



SWCON104
Web & Python Programming

Introduction to Python

Department of Software Convergence

Today

- Course introduction
- What does a computer do?
- What is programming?
- Computational thinking
- Intro to Python (Author, Python.org, Others)

[Textbook]

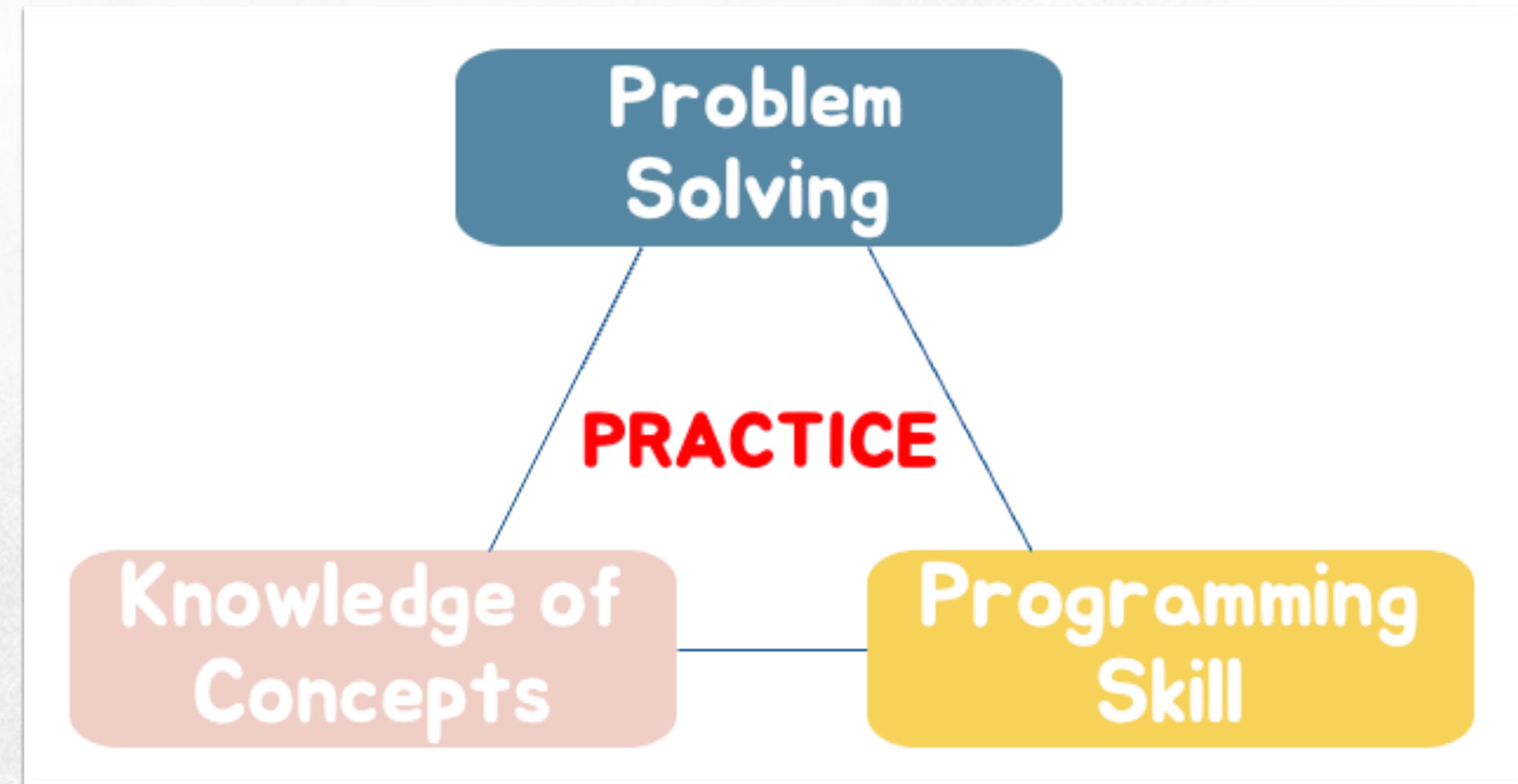
Practical Programming
(An Introduction to Computer Science Using Python).
by Paul Gries, Jennifer Campbell, Jason Montojo.
The Pragmatic Bookshelf, 2017

Practice

- Practice_01_DevToolsInstallation.pdf
 - Anaconda with Jupyter Notebook
 - Microsoft Visual Studio Code

