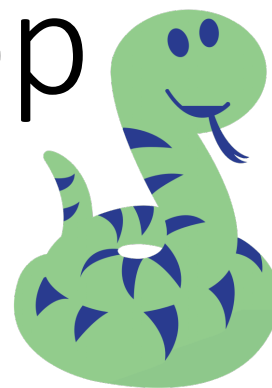


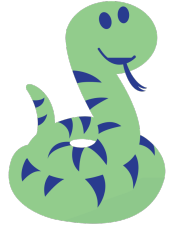


Python Workshop

Crockett Lab, Fall 2020

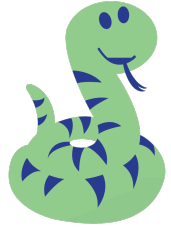


Workshop Topics

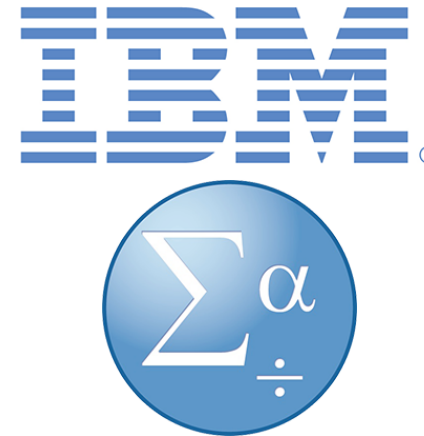


- Why code, why Python?
 - Advantages and disadvantages
- What *is* Python?
- Getting up and running with Python
 - Downloading
 - Installing
- Interactive coding, scripting, and notebooks
 - Anaconda
 - Downloading
 - Installing
- The basics
 - Variables, data types, operators, expressions, and statements
 - Functions and methods
 - Abstraction, encapsulation, and object-orientated programming
 - Conditionals and Flow Control
 - Libraries
- Working with data
 - Reading data files
 - Coronavirus dataset
 - Data structures
 - Tuples, lists, and dictionaries
 - Accessing data
 - Working with Pandas
 - Statistical operations
 - Data Visualization

Why Code



- Why should behavioral scientists code?
 - Why not use consumer products, like SPSS or Jamovi?
 - Open Science
 - Replication and Reproducibility
 - Interdisciplinarity
 - Pedagogy and statistical training
 - Flexibility and novelty
 - Computational methods
 - Transferable skills and 'market Value'?





Why code in Python

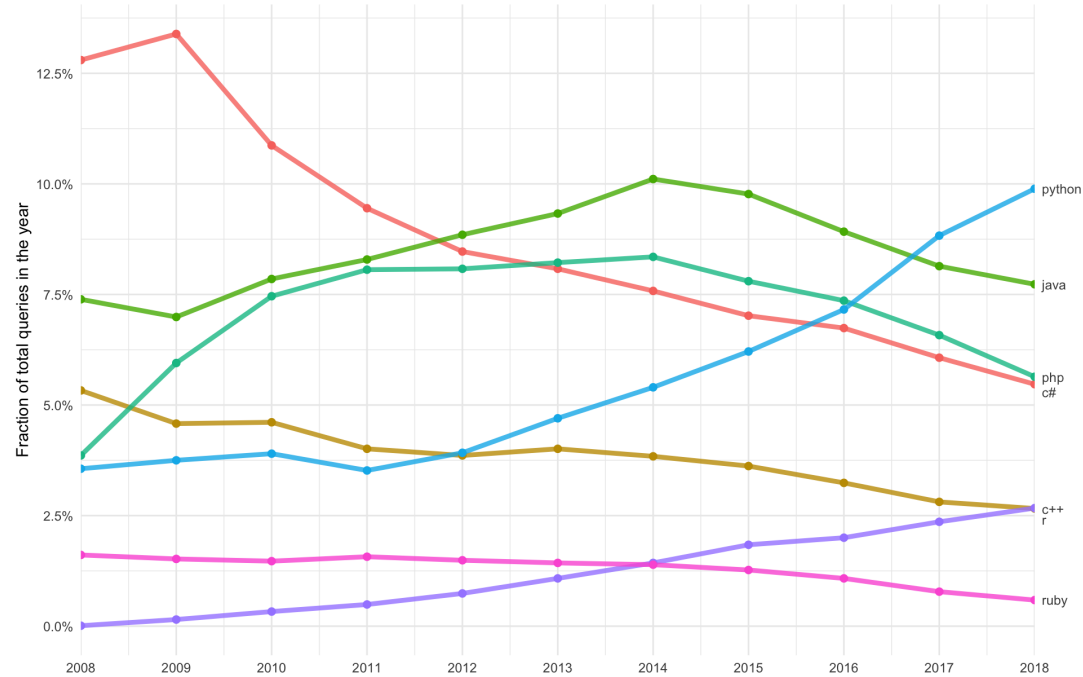
Worldwide, Jan 2020 compared to a year ago:

Rank	Change	Language	Share	Trend
1		Python	29.72 %	+4.3 %
2		Java	19.03 %	-1.9 %
3		Javascript	8.2 %	+0.1 %
4		C#	7.28 %	-0.2 %
5		PHP	6.09 %	-1.1 %
6		C/C++	5.91 %	-0.3 %
7		R	3.72 %	-0.2 %
8		Objective-C	2.47 %	-0.6 %
9		Swift	2.36 %	-0.2 %
10		Matlab	1.79 %	-0.2 %

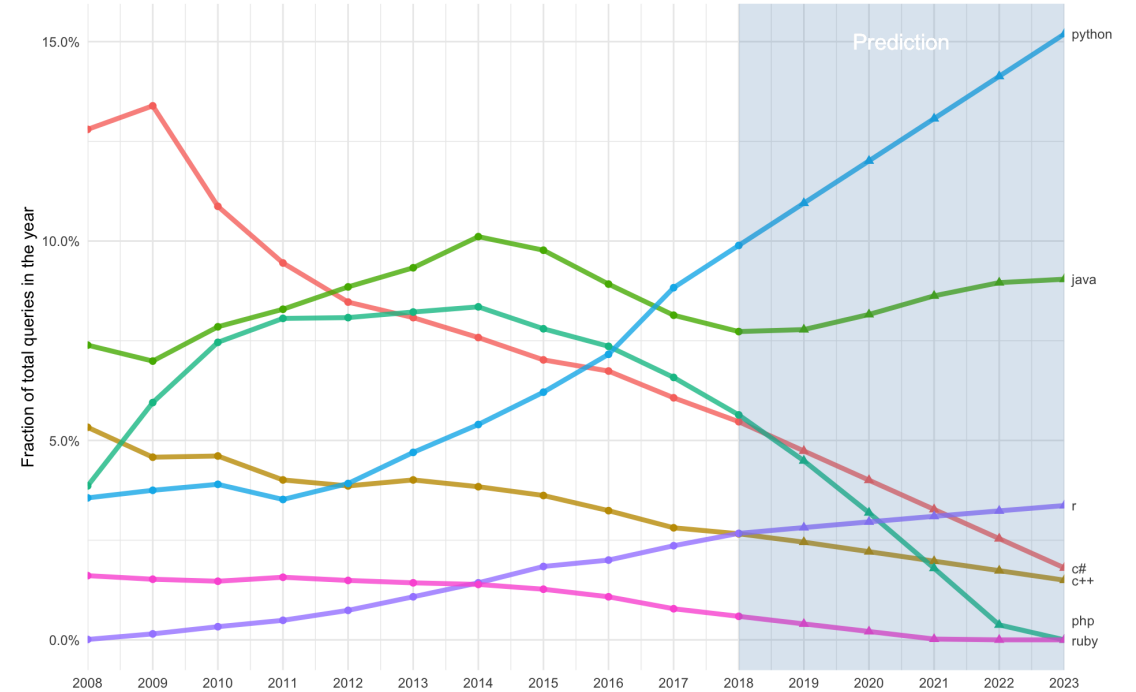
Why code in Python



Fraction of total questions per year in Stack Overflow
for top programming languages



