

Introduction to Python

Columbia Biostatistics Computing Club
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What is Python?

- In short it is another programming language.
 - We have talked a lot about R in the last couple of meetings which is a different programming language. You can do basically everything that you do in R with python.
- Python can be used for more than just data cleaning, statistics, visualizations
 - It can be used for web development
 - It can be used for Desktop development
 - It is a general purpose programming language!
 - Machine Learning!

Why learn Python?

According to the TIOBE index Python is the number 2 most used programming language this year.

Nov 2020	Nov 2019	Change	Programming Language	Ratings	Change
1	2	▲	C	16.21%	+0.17%
2	3	▲	Python	12.12%	+2.27%
3	1	▼	Java	11.68%	-4.57%
4	4		C++	7.60%	+1.99%
5	5		C#	4.67%	+0.36%
6	6		Visual Basic	4.01%	-0.22%
7	7		JavaScript	2.03%	+0.10%
8	8		PHP	1.79%	+0.07%
9	16	▲	R	1.64%	+0.66%
10	9	▼	SQL	1.54%	-0.15%

Source: <https://www.tiobe.com/tiobe-index/>

Python compared to R

- One is not better than the other!
 - It just all depend on what you are trying to do and what job you might want after the program you are in now!
- I have seen that more tech companies use python and that more academic researched based institutions use R.
 - There are always exceptions to this!
 - It is good to be familiar with both languages.
- If you know one it is easier to pick up the other over time!

Where to write Python Code

(just a few examples)

- Using a text editor and running python through your terminal
 - There are a lot of types of text editors (examples: Atom, Vim, Visual Studio Code, Notepad++).
- Google Colab Notebook
 - There is an example of this on the computing club website in resources.
 - <https://colab.research.google.com/notebooks/intro.ipynb>
 - This is the most like R Studio, no need to download anything!
 - We will also be using Google Colab in our coding demonstration.
- Jupyter Notebook
 - <https://jupyter.org/>
 - Also like R Studio (However, need to download more things).

How to Download Python

- A lot of computers come with versions on python already installed. Most OS and Linux operating systems already have it.
 - Here is how to check your python version:
<https://phoenixnap.com/kb/check-python-version>
 - If you don't have it yet here is where you can downloading Python:
<https://wiki.python.org/moin/BeginnersGuide/Download>

What is a Terminal?

- This in itself could be an entire computing club presentation!
- In simple terms it is a command line system that allows you quick access to all files, the ability to run those files, and control your operating system.
 - There is a lot of things you can do with your terminal!
- To run a file you edited in a text editor you will need to go to that file's directory and then run it using python.
 - Example command: `python3 hello.py`
 - Tutorial: <https://www.datacamp.com/community/tutorials/running-a-python-script>

List of python tutorials:

- Tutorialspoint: <https://www.tutorialspoint.com/python/index.htm>
 - This is a great online resource! (Runs python through terminal)
- Keras: <https://keras.io/about/>
 - This has a lot of code examples. It is an open source machine learning platform
 - https://keras.io/getting_started/intro_to_keras_for_researchers/ Intro for researchers
- Python tutorial: <https://www.learnpython.org/>
- DataCamp:
https://www.datacamp.com/?utm_source=learnpython_com&utm_campaign=learnpython_tutorials
- Video Tutorial: <https://www.youtube.com/watch?v=rfscVS0vtbw>

Common Libraries

(Just like R we need to install and call libraries)

- numpy -> library for some optimized data structures
 - `import numpy as np`
- pandas -> library for nice data frames (like tibbles)
 - `import pandas as pd`
 - <https://pandas.pydata.org/>
- seaborn -> library for plotting
 - `import seaborn as sns`
- sklearn -> library popular for machine learning
 - `import sklearn as sk`
 - <https://scikit-learn.org/stable/index.html>

Questions before the Demonstration?

If anyone has suggested Python resources please put them in the chat!