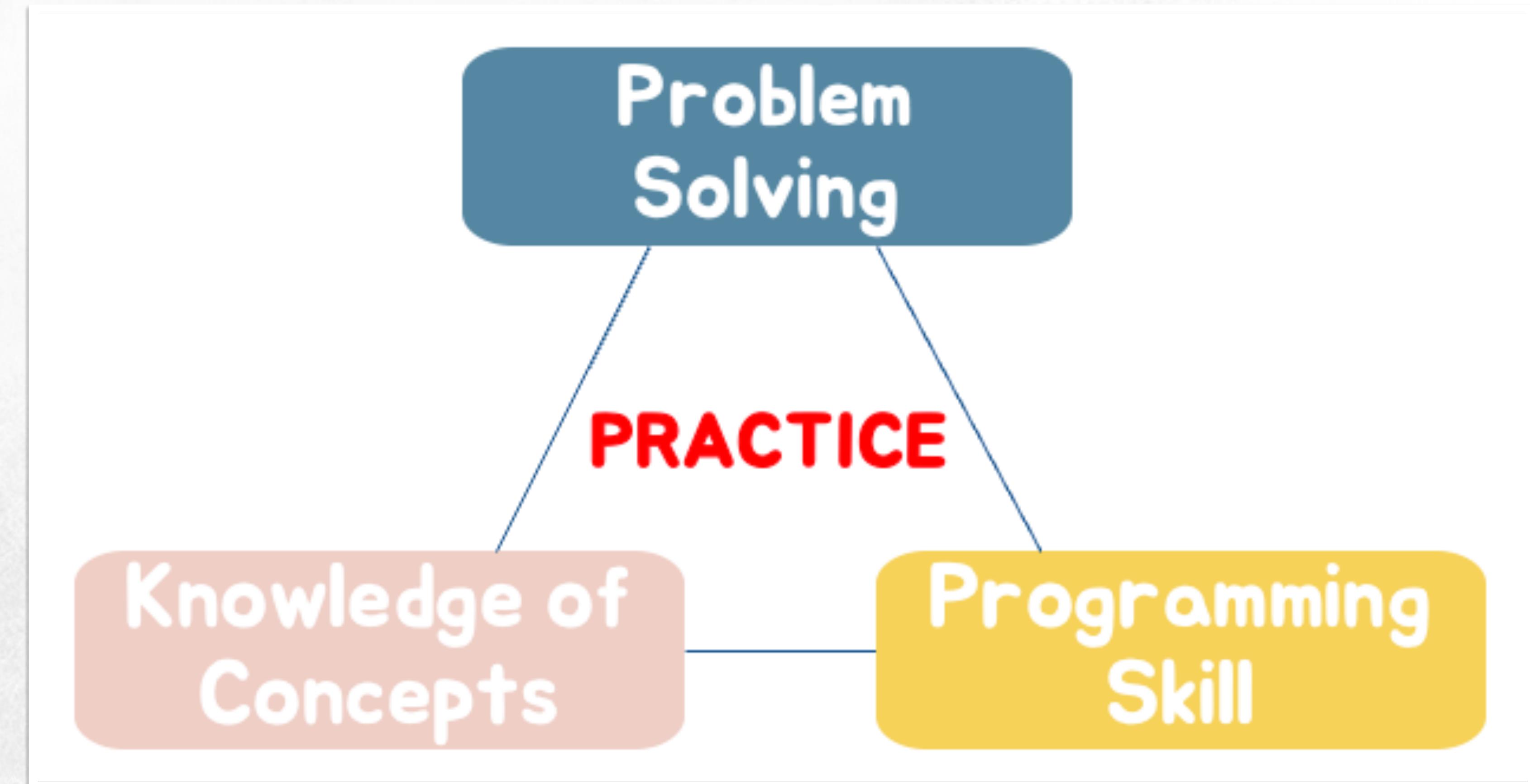
Fast paced course?

- New to programming?
- PRACTICE PRACTICE PRACTICE!!
- You can't break your computer
- Don't be afraid to test your code
- Worst case: reboot



Topics

- How to program
 - Data structures
 - Iteration and recursion
- How to write good code
 - Organize and modularize systems
 - Classes and methods
- How to evaluate
 - Different algorithms
 - Complexity



Topics

● Practice

- 1st: Lecture example
- 2nd: Practice for each chapter
- 3rd: www.w3schools.com
- 4th: Previous examinations