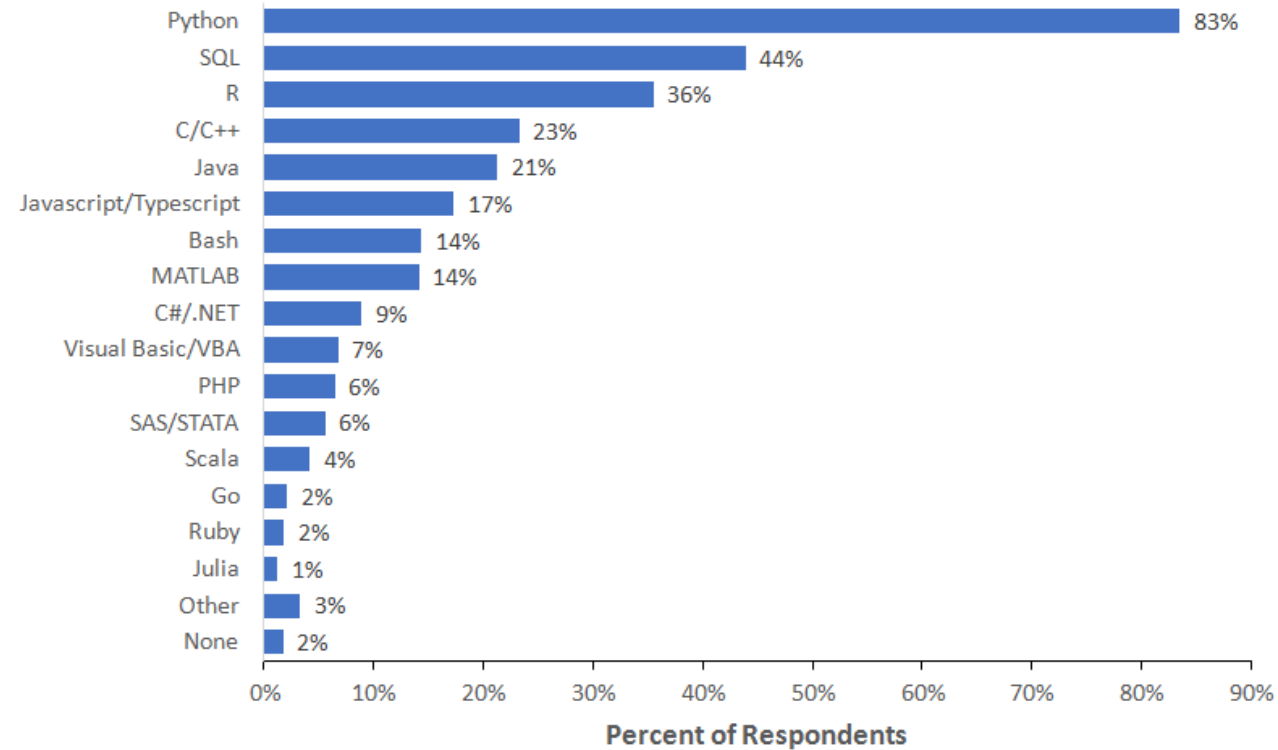
Predicting future fraction of total questions per year in Stack Overflow
for top programming languages



Why code in Python



What programming language do you use on a regular basis?



Note: Data are from the 2018 Kaggle Machine Learning and Data Science Survey.



Why code in Python

Advantages

- Data science, AI, and machine learning packages
- Quicker execution
- Easy to learn
- Powerful
- Progression

Disadvantages

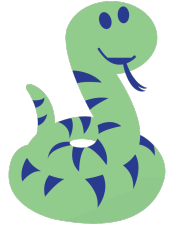
- Fewer libraries for statistics used in the social sciences
 - Beginning to change
- R is probably more common in psychology

What is Python?

