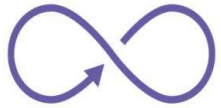
Basic Programming

Lesson 01

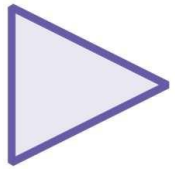
Python Introduction

High-level Programming Language

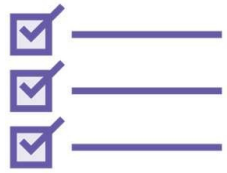


Dynamic

Readability

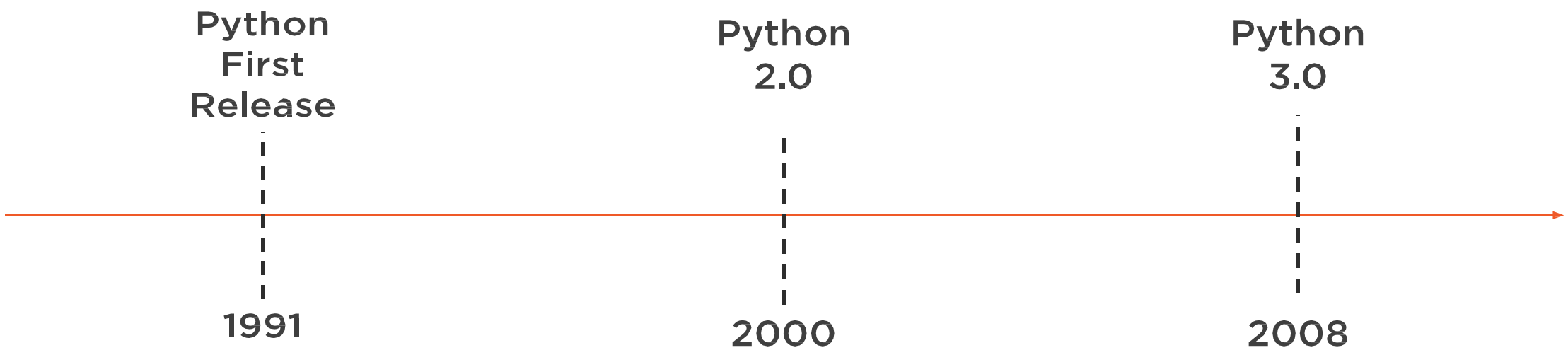


Interpreted

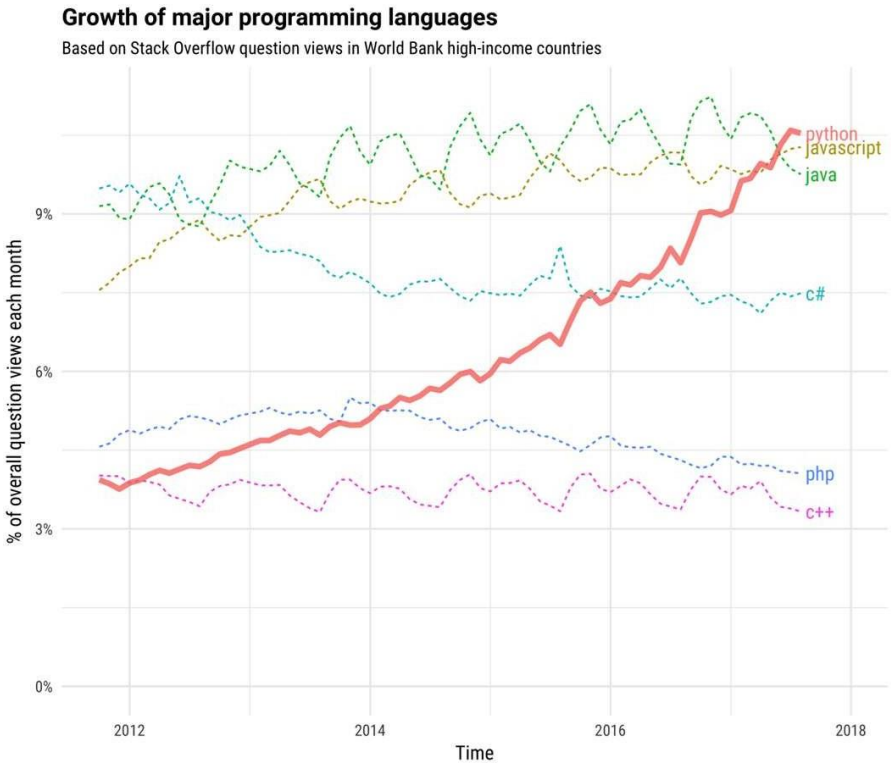


Multi-paradigm

History



Growing in Popularity



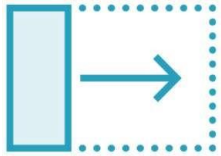
Worldwide, Sept 2017 compared to a year ago:

Rank	Change	Language	Share	Trend
1		Java	22.4 %	-0.8 %
2		Python	17.0 %	+4.0 %
3		PHP	8.7 %	-1.0 %
4		C#	8.1 %	-0.4 %
5		Javascript	8.0 %	+0.6 %
6		C++	6.8 %	-0.2 %
7		C	6.1 %	-1.1 %
8	↑	R	3.7 %	+0.6 %
9	↓	Objective-C	3.5 %	-1.4 %
10		Swift	2.9 %	-0.1 %

Stack Overflow (http://bit.ly/2wkMATk)

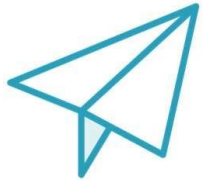
PYPL (http://bit.ly/2eJ2rnC)

What makes Python different?