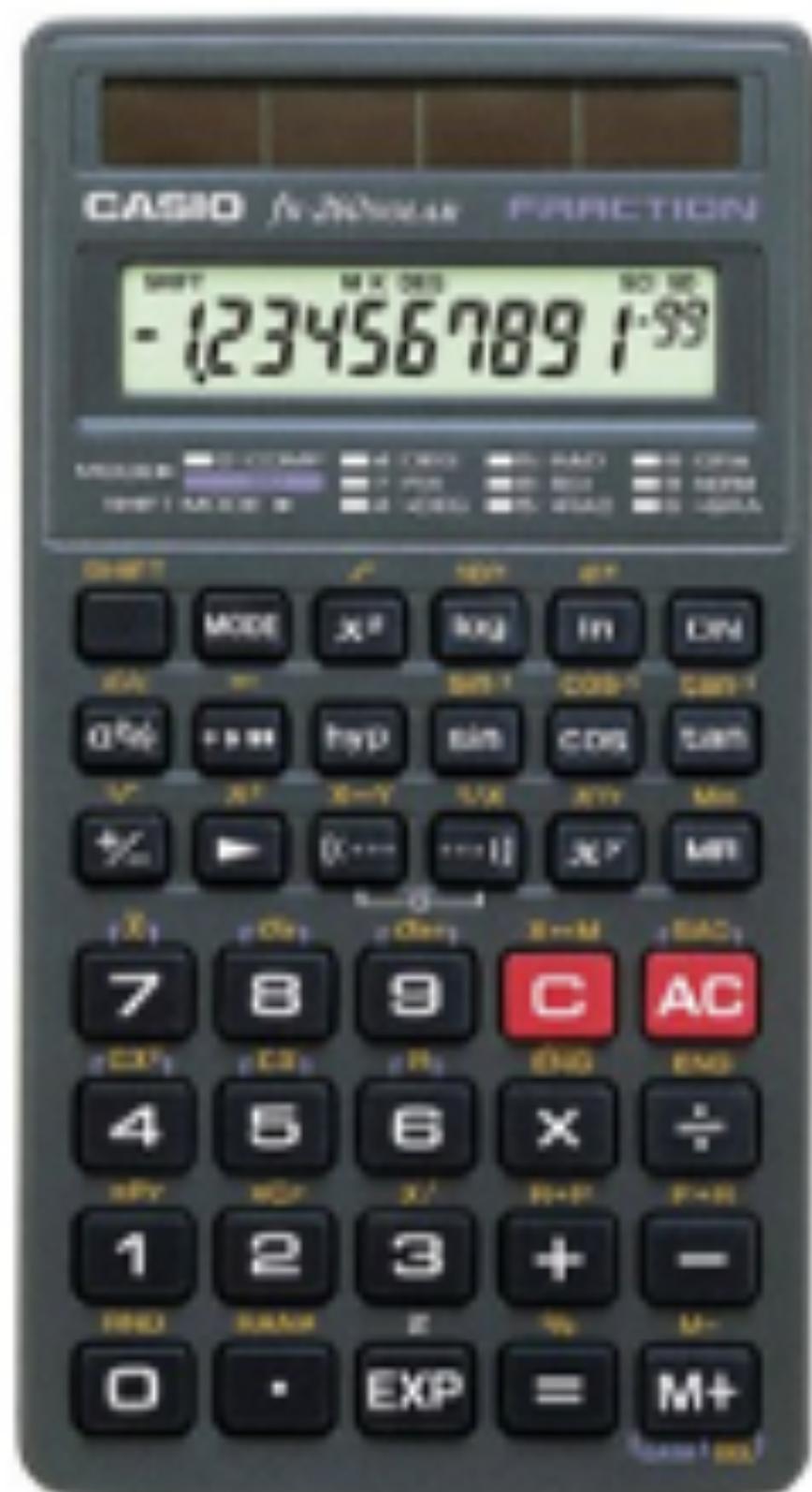
The screenshot shows the homepage of W3Schools, a web developer site. At the top, there's a navigation bar with links for Tutorials, References, Exercises, Videos, and a search bar. Below the header, a large "Learn to Code" section features a sub-header "With the world's largest web developer site." A search bar is located below this. In the center, there's a "Python" section with the text "A popular programming language" and three buttons: "Learn Python", "Python Reference", and "Get Certified". To the right, a "Python Example:" box contains the code "if 5 > 2: print("Five is greater than two!")" and a "Try it Yourself" button.

What does a computer do?

