

Python 3: The Big Picture

Why Python?



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Python 3: The Big Picture

Version Check



Version Check



This version was created by using:

- Python 3.11



Version Check



This course is 100% applicable to:

- Python 3.0 through Python 3.11



Relevant Notes



A note on Python 2:

- Most content will be applicable
- Will briefly discuss challenges around Python 2

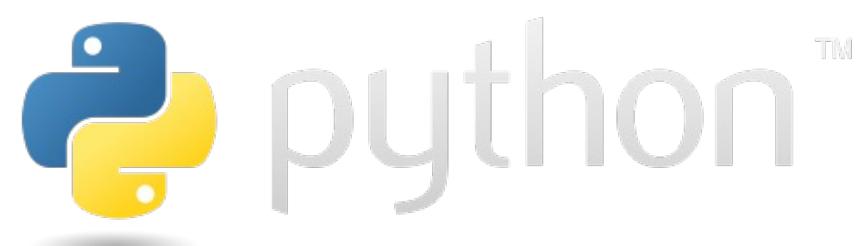
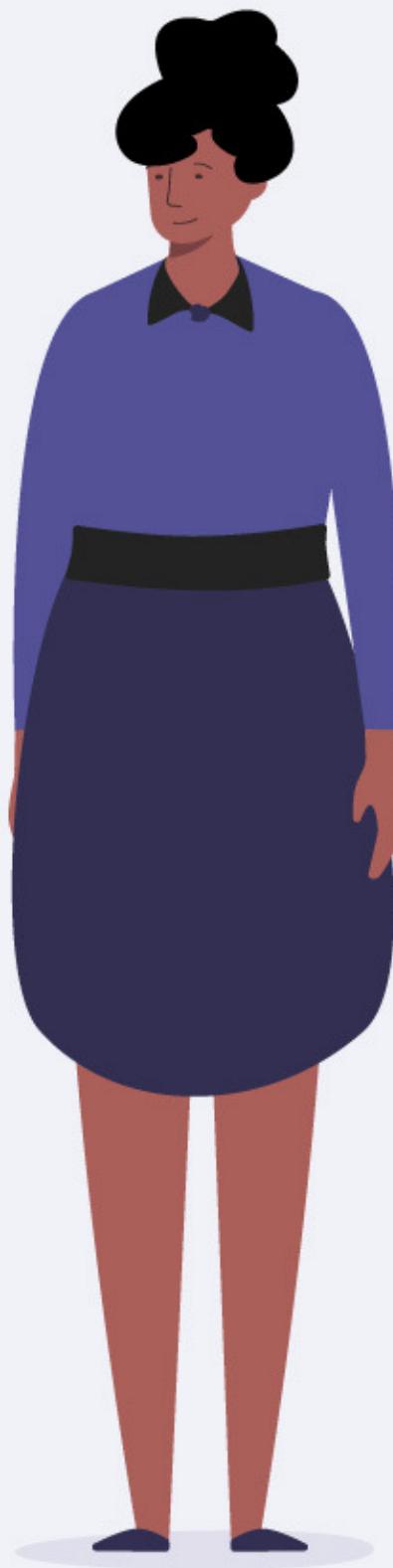




Why Python?

What makes Python unique?

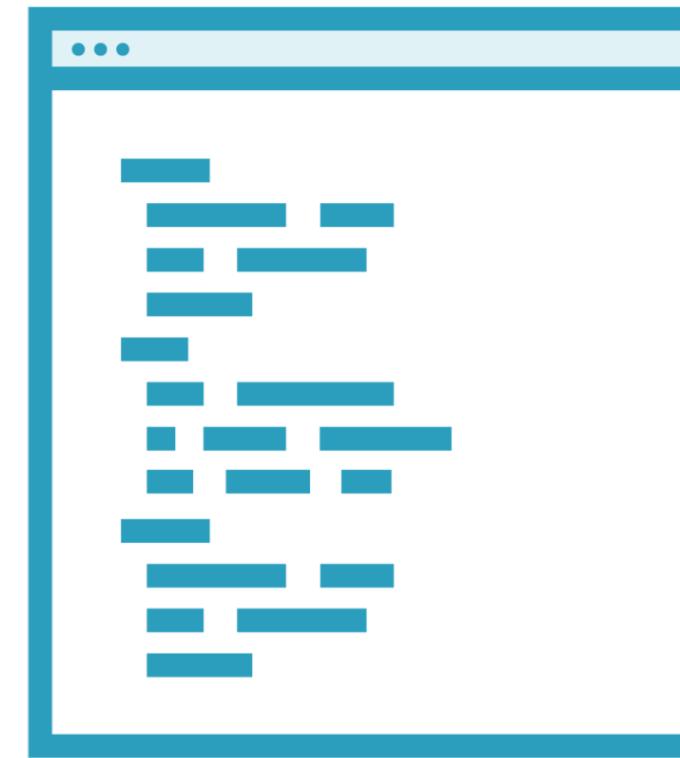
Should I learn more?



Big Picture Course



No software to install



No code to write



Module Overview



- Simple to learn
- Simple to use
- Great community
- Widely used
- In high demand



Simple to Learn



Minimal Computer Knowledge Required



Memory vs. Hard Drive

Operating Systems

Compilers



Easy to Read and Understand



Python is friendly to learn



Simple to Use



One Way to Do Things

1









Focus on Simplicity



INPUT

RESET

INPUT

RESET

INPUT

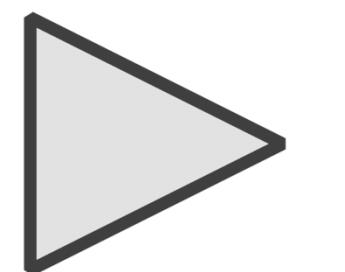
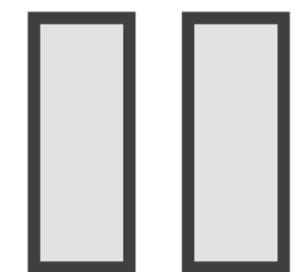
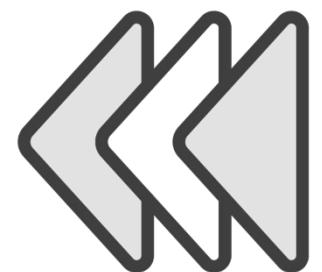
RESET

INPUT

RESET

INPUT !

