



# FAIM Python Course – Session 1

## Introduction for Beginners

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# Python is a...

general-purpose

interpreted

high-level

object-oriented

... programming language.

# A brief history of Python



Created by **Guido van Rossum** at CWI, Amsterdam. First release in 1991. Van Rossum was Python's 'Benevolent Dictator for Life' until 2018.

Started out as a 'hobby programming project' to bridge the gap between shell scripts and C. Named after the British comedy group 'Monty Python', but the logo is inspired by the snake.

Now developed and maintained by a large international community. Python Foundation (governance, releases, documentation): <https://www.python.org>

Python 1.0 – 1994

→ 1.x versions are obsolete

Python 2.0 – 2000

→ Latest and final: 2.7 in 2010

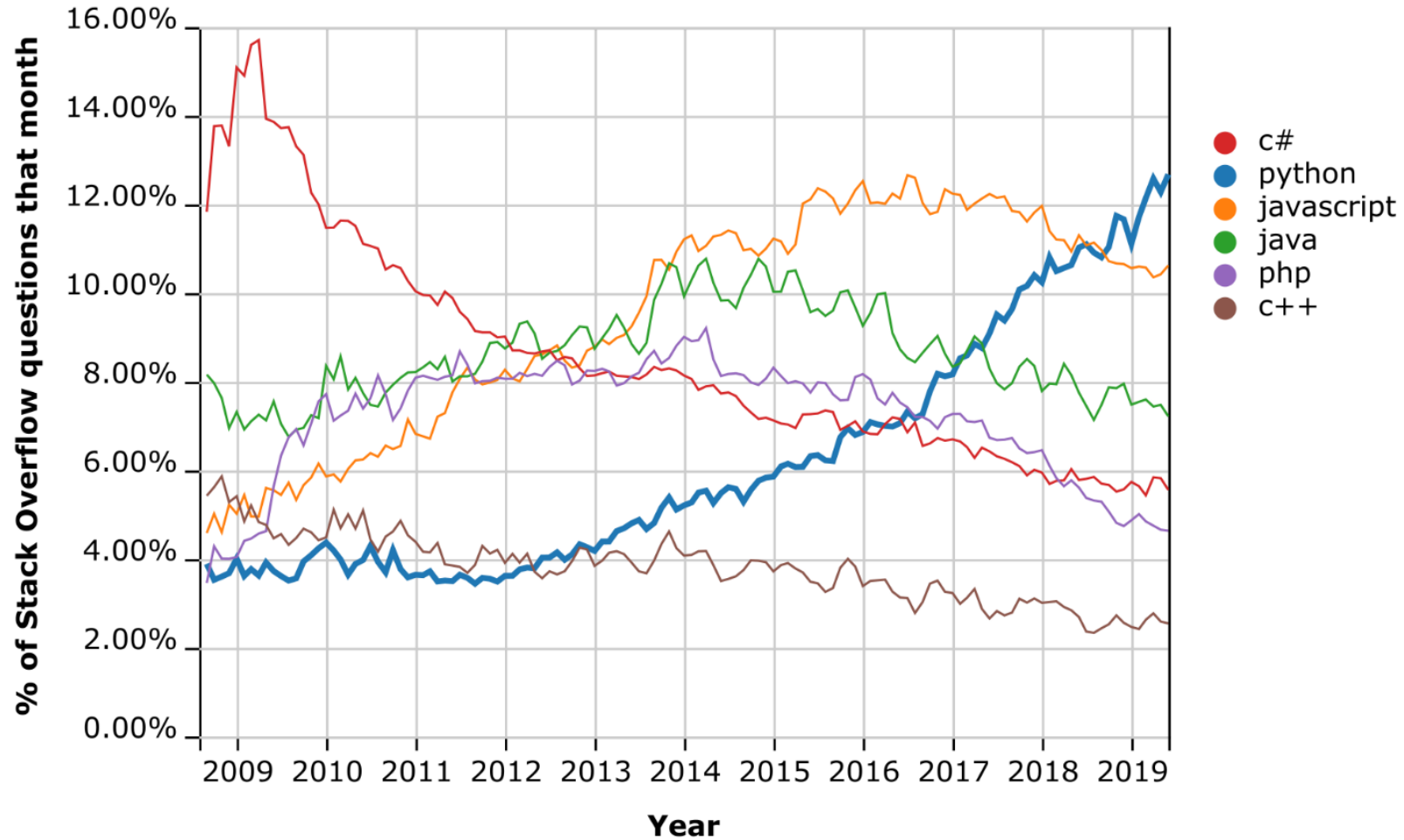
Python 3.0 – 2008

→ Currently 3.9 (October 2020)

Maintenance of Python 2 has stopped in 2020.