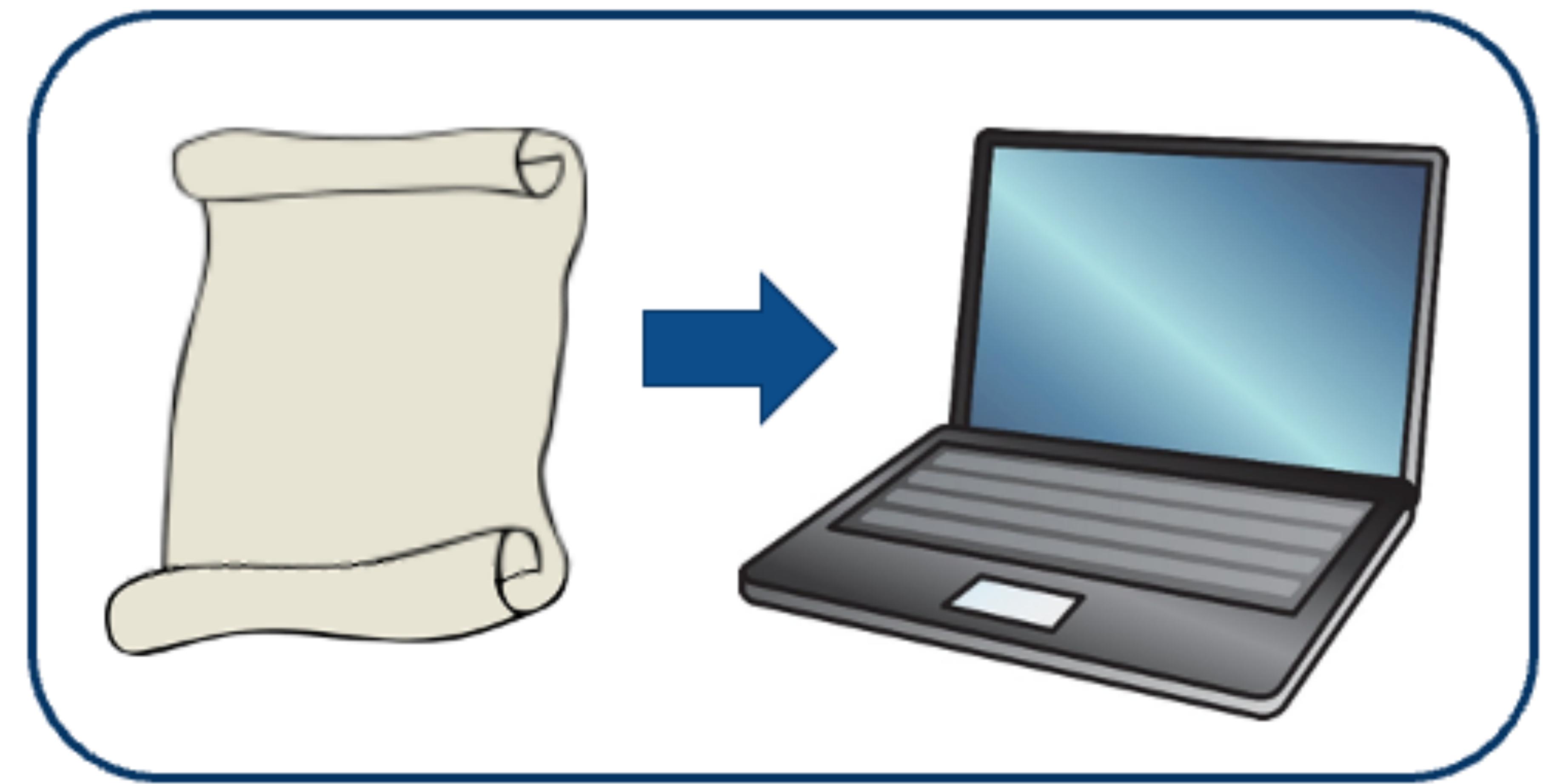
- Fundamentally:
 - Performs calculations
 - Remembers results
- What kinds of calculations?
 - Built-in to the language
 - Ones that you define as the programmer
- Computers only do what you tell them to do

What is programming?

- A program is a set of instructions
- You can “order” a computer using a software



VS.



Computational thinking

- Computer science is the study of computation
 - What can be computed and how to compute it
- Characteristics of computational thinking
 - Conceptualizing, not programming
 - A fundamental skill
 - A way that humans think
 - Complements and combines mathematical and engineering thinking
 - Ideas
 - For everyone, everywhere

Programming language

- There are many programming languages

English

Add 3 and 4

Python

$3 + 4$

Scheme

$(+ 3 4)$

- Mathematical expressions (add, subtract, multiply, divide…)
- Repeat a list of instructions a number of times (loop operations)
- Choose which of two instructions to do based on the current information you have (conditional operations)

Why Python?

- It is free and well documented
- It runs everywhere
 - supports multiple platforms
- It has a clean syntax
- It is relevant
 - many companies use it every day
- It is well supported by tools
 - Jupyter Notebook
 - MS Visual Studio Code

Birthday

1991-02-20

Author

- <https://gvanrossum.github.io/>
- https://en.wikipedia.org/wiki/Guido_van_Rossum
- https://www.youtube.com/results?search_query=Guido+van+Rossum



Python in wiki

- [https://en.wikipedia.org/wiki/Python_\(programming_language\)](https://en.wikipedia.org/wiki/Python_(programming_language))
- https://en.wikipedia.org/wiki/Python_Software_Foundation