SUBMIT



INPUT

INPUT

INPUT

INPUT

INPUT

INPUT

INPUT

INPUT

A screenshot of a mobile application interface. At the top, there is a header with three dots. Below the header, there is a list of items, each consisting of a short horizontal line followed by a dot and another horizontal line. The fourth item in the list has a checkmark icon next to it. The bottom of the screen features a large, light-gray button with a dark-gray outline and a white arrow pointing to the right.A screenshot of a mobile application interface. It shows a list of items similar to the one above, but the fourth item has a checkmark icon. A large, dark-gray arrow points to the right, indicating the direction of the scroll action. The bottom of the screen features a large, light-gray button with a dark-gray outline and a white arrow pointing to the right.A screenshot of a mobile application interface. It displays a grid of items arranged in four columns and six rows. Each item is represented by a light-gray rectangle. The bottom of the screen features a large, light-gray button with a dark-gray outline and a white arrow pointing to the right.



EASY



Focus on Beauty





Great Community







Python's community is vast; diverse & aims to grow; Python is Open.

Great software is supported by great people, and Python is no exception. Our user base is enthusiastic and dedicated to spreading use of the language far and wide. Our community can help support the beginner, the expert, and adds to the ever-increasing open-source knowledgebase.



Countless Python packages

[Python FAQs](#)

Great tools

We want to be open about how we can improve transparency, provide

Much more...

Contribute by filling out the Python Software Foundation Community Survey [here](#).

Success Stories

My experience with the Python community has been awesome. I have met some fantastic people through local meetups and gotten great support. [@alex_gaynor](#)

Python Weekly

Python Weekly is a free weekly email newsletter featuring curated news, articles, new releases, jobs, and more. Curated by Rahul Chaudhary every Thursday.

Go to [pythonweekly.com](#) to sign up.

PySlackers

PySlackers is a community of Python enthusiasts centered around an open Slack team.

Go to [pyslackers.com](#) for more information and to join.

Internet Relay Chat

Freenode IRC hosts several channels. Select an IRC client, register your nickname with Freenode, and you can be off and running!

Freenode IRC General Channels

#python for general questions

#python-dev for CPython developers

#distutils for Python packaging discussion

Python Discord

Python Discord is a large community

[Donate](#)[Search](#)[GO](#)[Socialize](#)[About](#)[Downloads](#)[Documentation](#)[Community](#)[Success Stories](#)[News](#)[Events](#)

Tweets by @ThePSF

[Python](#) »» [Python Developer's Guide](#) »» [PEP Index](#) »» [PEP 0 -- Index of Python Enhancement Proposals \(PEPs\)](#)

Proposing new features



Welcome to Python.org

Collecting input



Python Software Foundation @ThePSF

Documenting design decisions

The Python Logo
The official home of the...
[python.org](#)[Embed](#)[View on Twitter](#)

The PSF

The Python Software Foundation
is the organization behind Python.
Become a member of the PSF and
help advance the software and

PEP 0 -- Index of Python Enhancement Proposals (PEPs)

PEP:	0
Title:	Index of Python Enhancement Proposals (PEPs)
Last-Modified:	2020-11-22
Author:	python-dev <python-dev at python.org>
Status:	Active
Type:	Informational
Created:	13-Jul-2000

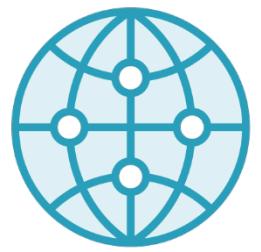
Contents

- [Introduction](#)
- [Index by Category](#)
 - [Meta-PEPs \(PEPs about PEPs or Processes\)](#)
 - [Other Informational PEPs](#)
 - [Provisional PEPs \(provisionally accepted; interface may still change\)](#)
 - [Accepted PEPs \(accepted; may not be implemented yet\)](#)
 - [Open PEPs \(under consideration\)](#)
 - [Finished PEPs \(done, with a stable interface\)](#)
 - [Historical Meta-PEPs and Informational PEPs](#)
 - [Deferred PEPs \(postponed pending further research or updates\)](#)
 - [Abandoned, Withdrawn, and Rejected PEPs](#)

Python Is Widely Used



Many Different Uses



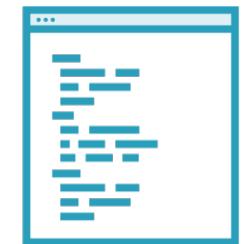
Web Development



Data Science



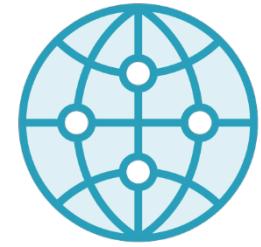
Education and Learning



Scripting

And More!
And More!





