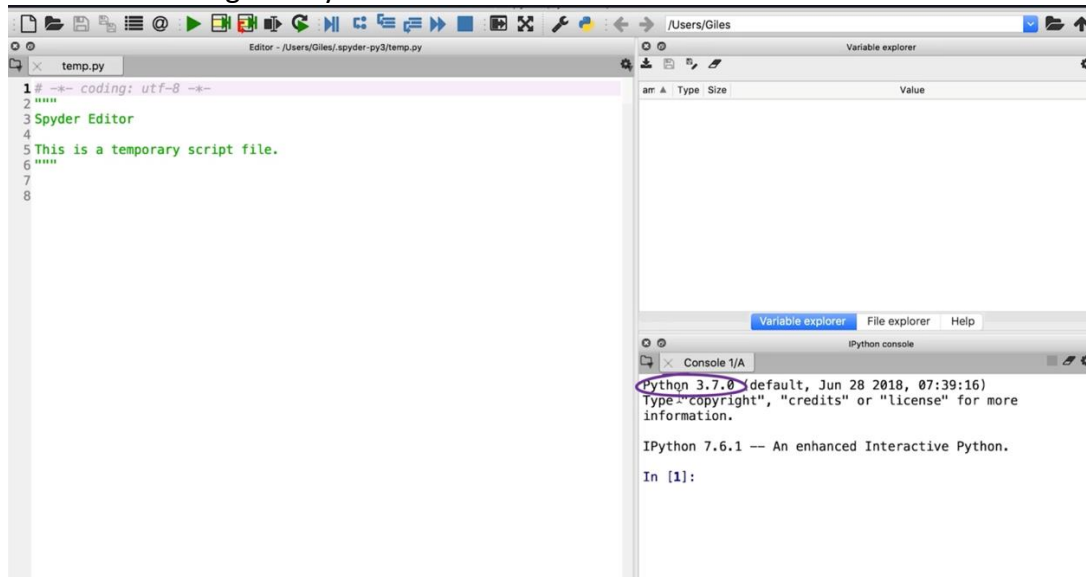
Spyder Introduction

Open Anaconda Navigator, Launch Spyder. When you open Spyder for the first time this is what you will see.