**Python 3 is the future.** Don't start new projects with Python 2!

# Python has become a mainstream programming language



Easy to learn and use, great community and open-source ecosystem (over 250,000 packages available as of 2020!).

It's free forever (unlike proprietary software such as MATLAB, LabVIEW, ...).

Increasing use by large tech companies: Google, Amazon, Instagram, Dropbox, Spotify, Netflix...

... and it's the most popular choice for machine learning applications.

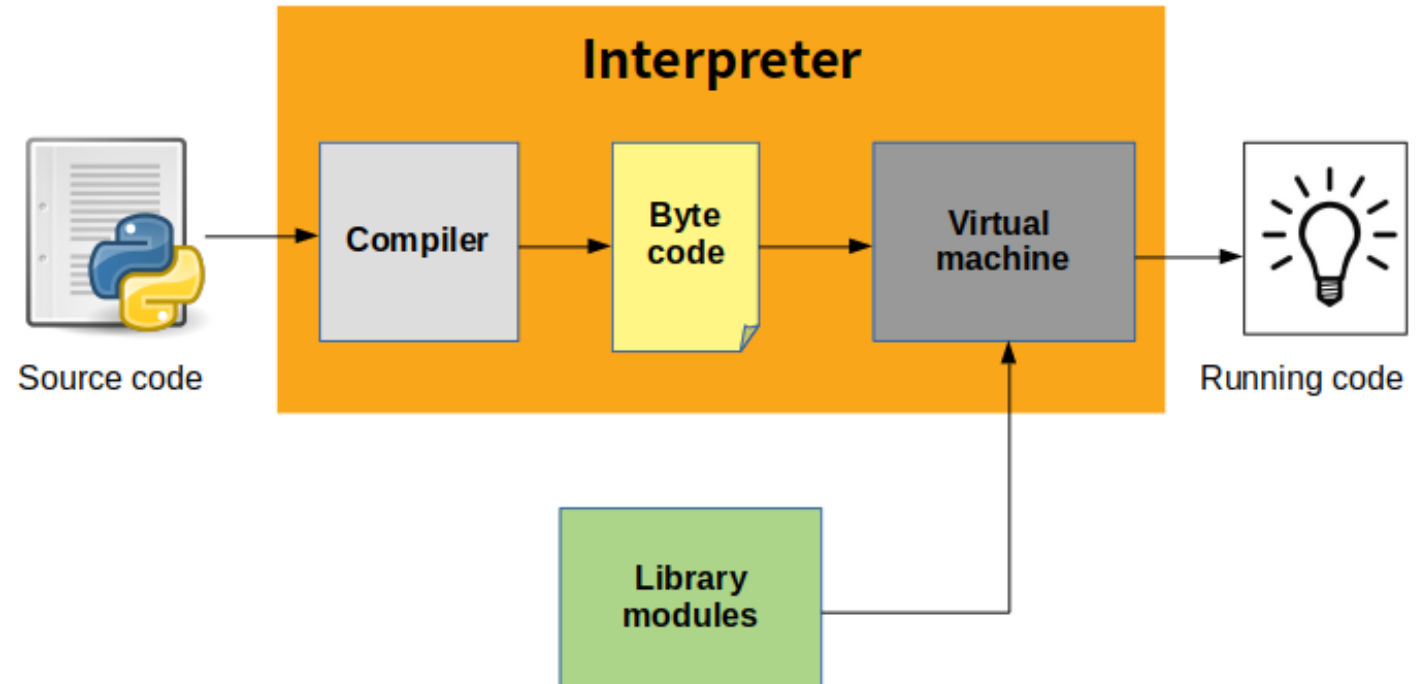
Among major programming languages, Python has seen the fastest growth over the past decade. See also <https://tiobe.com/tiobe-index/>

# From source code to execution

The *source code* (\*.py files) is first compiled into *byte code* (\*.pyc files), an intermediate lower-level language for faster execution (but much slower than *machine code*).

Byte code is run on the Python Virtual Machine.

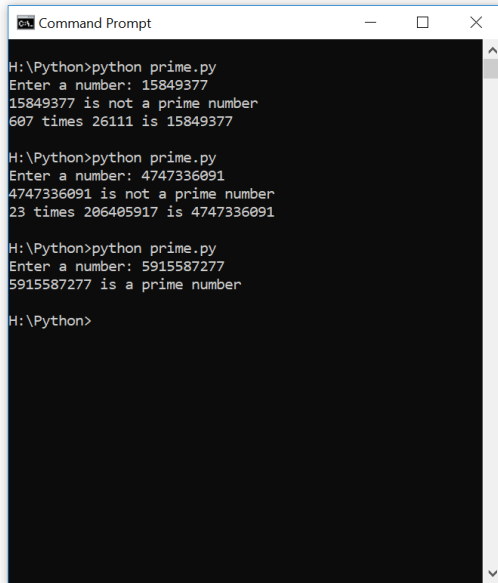
*CPython* is Python's open-source reference implementation.



