

# Introduction to Python, Spring 2020

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## What is Python?

“*Python is an interpreted, high-level, general-purpose programming language.*”  
(Wikipedia)

- “interpreted”: executes without previously compiling a program
- “high-level”: abstracts from details of the computer (memory management)
- “general-purpose”: wide variety of applications

## What for and why is it widely used?

- Easy to learn and use, in comparison to other programming languages.
- Provides many useful tools to work with data.
- Popular and open source programming language: means you don’t have to write everything from scratch for your application, but can often use (and contribute to) open source code.
- General purpose: data analysis, data visualization, financial modeling, websites, presentations, etc.

## How can we access it?

<https://www.python.org/>

We can install Python like any other piece of software, by downloading and installing the relevant software packages.

However, for this course we need additional Python resources (i.e. packages, *libraries* of code with Python *functions* we will use often), which are not included in the core Python distribution.

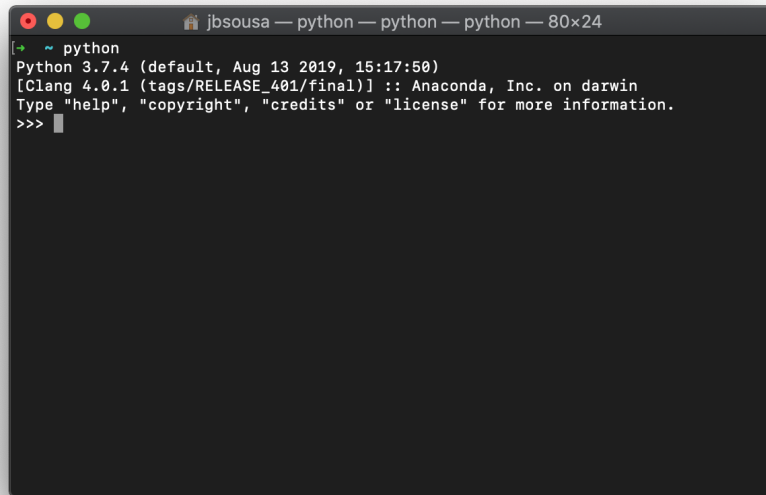
Instead of installing each of these packages individually, we will install the Anaconda Python distribution.

By installing Anaconda, we make sure not only that we have all the Python packages we need, but that they interact smoothly when we use them together.

## How can we use it?

Once Python is installed, we can use directly by opening a Terminal window (*Command prompt* in Windows), and typing **python**:

We have started the Python *interpreter*, meaning that we can now type in statements that our computer will be able to interpret in Python, provided they are written in correct Python language.



```
jbsousa — python — python — python — 80x24
[+] ~ python
Python 3.7.4 (default, Aug 13 2019, 15:17:50)
[Clang 4.0.1 (tags/RELEASE_401/final)] :: Anaconda, Inc. on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> █
```

Figure 1: Starting Python from Terminal/Command prompt

Exit by typing `control+D` on Unix or `control+Z` on Windows, or `quit()`.

With the Python interpreter, we can perform simple operations:

Or we can use Python functions available in the core Python libraries (we can also create our own functions!):

### Jupyter Notebooks

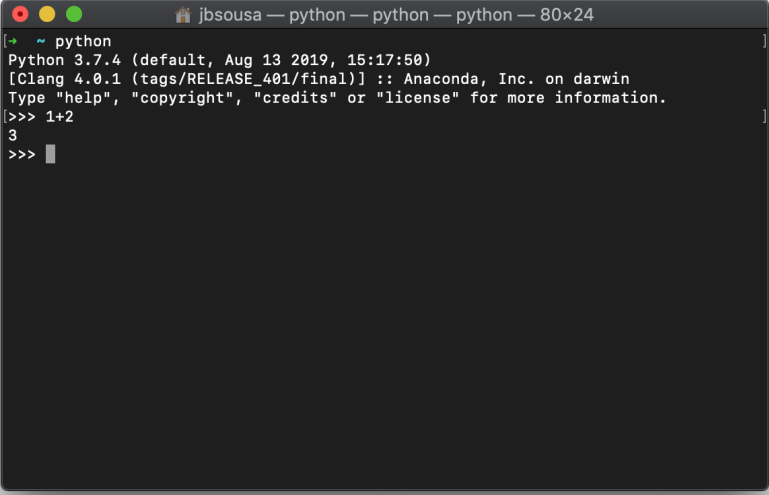
Instead of using Python directly from the Command/Terminal window, we will use a software called Jupyter.