Python	
	
Paradigm	Multi-paradigm: object-oriented, ^[1] procedural (imperative), functional, structured, reflective
Designed by	Guido van Rossum
Developer	Python Software Foundation
First appeared	20 February 1991; 31 years ago ^[2]
Stable release	3.11.0 ^[3] / 24 October 2022; 11 days ago
Preview release	3.12.0a1 ^[4] / 25 October 2022; 10 days ago
Typing discipline	Duck, dynamic, strong typing; ^[5] gradual (since 3.5, but ignored in CPython) ^[6]
OS	Windows, macOS, Linux/UNIX, Android ^{[7][8]} and more ^[9]
License	Python Software Foundation License
Filename extensions	.py, .pyi, .pyc, .pyd, .pyw, .pyz (since 3.5), ^[10] .pyo (prior to 3.5) ^[11]
Website	python.org
Python Software Foundation	
	
Abbreviation	PSF
Formation	March 6, 2001
Type	501(c)(3) nonprofit organization
Purpose	Promote, protect, and advance the Python programming language, and to support and facilitate the growth of a diverse and international community of Python programmers ^[1]
Headquarters	Delaware, United States
Region served	Worldwide
Official language	English
President	Guido van Rossum
Chairperson	Lorena Mesa
Revenue (2018)	\$3.1 million ^[2]
Website	www.python.org/psf-landing/

Python homepage

● <https://www.python.org/>

The screenshot shows the official Python homepage. At the top is a dark navigation bar with tabs for Python, PSF, Docs, PyPI, Jobs, and Community. Below the bar is the Python logo and a search bar with a magnifying glass icon and a 'GO' button. A yellow 'Donate' button is also visible. The main content area features a blue header with a navigation menu for About, Downloads, Documentation, Community, Success Stories, News, and Events. On the left, there's a code snippet in a terminal window:

```
# For loop on a list
>>> numbers = [2, 4, 6, 8]
>>> product = 1
>>> for number in numbers:
...     product = product * number
...
>>> print('The product is:', product)
The product is: 384
```

To the right of the code is a section titled "All the Flow You'd Expect" which discusses Python's control flow statements. Below the code snippet are five small numbered boxes (1, 2, 3, 4, 5). The main message below the header reads: "Python is a programming language that lets you work quickly and integrate systems more effectively. [»» Learn More](#)".

At the bottom, a yellow banner encourages users to "Join the official Python Developers Survey 2022 and win valuable prizes: Start the Survey!" and provides a link to "Python Developers Survey 2022". The footer is divided into four sections: "Get Started", "Download", "Docs", and "Jobs". Each section has a brief description and a link to its respective page.

Get Started
Whether you're new to programming or an experienced developer, it's easy to learn and use Python.
[Start with our Beginner's Guide](#)

Download
Python source code and installers are available for download for all versions!
Latest: [Python 3.11.0](#)

Docs
Documentation for Python's standard library, along with tutorials and guides, are available online.
[docs.python.org](#)

Jobs
Looking for work or have a Python related position that you're trying to hire for? Our **relaunched community-run job board** is the place to go.
[jobs.python.org](#)

Python sourcecode

- <https://github.com/python/cpython>

The screenshot shows the content of the `README.rst` file for Python version 3.12.0 alpha 1. At the top, it displays "This is Python version 3.12.0 alpha 1". Below this, there are status indicators for "Tests" (passing) and "Azure Pipelines" (succeeded), along with links to "discourse" and "join chat". The copyright notice states "Copyright © 2001-2022 Python Software Foundation. All rights reserved." It also mentions to see the end of the file for further copyright and license information. The "Contents" section lists various topics:

- General Information
- Contributing to CPython
- Using Python
- Build Instructions
 - Profile Guided Optimization
 - Link Time Optimization
- What's New
- Documentation
- Converting From Python 2.x to 3.x
- Testing
- Installing multiple versions
- Issue Tracker and Mailing List
- Proposals for enhancement
- Release Schedule
- Copyright and License Information

Python open course

- <https://www.w3schools.com/> [FREE Interactive learning system]
- <https://www.coursera.org/courses?query=python&>
- <https://programmers.co.kr/learn/courses/2>