Source: <https://indianpythonista.wordpress.com>

# How Python is commonly used

Python programs (usually tools) that are run from the **command line/terminal/shell/console**:  
No graphical user interface, only text.



```
H:\Python>python prime.py
Enter a number: 15849377
15849377 is not a prime number
607 times 26111 is 15849377

H:\Python>python prime.py
Enter a number: 4747336091
4747336091 is not a prime number
23 times 206405917 is 4747336091

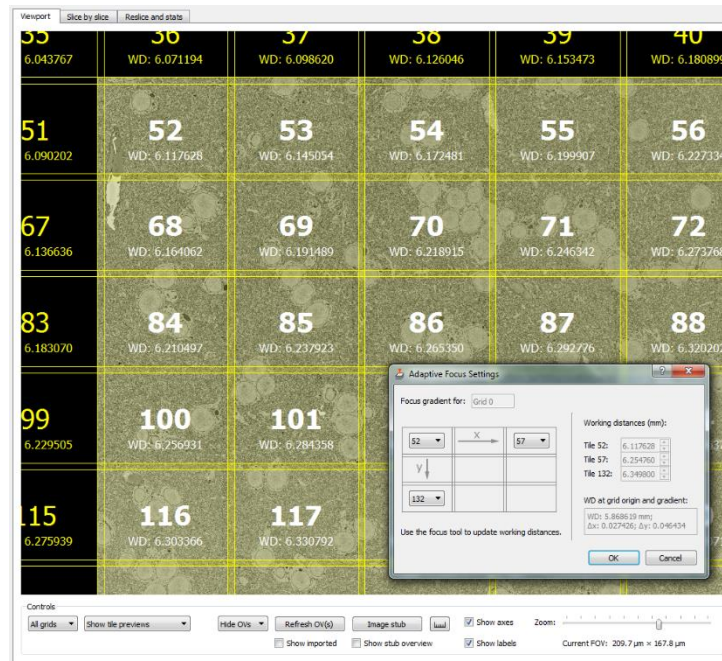
H:\Python>python prime.py
Enter a number: 5915587277
5915587277 is a prime number

H:\Python>
```

**Web development** with frameworks such as Django and Flask

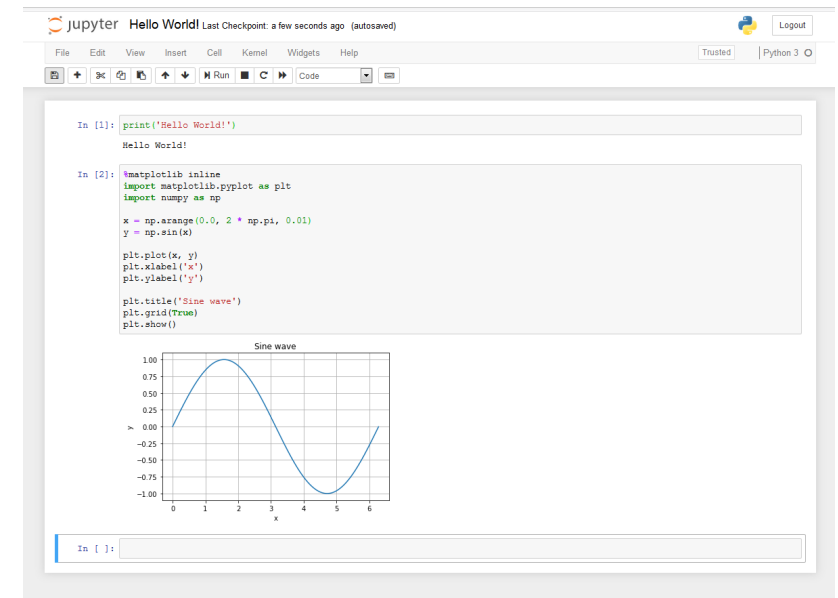


**GUI (Graphical User Interface)-based applications** (with PyQt, for example)



**Jupyter Notebook:**

A browser-based interactive programming environment (Julia, Python, R), ideal for data analysis and visualization.