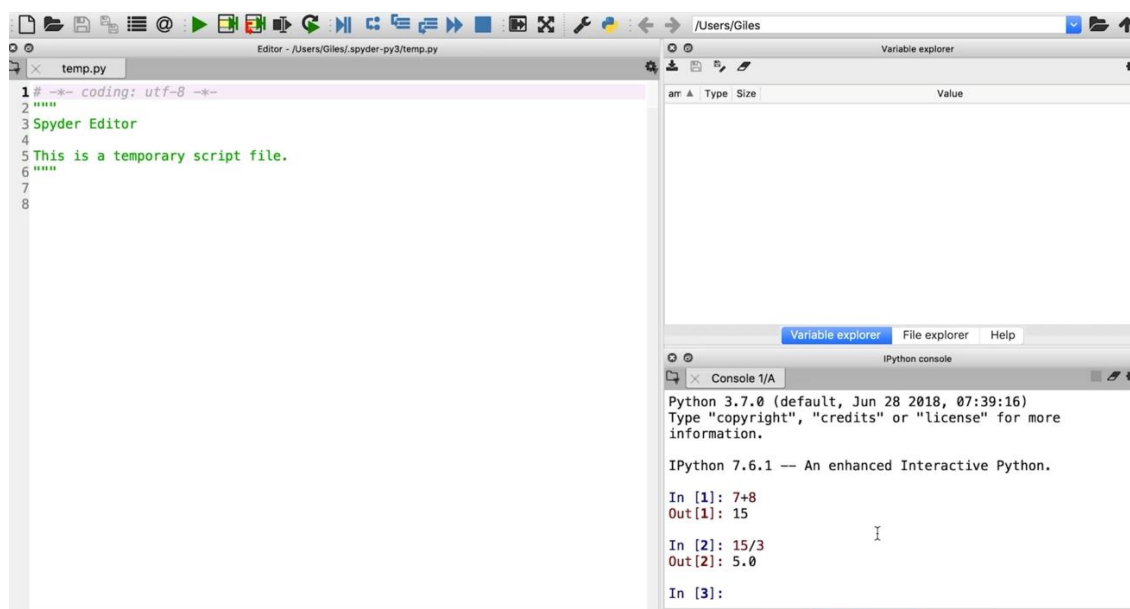


You have a **file editor** here on the left and on the lower right you'll have an **IPython console**¹. And on the upper right you have either a **help box** or a **variable explorer** or a **file explorer** and this can be really useful when your debugging large programs.

Let's start with the console. We can see that this console is telling me that I've got python 3.7.0 installed and I've got a IPython 7.6.1.

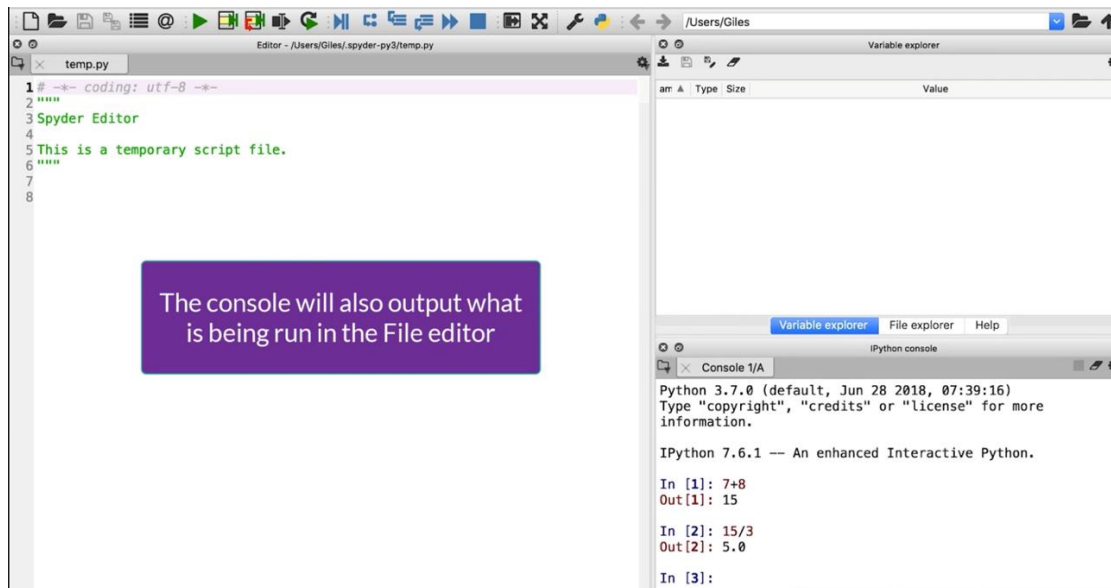


The console can run small lines of Python code so we can use Python just as a calculator. For example, if I put 7 plus 8 in here we will get the output of 15; if I put 15 divide it by 3, we'll get an output of 5.0.