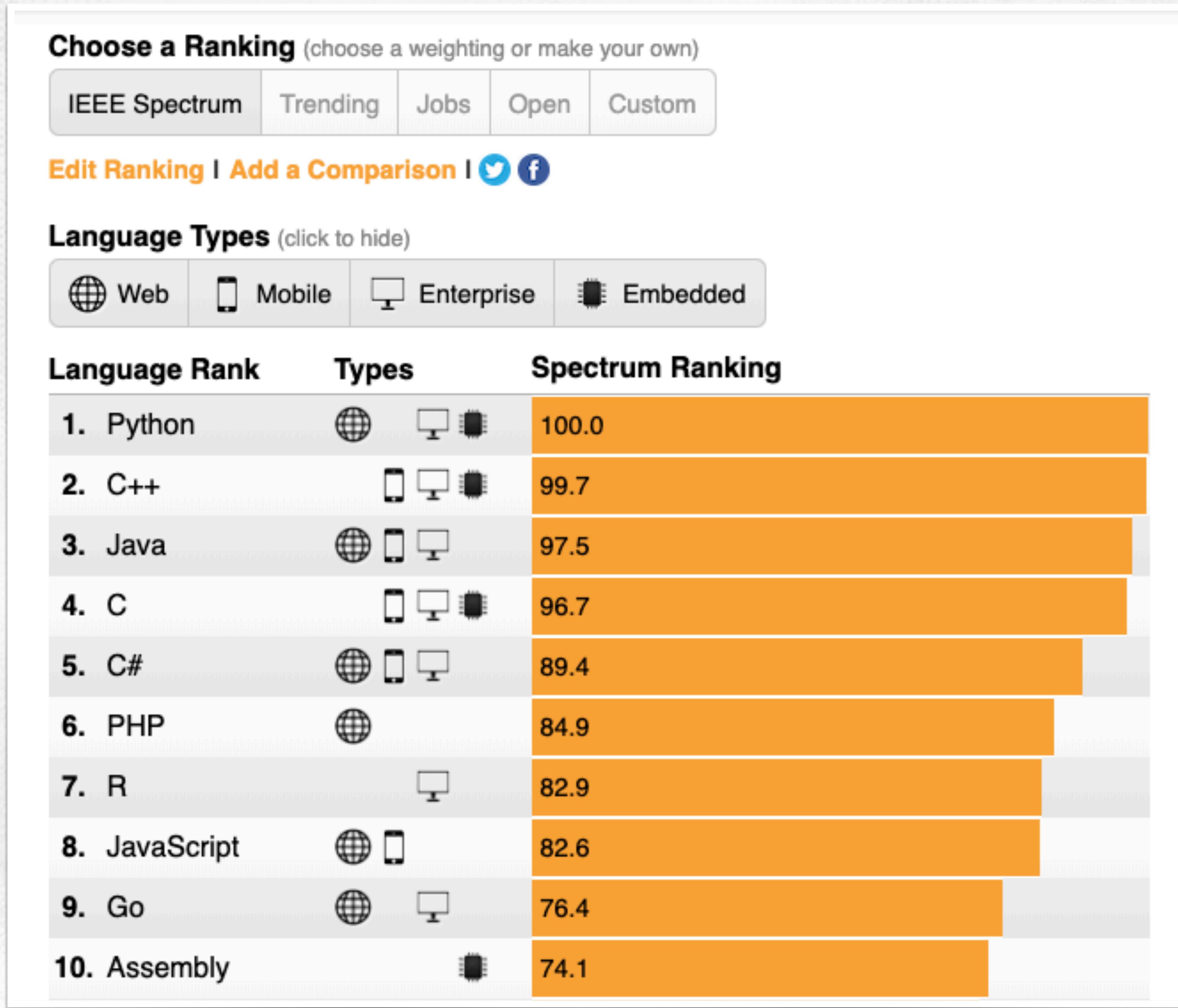
The screenshot shows the homepage of W3Schools, a website for learning web development. At the top, there is a navigation bar with links for Tutorials, References, Exercises, and Videos. On the right side of the bar are buttons for Upgrade, Get Certified, Free Website, and Log in. Below the navigation bar, a large dark banner features the text "Learn to Code" in white and "With the world's largest web developer site." in smaller white text. A search bar with the placeholder "Search our tutorials, e.g. HTML" and a magnifying glass icon is positioned below the banner. Underneath the banner, there is a section titled "Python" with the subtitle "A popular programming language". Below this, three buttons are visible: "Learn Python" (green), "Python Reference" (black), and "Get Certified" (pink). To the right, a callout box titled "Python Example:" contains the following code:

```
if 5 > 2:  
    print("Five is greater than two!")
```

At the bottom of the callout box is a green button labeled "Try it Yourself".