Web Development

API

Website

**App
(CMS, ERP)**



Flask

Django

Django CMS

FastAPI

TurboGears

WagTail

Bottle

web2py

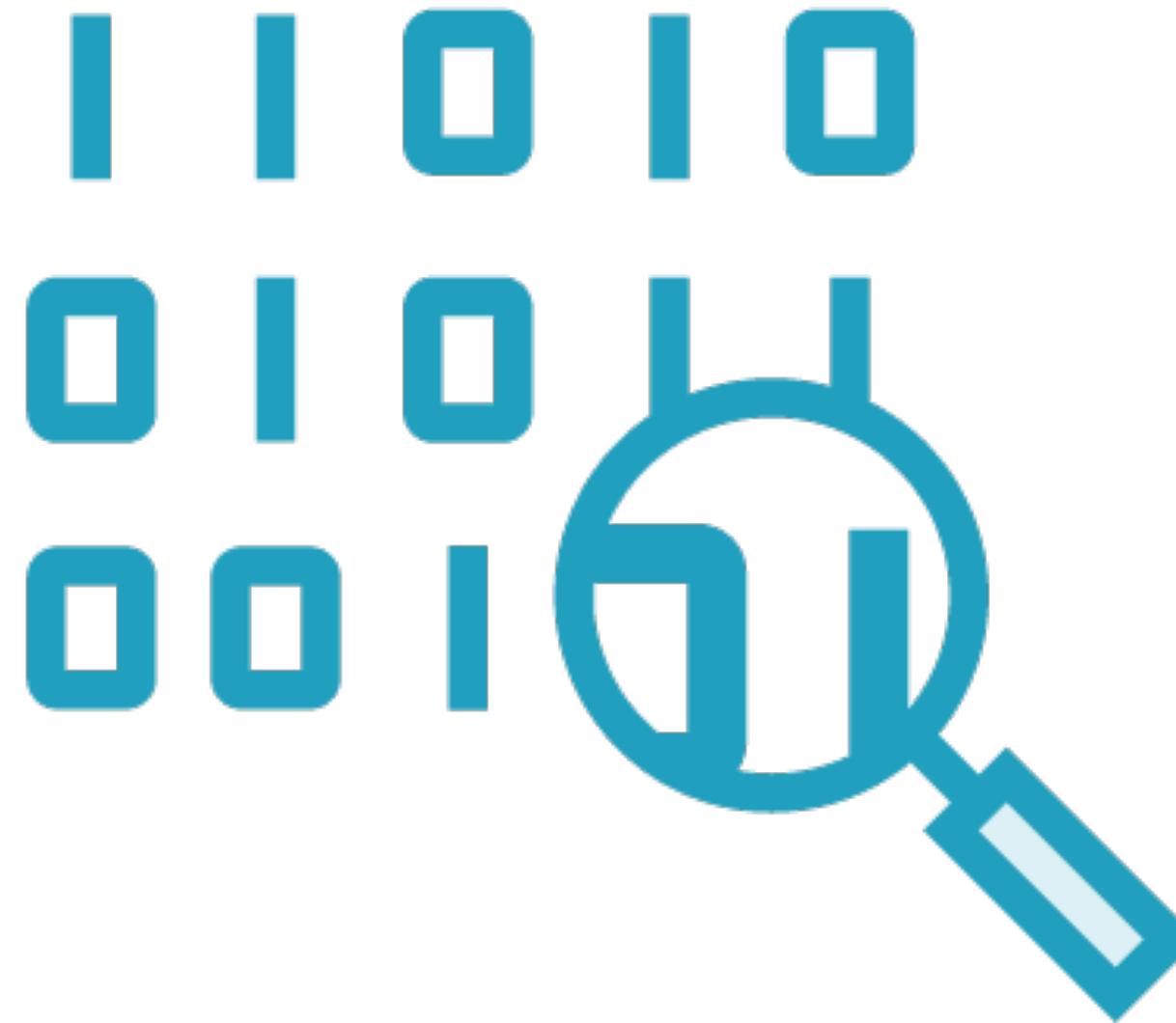
Mezzanine



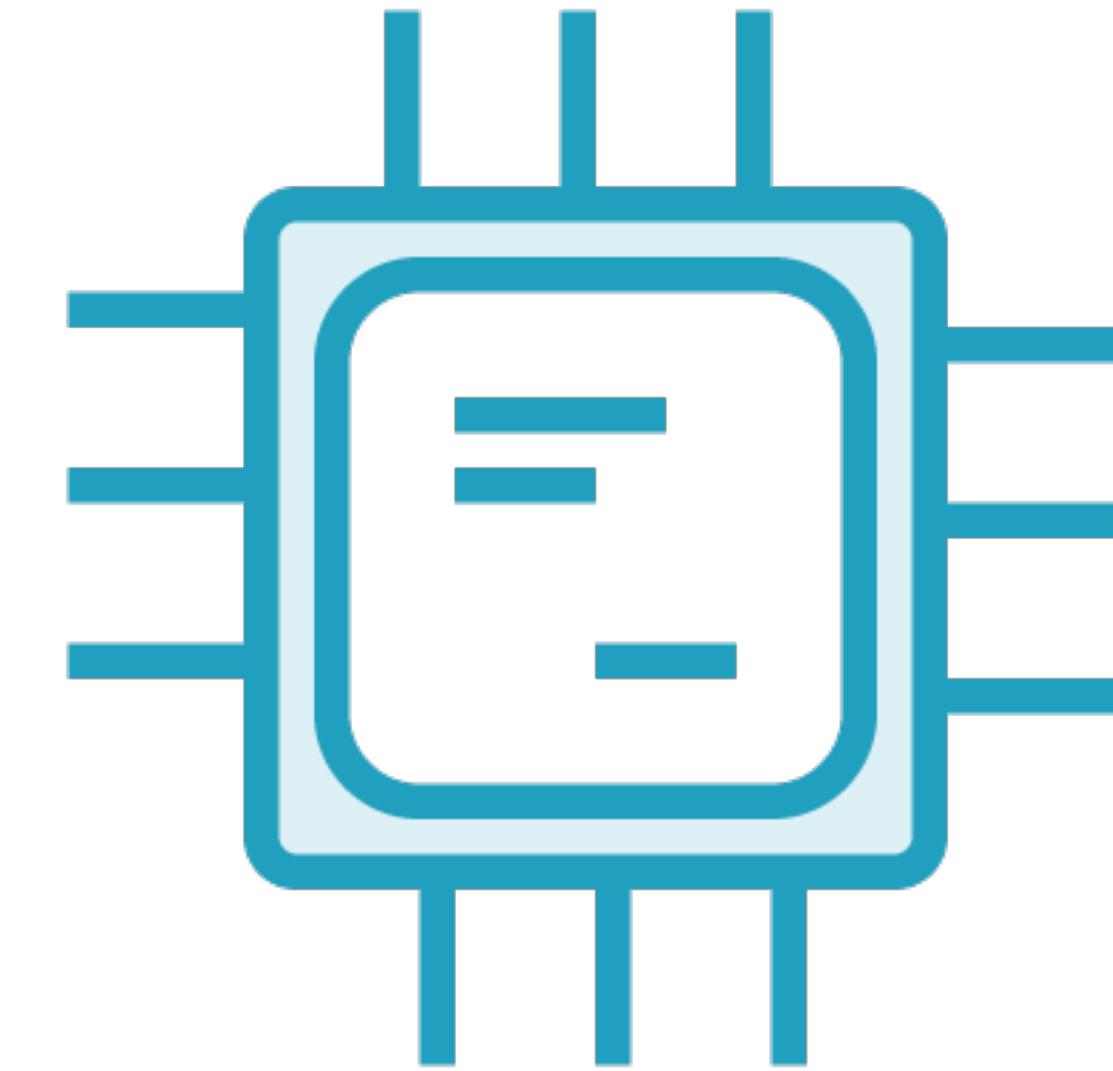
Data Science



Data Science

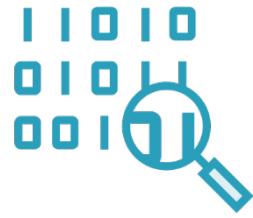


Big Data



Machine Learning





Big Data

Kilobytes

Megabytes

Gigabytes

Terabytes

Petabytes

Exabytes

25000000000000000000 bytes/day

New Systems Are Needed!