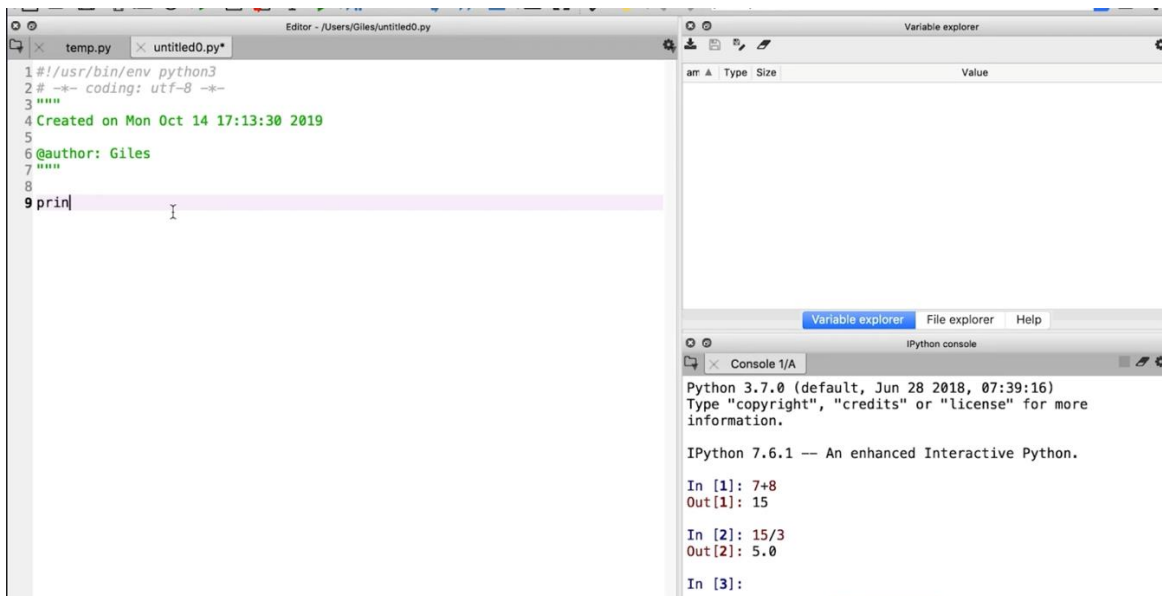


The console will also output what's being run in the file editor.

¹ **IPython** is an alternative Python interpreter. It is an interactive shell used for computing in Python. It provides many more useful features over the more popular default Python interpreter.



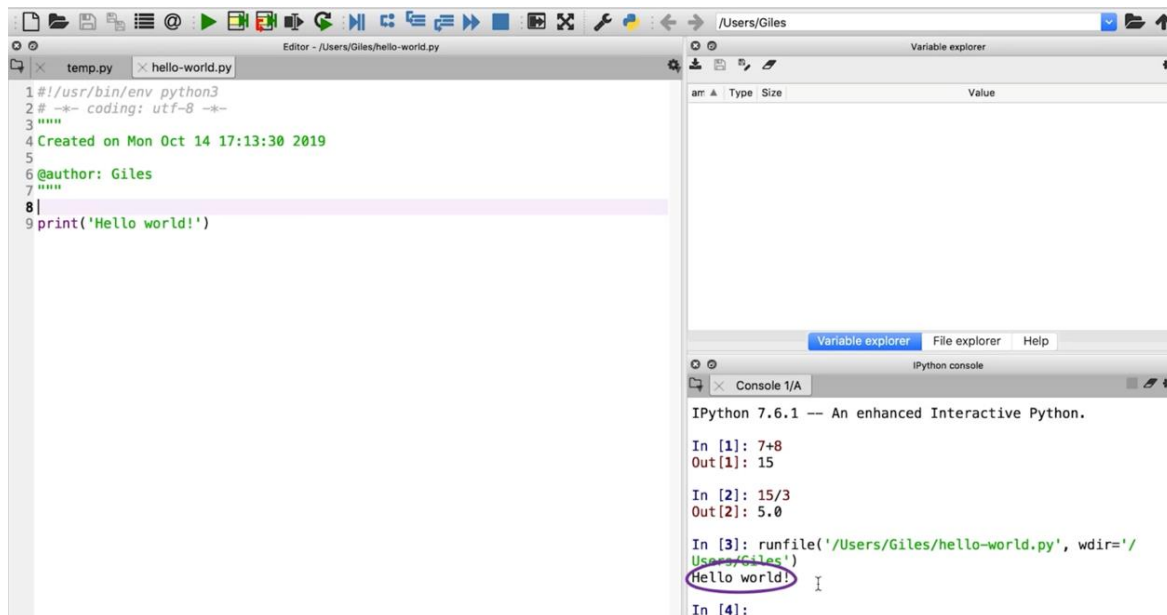
Let's open a new file. This is **untitled0.py** and let's write a code to print "Hello World!".