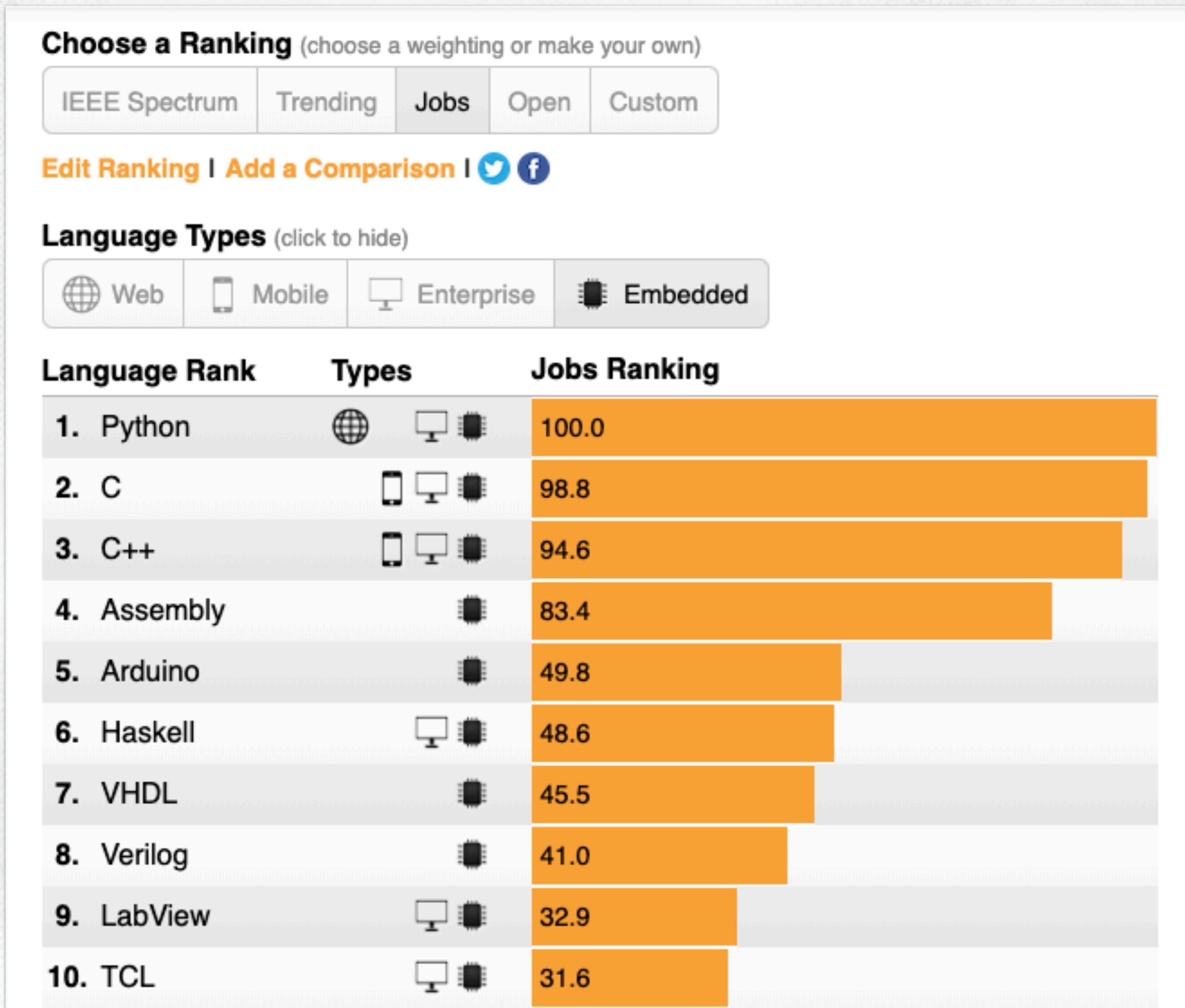
Positioning of Python

- IEEE Spectrum Survey (Web, Mobile, Enterprise, and Embedded)



Positioning of Python

- IEEE Spectrum Survey (Embedded)



Positioning of Python

- GitHub Language Rank ('19.2Q)
 - https://madnight.github.io/github/#/pull_requests/2019/2

# Ranking	Programming Language	Percentage (Change)	Trend
1	JavaScript	19.922% (-2.425%)	
2	Python	17.803% (+1.519%)	
3	Java	10.482% (+0.591%)	
4	Go	7.916% (+0.295%)	
5	C++	7.253% (+0.167%)	
6	Ruby	6.296% (-0.249%)	
7	PHP	5.515% (-0.285%)	
8	TypeScript	5.415% (+0.641%)	
9	C#	4.001% (+0.659%)	
10	C	3.190% (+0.248%)	