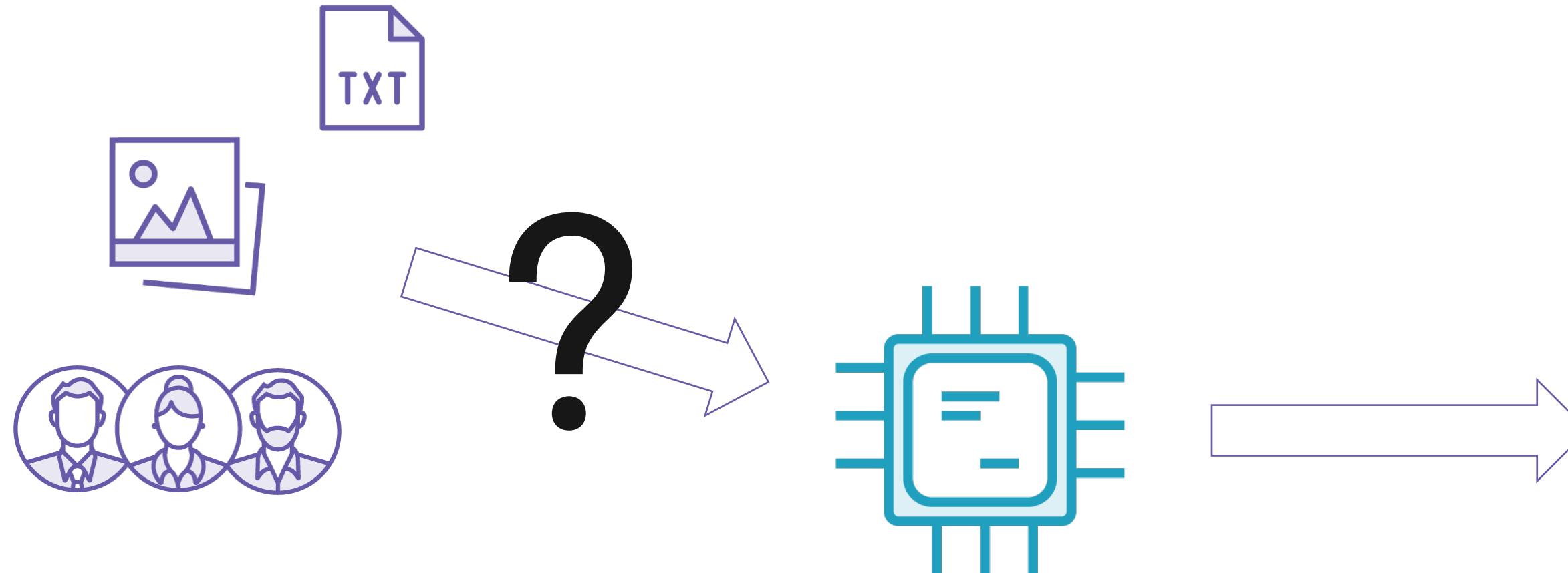


Large datasets are powerful!