We'll save it as **hello-world.py**.

And now let's run that by clicking the green triangular button.

We can see here that it has run, and it's printed out "Hello World!" in this console.

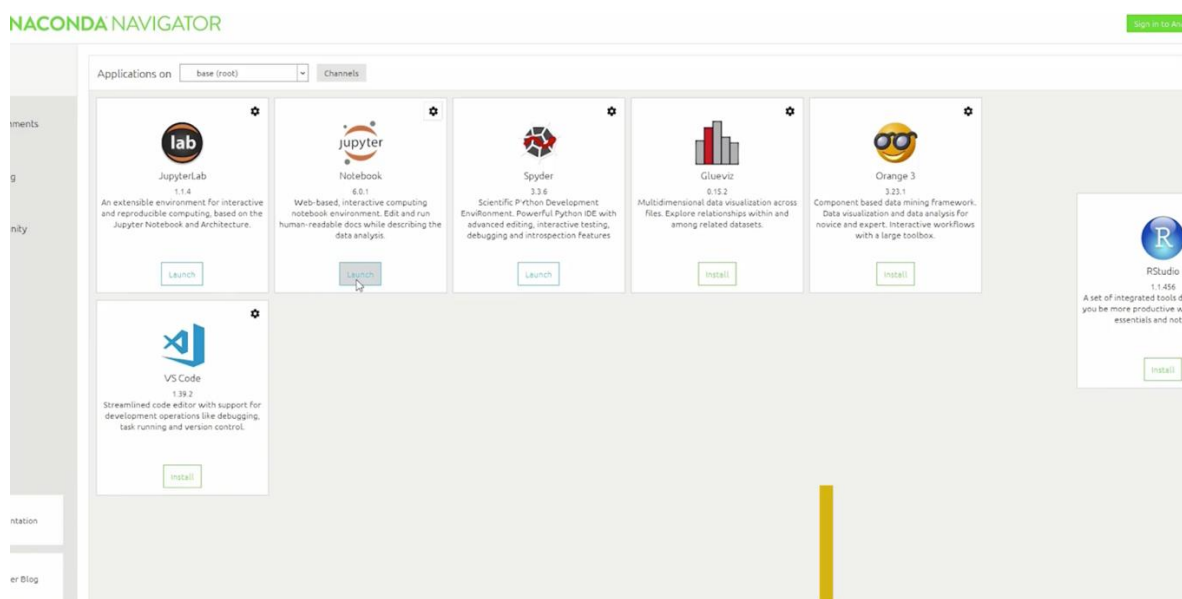


Jupyter Notebook

Jupyter Notebook is a really good way of sharing live code since anyone that receives your notebook can run that code.

There are two ways to open the Jupyter Notebook:

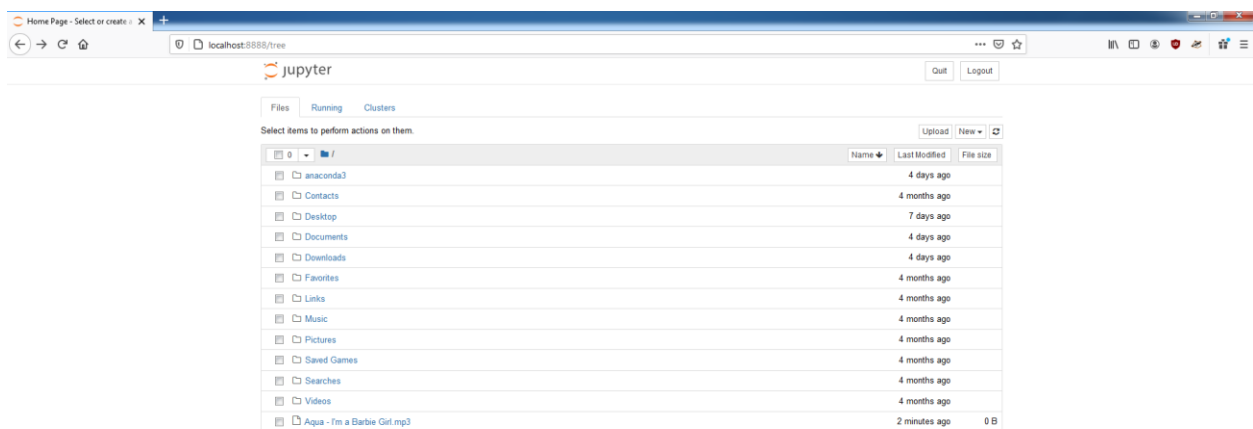
1. Open your Anaconda navigator and click on launch on the Jupyter Notebook.



2. Alternatively, you can also start your Jupyter Notebook from the [command line \(or terminal\)](#) by typing:

```
jupyter notebook
```

When you launch Jupyter Notebook, it creates a local web server that you can access with a web browser (it should automatically launch a browser tab). You should see the Jupyter Notebook open in your browser. When you open Jupyter Notebook and these are just the folders and files on your computer wherever Jupyter happens to be running (either in your Home folder or your working folder).



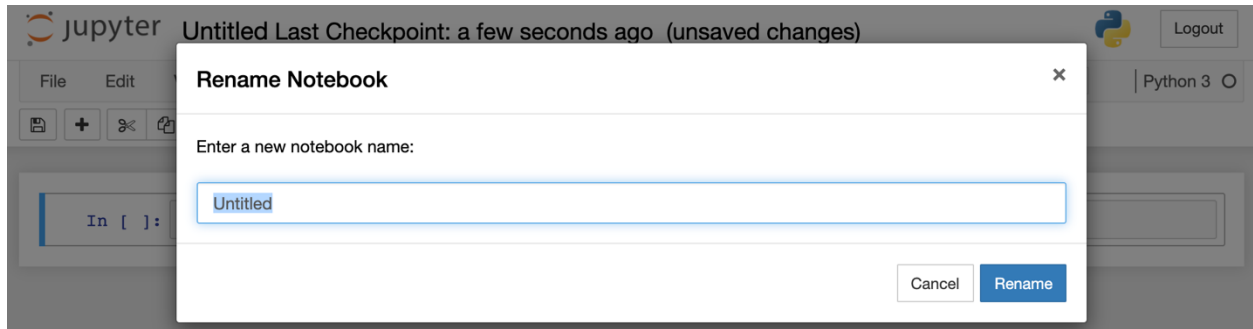
Quick note:

Within Jupyter Notebook, you can only navigate down through child-directories of your default path (you cannot access parent-directories). **It is advisable to work and save all of your notebook files within these child-directories (e.g. Documents).** In order to save/open notebooks outside of the default path (not advised), you would need to navigate to a different directory within PowerShell and then open Jupyter Notebook through the PowerShell.

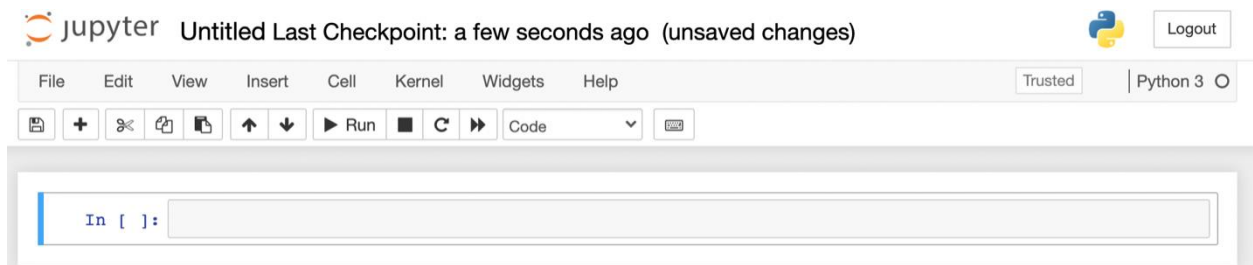
Now, go to new and then create a new **Python 3** notebook. And this is what you will see.