Jupyter is an interactive development environment. Using Jupyter Notebooks, we can create documents (the Notebooks) that contain Python code, graphics, text, all in the same file.

We can easily share Jupyter Notebooks, and we can convert them to PDF, interactive slides, website pages, and more. You have actually been reading these lines after I wrote them using a Jupyter Notebook! (more on this later...)

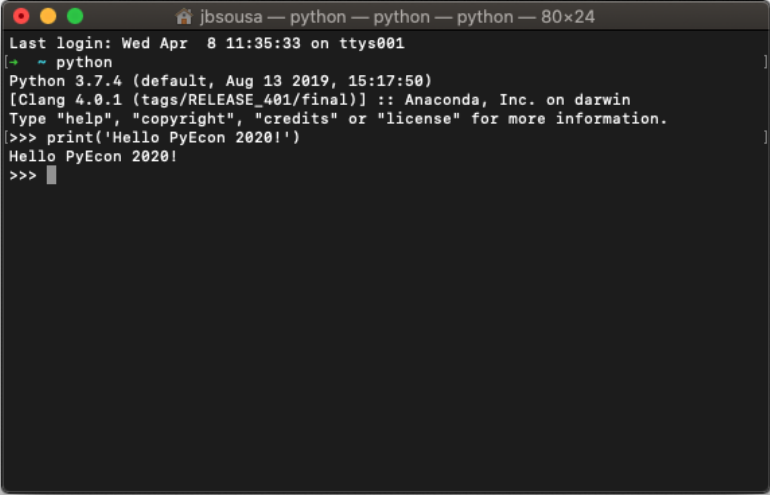
```
print("Welcome to your first Jupyter Notebook!")
```

Welcome to your first Jupyter Notebook!

A screenshot of a macOS terminal window. The title bar at the top shows the window name as 'jbsousa — python — python — python — 80x24'. The terminal content shows the command 'python' being executed, which starts the Python 3.7.4 interpreter. The interpreter displays its version and build information, then prompts for input. The user enters '1+2', and the interpreter outputs '3'. The prompt '>>>' is visible at the end of the line.

```
jbsousa — python — python — python — 80x24
[+] ~ python
Python 3.7.4 (default, Aug 13 2019, 15:17:50)
[Clang 4.0.1 (tags/RELEASE_401/final)] :: Anaconda, Inc. on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> 1+2
3
>>> █
```

Figure 2: Using Python from Terminal/Command prompt for simple math operations.

A screenshot of a macOS terminal window. The title bar at the top shows a home icon, the name 'jbsousa', and the path 'python — python — python' followed by the window size '80x24'. The terminal content shows the login message 'Last login: Wed Apr 8 11:35:33 on ttys001', the command prompt '~ python', and the Python 3.7.4 startup banner including version, date, and compiler information. The user enters '>>> print('Hello PyEcon 2020!')' and the output 'Hello PyEcon 2020!' is displayed. The prompt '>>>' is followed by a cursor.

```
jbsousa — python — python — python — 80x24
Last login: Wed Apr 8 11:35:33 on ttys001
~ python
Python 3.7.4 (default, Aug 13 2019, 15:17:50)
[Clang 4.0.1 (tags/RELEASE_401/final)] :: Anaconda, Inc. on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> print('Hello PyEcon 2020!')
Hello PyEcon 2020!
>>> █
```

Figure 3: Using Python from Terminal/Command prompt with Python's built-in functions.

## Exercises

Download and install the Anaconda distribution on your laptop.

Choose Anaconda 2020.02 with Python 3.7 version.

### 1. Your first Python program

After installing, open the Anaconda Prompt (terminal on Linux or macOS).

Type `python`. The `>>>` means you are now able to run Python code.

Type `print("Hello Python world!")` and press Enter.

Exit Python: on Windows, press `ctrl+z` and Enter. On Linux or macOS, type `exit()` and press Enter.

### 2. Run Python in a Jupyter Notebook

At the Anaconda Prompt (terminal on Linux or macOS), type `jupyter-notebook` and press Enter.

Create a new Python 3 Notebook.

Type `print("Hello Python world!")` in the empty cell, and evaluate it by pressing `Shift+Enter`.

Close the Notebook and in the Notebook server directory, select and shutdown the Notebook (it should be named `Untitled.ipynb` in case you have not changed the name), and delete it.

At the Anaconda Prompt, press `ctrl+z` (Windows) or `ctrl+c` to exit Jupyter.

For detailed instructions see the Anaconda User guide and Jupyter's Quick Start guide.