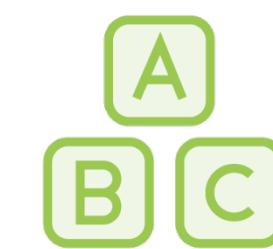
Machine Learning



Spam



Network
Intrusion
Detection



Optical
Character
Recognition



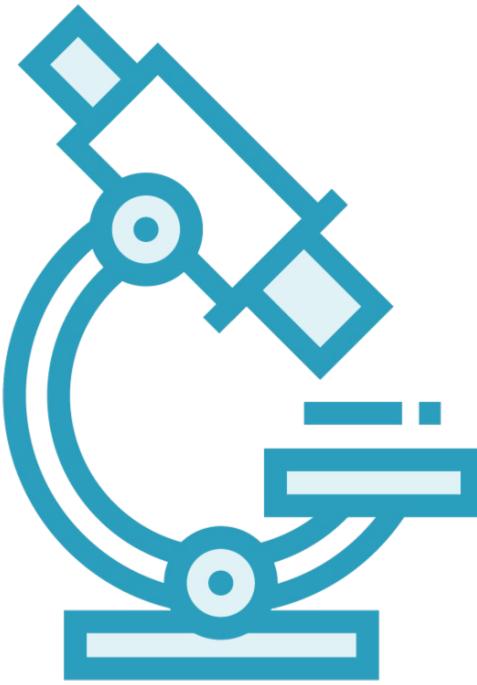
Computer
Vision



Education and Learning



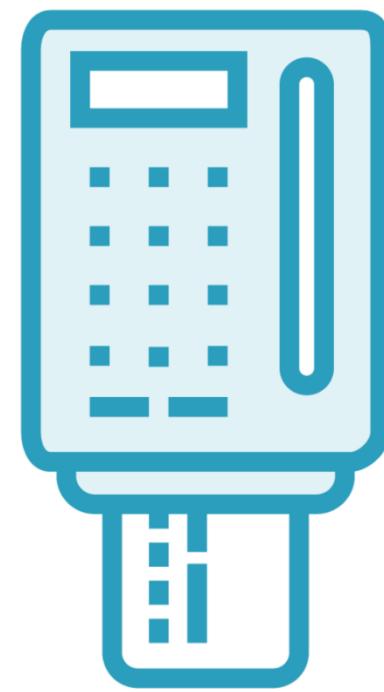
Education and Learning



STEM



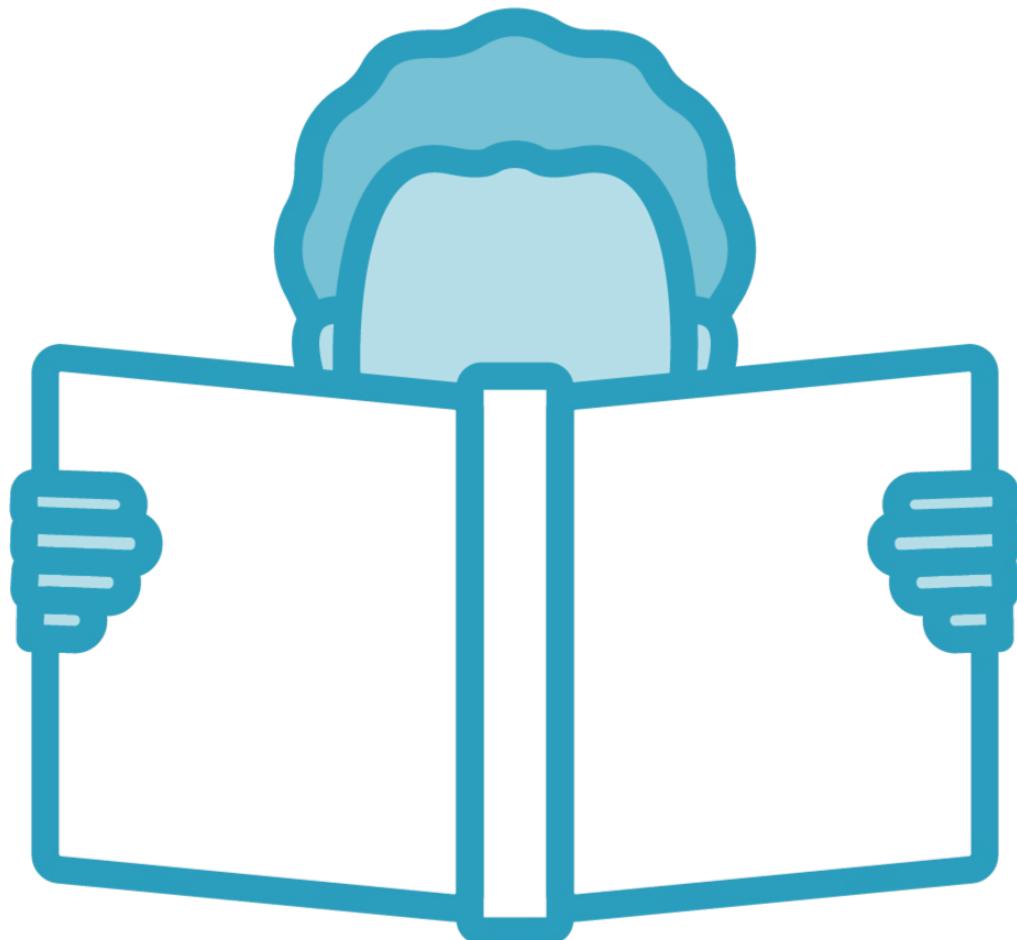
Programming



Hardware



Education and Learning



Jupyter Notebooks

jupyter Rich Output (unsaved changes)

File Edit View Insert Cell Kernel Widgets Help

Not Trusted Python 3 Memory: 167 / 2048 MB

```
.style("text-anchor", "middle")
.text(function(d) { return d.name.substring(0, d.r / 3); });

d3.select(self.frameElement).style("height", diameter + "px");

<IPython.core.display.Javascript object>
```

LaTeX

The IPython display system also has builtin support for the display of mathematical expressions typeset in LaTeX, which is rendered in the browser using [MathJax](#).

You can pass raw LaTeX test as a string to the `Math` object:

In [24]: `from IPython.display import Math
Math(r'F(k) = \int_{-\infty}^{\infty} f(x) e^{2\pi i k} dx')`

Out[24]:
$$F(k) = \int_{-\infty}^{\infty} f(x) e^{2\pi i k} dx$$

With the `Latex` class, you have to include the delimiters yourself. This allows you to use other LaTeX modes such as `eqnarray`:

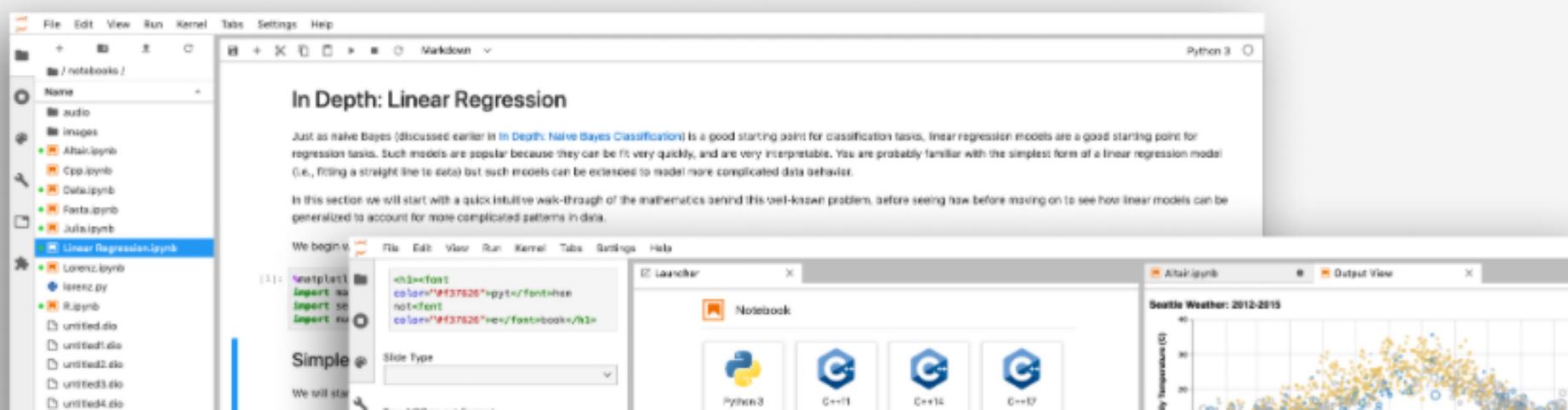
In [25]: `from IPython.display import Latex
Latex(r"""\begin{eqnarray}\nabla \times \vec{\mathbf{B}} - \frac{1}{c} \frac{\partial \vec{\mathbf{E}}}{\partial t} &= \frac{4\pi}{c} \vec{\mathbf{j}} \\ \nabla \cdot \vec{\mathbf{E}} &= 4\pi\rho \\ \nabla \times \vec{\mathbf{E}} + \frac{1}{c} \frac{\partial \vec{\mathbf{B}}}{\partial t} &= \vec{0} \\ \nabla \cdot \vec{\mathbf{B}} &= 0\end{eqnarray}""")`

Out[25]:

$$\nabla \times \vec{\mathbf{B}} - \frac{1}{c} \frac{\partial \vec{\mathbf{E}}}{\partial t} = \frac{4\pi}{c} \vec{\mathbf{j}}$$
$$\nabla \cdot \vec{\mathbf{E}} = 4\pi\rho$$
$$\nabla \times \vec{\mathbf{E}} + \frac{1}{c} \frac{\partial \vec{\mathbf{B}}}{\partial t} = \vec{0}$$
$$\nabla \cdot \vec{\mathbf{B}} = 0$$




Project Jupyter exists to develop open-source software, open-standards, and services for interactive computing across dozens of programming languages.