Positioning of Python

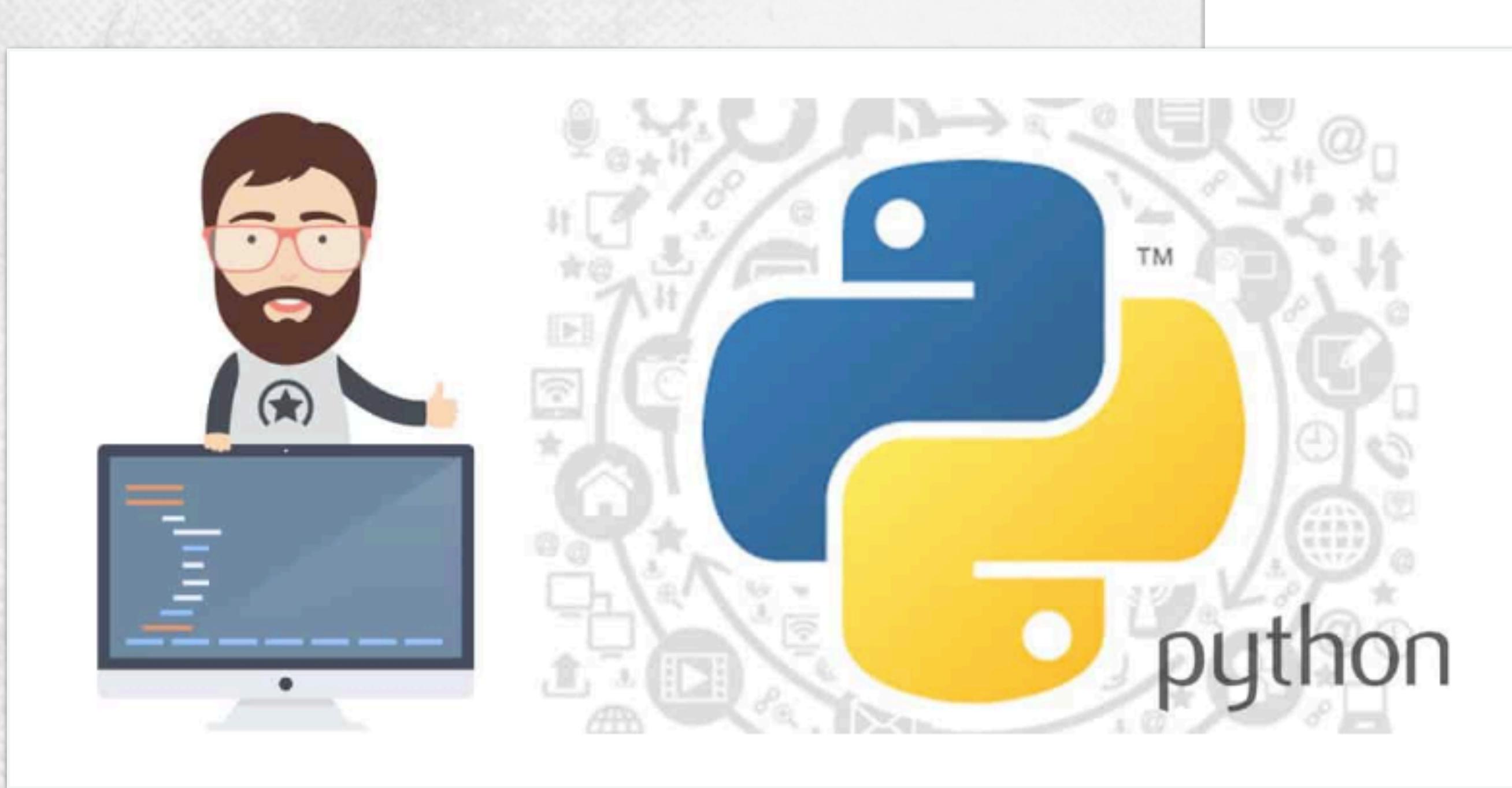
- Tiobe index:
<https://www.tiobe.com/tiobe-index/>
- GitHub user rank:
<https://www.benfrederickson.com/ranking-programming-languages-by-github-users/>
- GitHub repository statistics:
<https://githut.info/>
- Source codes:
<https://github.com/collections/programming-languages>

Positioning of Python

경희대학교 전자공학과 교수님 (programming 관련 분야)

교수님	연구 분야	선호 언어	선호 소프트웨어
김진상	SoC/VLSI	Verilog	Linux, Quartus
장익준	초저전력VLSI/나노소자	Verilog	Linux, Quartus
이범선	안테나/메타물질/무전선력전송	Python	MATLAB
김상혁	전자파/무선전력전송/마이크로웨이브	Python	MATLAB
김정근	무선네트워크	Python	없음
송주빈	무선통신/인지통신	Python	MATLAB
김원하	인간인지멀티미디어신호처리	C++	MATLAB
서덕영	네트워크미디어/MPEG/모바일미디어	C++	MATLAB, Unity
백운식	광신호처리/홀로그래피/생체공학	C, Python	MATLAB
김동한	Multi-agent Cooperation System/로봇	C, Python	MATLAB
홍상훈	임베디드메모리/저전력인터페이스	C, Python	MATLAB, FPGA, Verilog HDL
김규현	디지털멀티미디어방송/대화형데이터서비스	C, Python	MATLAB
김윤희	무선이동통신/OFDM/MIMO/릴레이	C, Python	MATLAB
박영태	컴퓨터비전/디지털영상처리/패턴인식	C, Python	MATLAB
홍인기	이동통신/스펙트럼엔지니어링	C, Python	MATLAB
이계산	이동통신/가시광통신	C, Python	없음
손원	디지털방송/위성통신/신호처리	C	MATLAB

Summary



Matteo Monteneri



Thank you