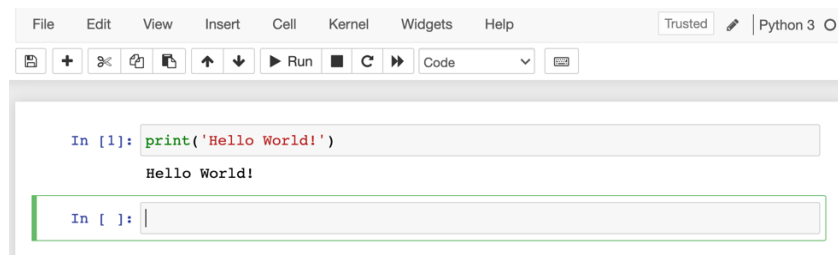
We'll go up to **untitled** here. I'll just put a name to here and that will then change the name of this notebook.



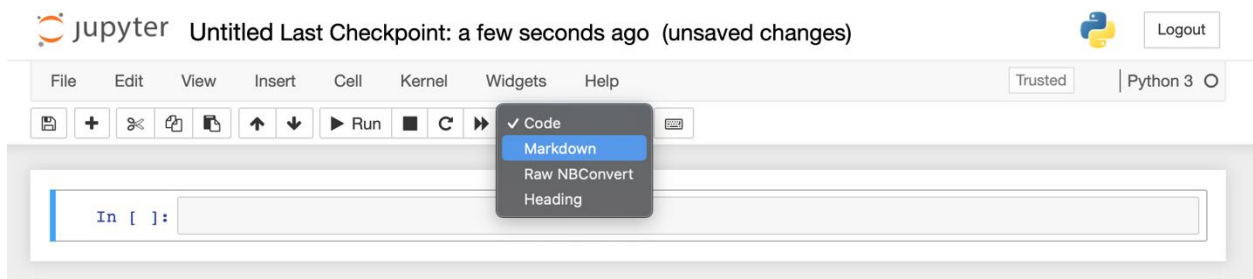
The cell is capable of running code.

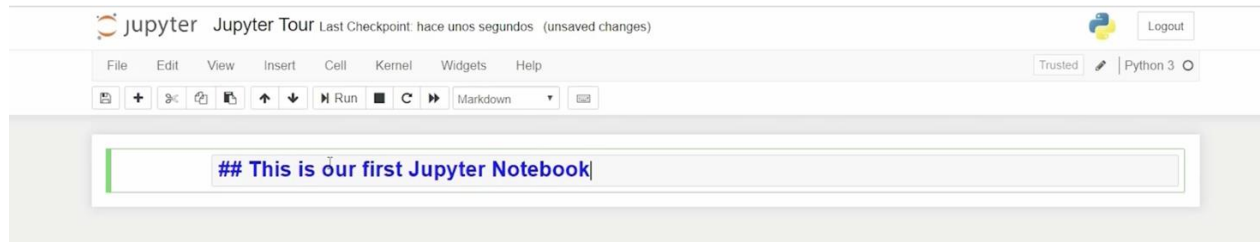


Now, let's **write some code** to print “Hello, world!” in the cell, and hit **Run** button.



In this case it is Python code because it's a python Jupyter notebook. But Jupyter notebooks can run other code too. It can also display text if you want to display text. You click on this little dropdown box and you change to **markdown** and we can put “This is our first Jupyter Notebook”.





More markdown syntax can be found from this link: [Markdown Cells](#).

We will cover more about Python coding and Markdown syntax in the next two Labs.