- Developed in the 1980s by Guido van Rossum
- Now in it's third iteration, Python 3
- High-level programming language
 - Built on C
- Functional
- Procedural
- Object-orientated
- Playful
- Easy to understand
- Error handling



Guido van Rossum



Getting Python Running

Python 3.8

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

The screenshot shows the Python.org homepage with a dark blue background. At the top left is the Python logo. To its right are links for 'Donate', a search bar with a 'GO' button, and a 'Socialize' link. Below this is a navigation bar with buttons for 'About', 'Downloads', 'Documentation', 'Community', 'Success Stories', 'News', and 'Events'. The main content area features a large yellow button labeled 'Download Python 3.8.1'. Below the button, there are links for 'Looking for Python with a different OS? Python for [Windows](#), [Linux/UNIX](#), [Mac OS X](#), [Other](#)' and 'Want to help test development versions of Python? [Prereleases](#), [Docker images](#)'. At the bottom, it says 'Looking for Python 2.7? See below for specific releases'. On the right side of the main content area, there is an illustration of two cardboard boxes being lowered by yellow and white striped parachutes against a blue sky with clouds.

Opening Python

- IDLE and interactive programming

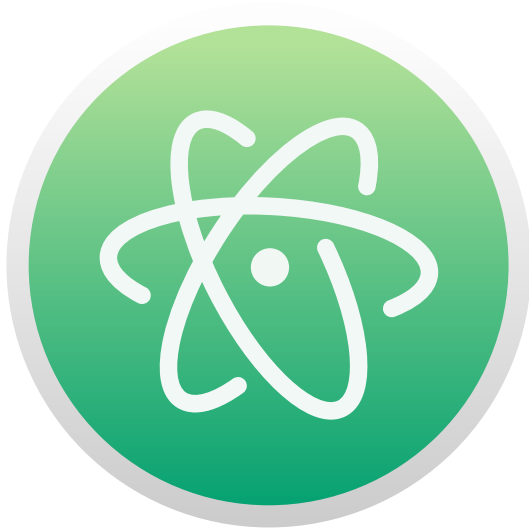


- IDLE, scripting, and procedural programming



Opening Python

Compilers

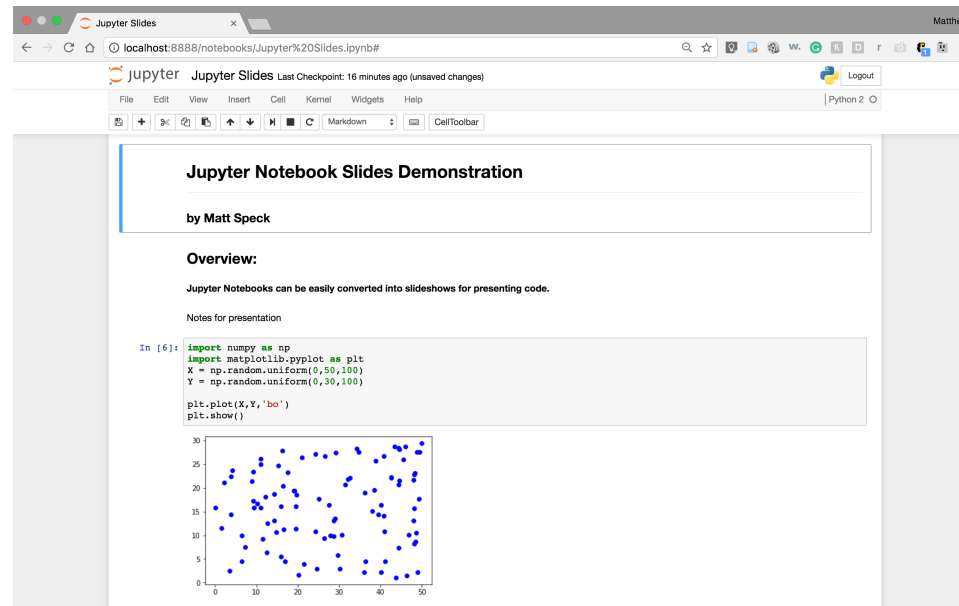


```
README.md .travis.yml python-tool... python-tool... tools.py Settings
49     sys.path.insert(0, path)
50
51     script = jedi.api.Script(
52         source=request['source'],
53         line=request['line'] + 1,
54         column=request['col'],
55         path=request.get('path', ''),
56     )
57
58     if request['type'] == 'usages':
59         self._write_response(self._serialize('usages', script.usages()))
60     elif request['type'] == 'gotoDef':
61         self._write_response(self._serialize('gotoDef', script.goto_definitions()))
62
63     def _write_response(self, response):
64         sys.stdout.write(response + '\n')
65         sys.stdout.flush()
66
67     def watch(self):
68         while True:
69             try:
70                 data = self._input.readline()
```