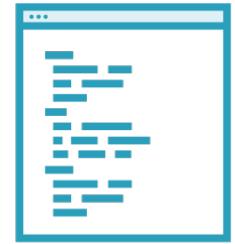


JupyterLab: Jupyter's Next-Generation Notebook Interface

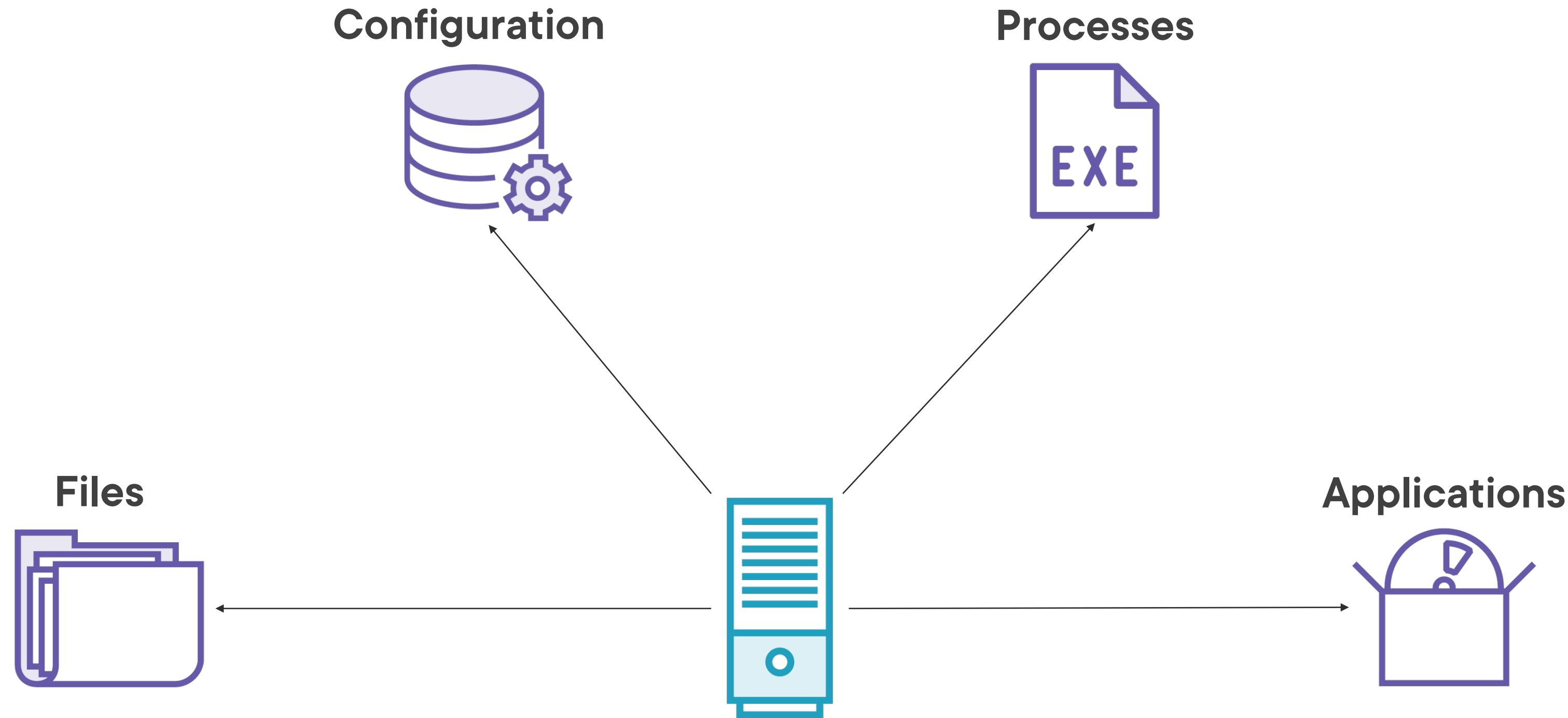
JupyterLab is a web-based interactive development environment for Jupyter notebooks, code, and data. JupyterLab is flexible: configure and arrange the user interface to support a wide range of workflows in science, scientific computing, and machine learning. JupyterLab is extensible and modular: write new components and integrate with existing ones.