# We will use Jupyter Notebook for this session

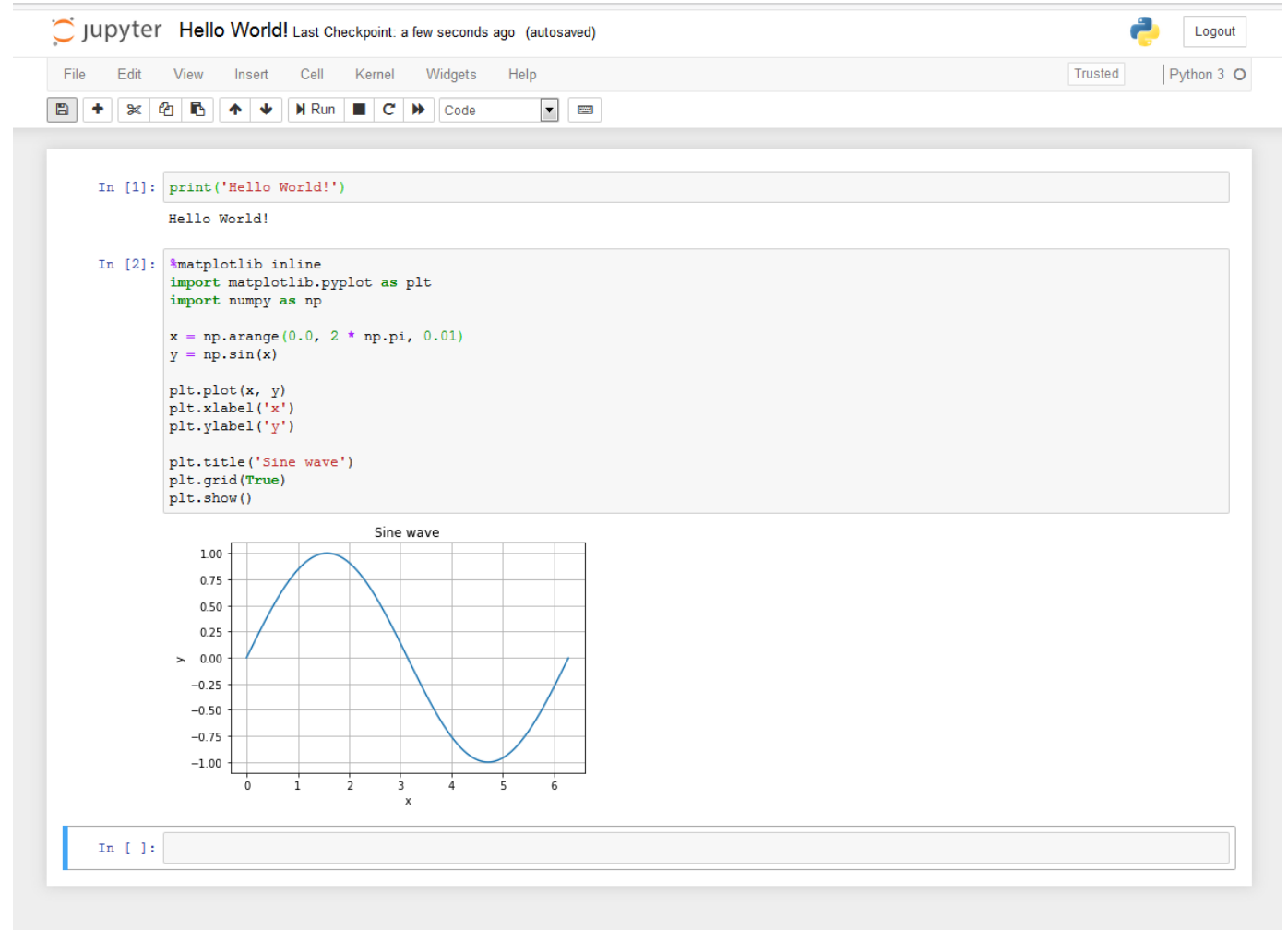
Run from command line / Anaconda Prompt:  
`jupyter notebook`

or launch via *Anaconda Navigator*.

If it's not installed yet, install with:  
`pip install jupyter`  
or  
`conda install jupyter`

Notebook files: \*.ipynb (ending comes from previous name *IPython Notebook*)

Let's get started:  
Launch Jupyter Notebook in your browser, click on 'New' and select 'Python 3'.



## Part I: Introduction to basic programming concepts in Python

→ Jupyter Notebook: `python_introduction.ipynb`

## Part II (optional): Coding practice

→ Jupyter Notebook: `coding_practice.ipynb`



# Next steps...

- Try to write short (and ideally useful ;) programs. Think of tasks you could automate with Python to make your work/life easier!
- Use *stackoverflow.com* (Google “python how to [...]” – you are almost certain to find advice on stackoverflow). Don’t just copy/paste, but try to understand!
- Many courses at Codecademy, DataCamp, Coursera, Udemy, [www.learnpython.org](http://www.learnpython.org) ...
- Look for tutorials for NumPy, Matplotlib, SciPy and pandas to get started with Python for data science.
- Resources for beginners who are already familiar with programming:  
<https://wiki.python.org/moin/BeginnersGuide/Programmers>
- Resources for beginners with no programming experience:  
<https://wiki.python.org/moin/BeginnersGuide/NonProgrammers>