Opening Python

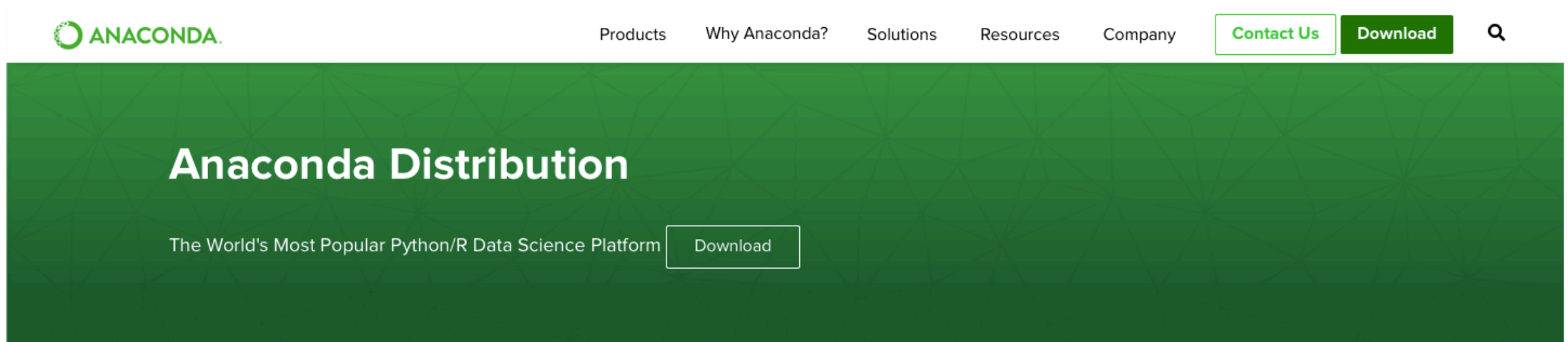
Notebooks



Getting Jupyter Notebooks Running

Anaconda 2019.10

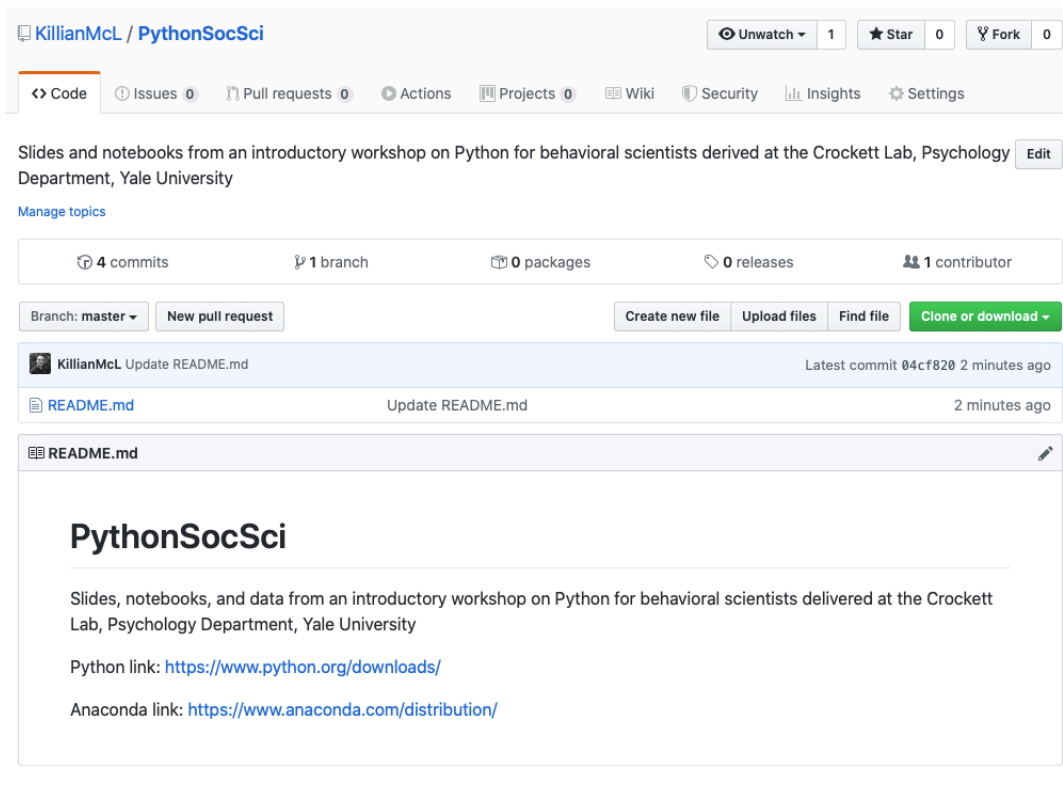
<https://www.anaconda.com/distribution/>



Workshop Files

GitHub Repository

<https://github.com/KillianMcL/PythonSocSci>



The screenshot shows the GitHub repository page for `KillianMcL / PythonSocSci`. At the top, there are buttons for `Unwatch` (1), `Star` (0), and `Fork` (0). Below this is a navigation bar with links to `Code`, `Issues` (0), `Pull requests` (0), `Actions`, `Projects` (0), `Wiki`, `Security`, `Insights`, and `Settings`. The repository description states: "Slides and notebooks from an introductory workshop on Python for behavioral scientists derived at the Crockett Lab, Psychology Department, Yale University". Below the description, there are statistics: 4 commits, 1 branch, 0 packages, 0 releases, and 1 contributor. A bar shows the current branch as `master` with a `New pull request` button. Below this, a commit history table shows a recent commit by `KillianMcL` titled "Update README.md" with the commit hash `04cf820` and a timestamp of "2 minutes ago". The commit details section shows the file `README.md` was updated. The main content area displays the `README.md` file content, which includes the repository name `PythonSocSci`, a description of the workshop materials, and links to Python and Anaconda resources.

KillianMcL / PythonSocSci

Unwatch 1 Star 0 Fork 0

Code Issues 0 Pull requests 0 Actions Projects 0 Wiki Security Insights Settings

Slides and notebooks from an introductory workshop on Python for behavioral scientists derived at the Crockett Lab, Psychology Department, Yale University

Manage topics

4 commits 1 branch 0 packages 0 releases 1 contributor

Branch: master New pull request Create new file Upload files Find file Clone or download

Commit	Message	Time
KillianMcL	Update README.md	Latest commit 04cf820 2 minutes ago

README.md Update README.md 2 minutes ago

README.md

PythonSocSci

Slides, notebooks, and data from an introductory workshop on Python for behavioral scientists delivered at the Crockett Lab, Psychology Department, Yale University

Python link: <https://www.python.org/downloads/>

Anaconda link: <https://www.anaconda.com/distribution/>