Scripting





Machine Scripting





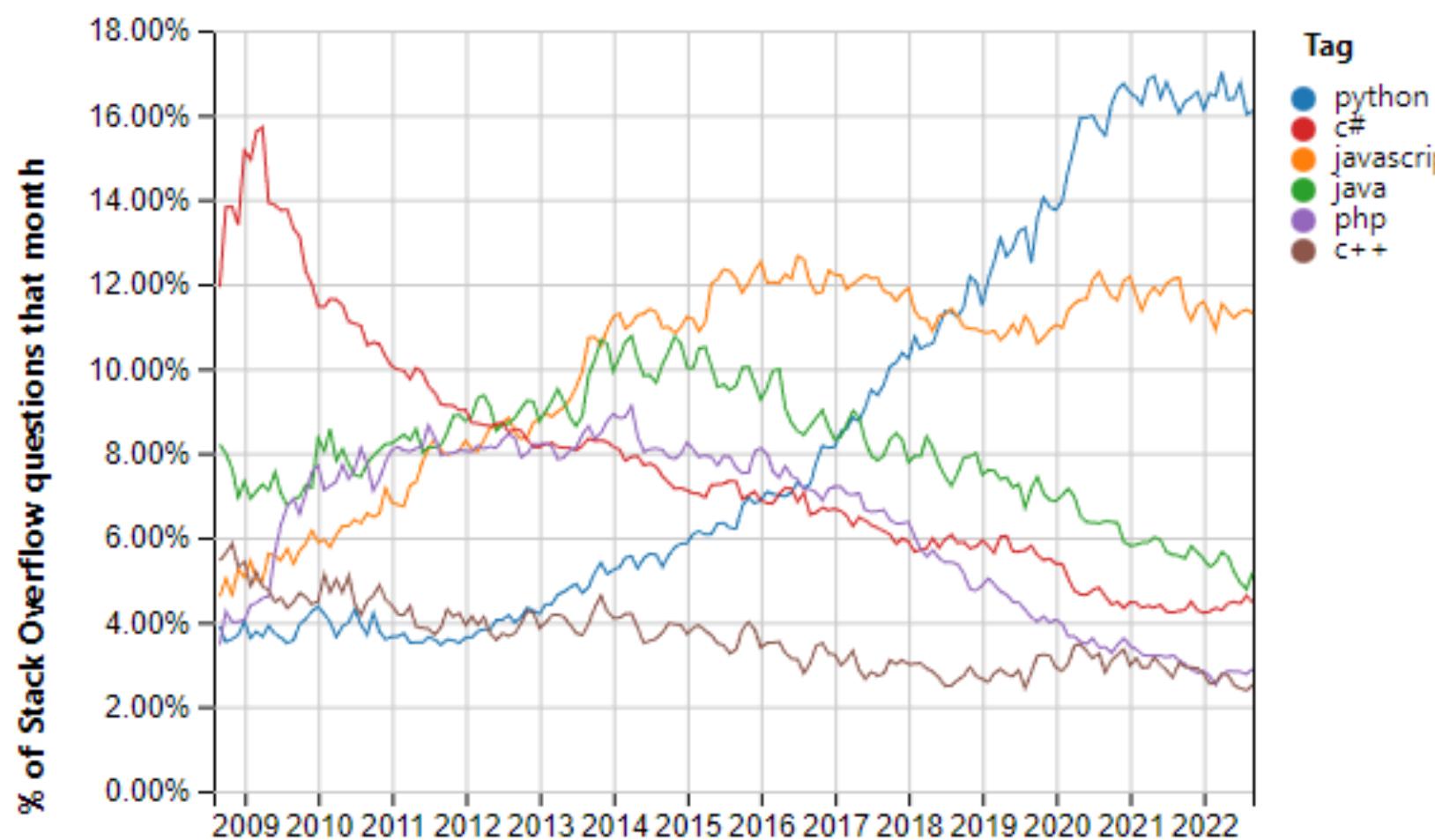
Application Scripting



In High Demand



Growing in Popularity



Worldwide, Oct 2022 compared to a year ago:				
Rank	Change	Language	Share	Trend
1		Python	28.3 %	-1.8 %
2		Java	17.2 %	-0.9 %
3		JavaScript	9.69 %	+0.4 %
4		C#	7.2 %	-0.2 %
5		C/C++	6.45 %	-0.5 %
6		PHP	5.39 %	-0.9 %
7		R	4.03 %	+0.3 %
8	↑↑↑	TypeScript	2.71 %	+1.1 %
9	↓	Objective-C	2.16 %	+0.2 %
10	↑↑	Go	2.08 %	+0.5 %

Stack Overflow (<https://bit.ly/3rXH8UL>)

PYPL (<http://bit.ly/2eJ2rnC>)



Growing in Popularity



Oct 2022	Oct 2021	Change	Programming Language	Ratings	Change
1	1		Python	17.08%	+5.81%
2	2		C	15.21%	+4.05%
3	3		Java	12.84%	+2.38%
4	4		C++	9.92%	+2.42%
5	5		C#	4.42%	-0.84%
6	6		Visual Basic	3.95%	-1.29%
7	7		JavaScript	2.74%	+0.55%
8	10	▲	Assembly language	2.39%	+0.33%
9	9		PHP	2.04%	-0.06%

IEEE
(<https://spectrum.ieee.org/top-programming-languages-2022>)

TIOBE
(<https://www.tiobe.com/tiobe-index/>)



Module Summary



- Simple to learn
- Simple to use
- Great community
- Widely used
- In high demand



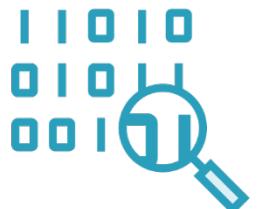
Python is simple to learn and use



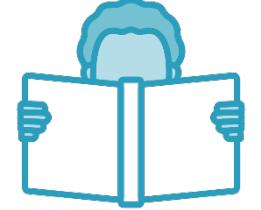
Many Different Uses



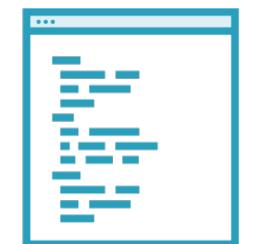
Web Development



Data Science



Education and Learning



Scripting

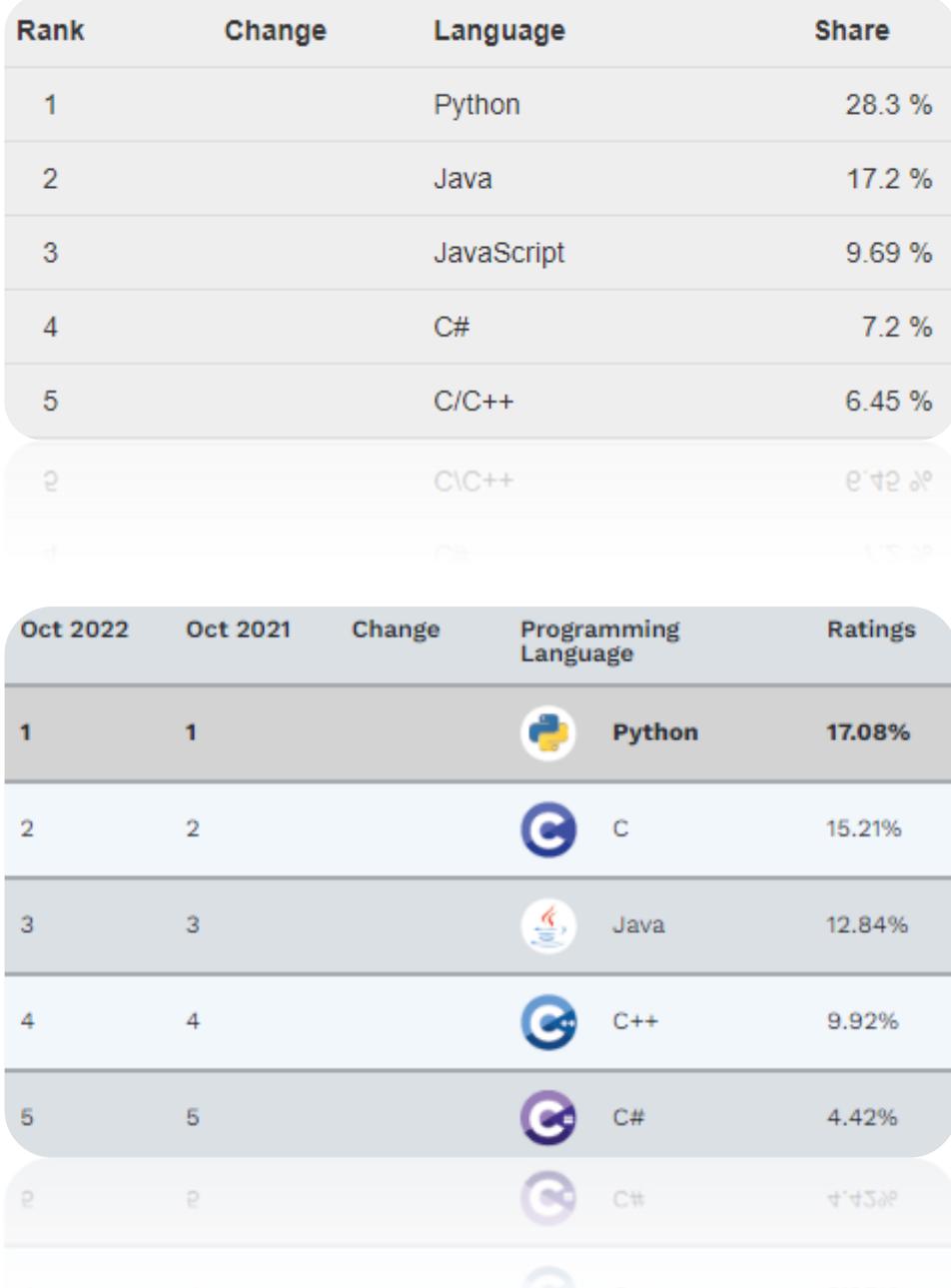


Great Community!

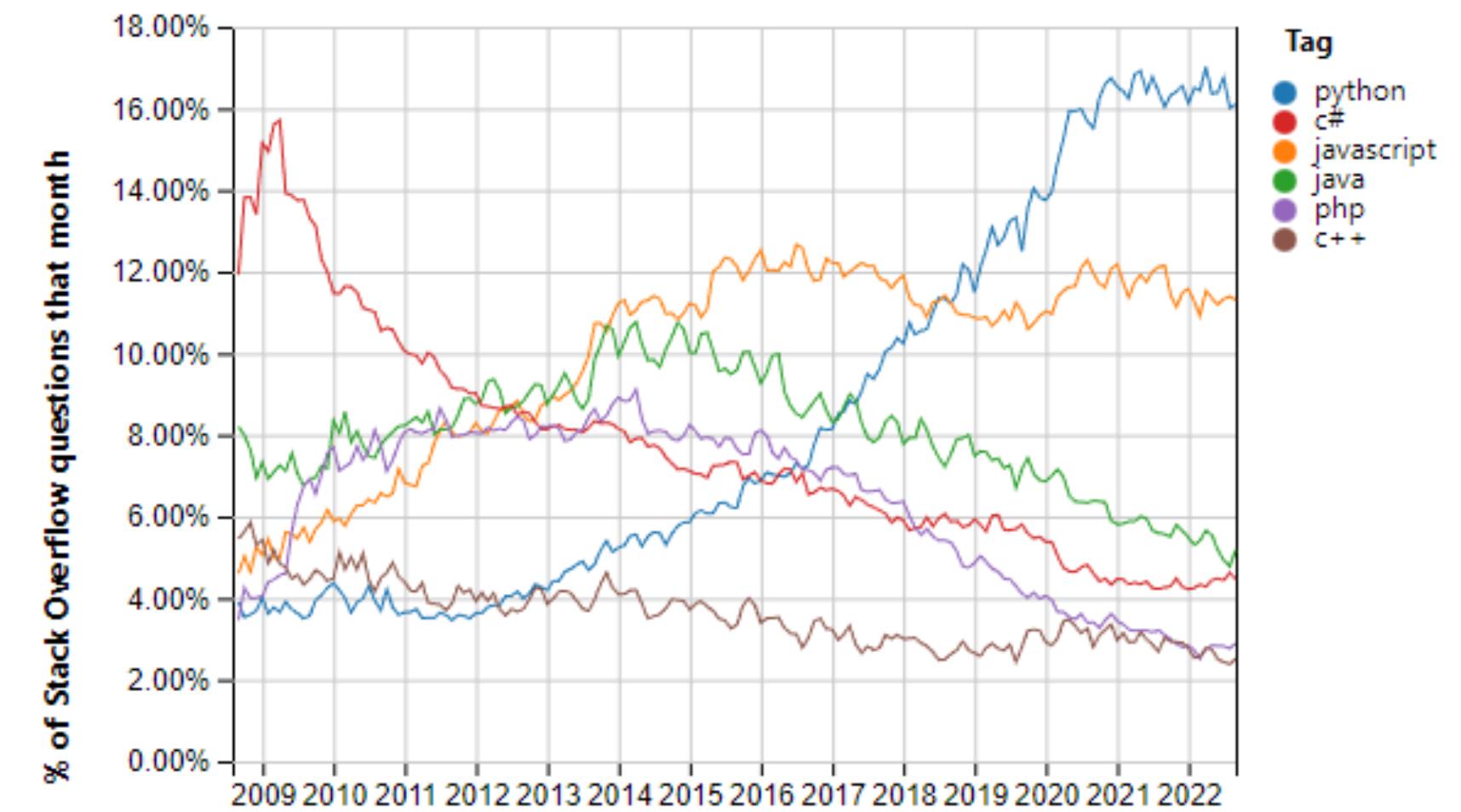


In High Demand

PYPL



TIOBE



Stack Overflow (<https://bit.ly/3rXH8UL>)