Extensible Design

Community Involved Design

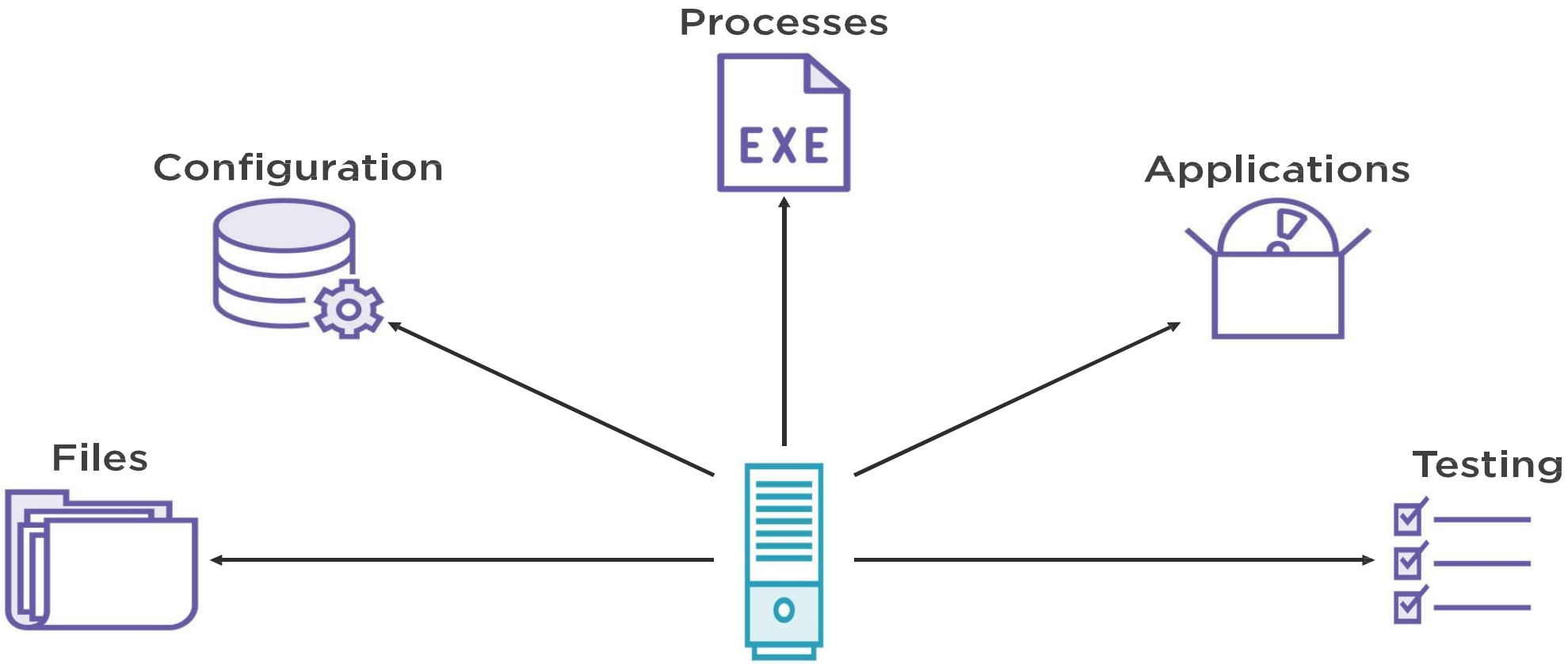


Emphasizing Fun

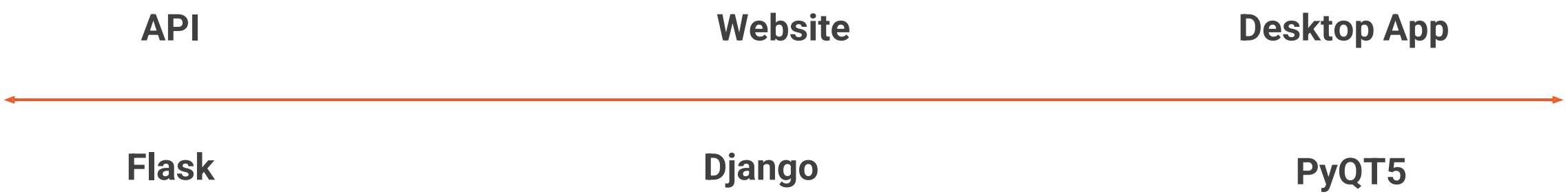
Culture

When and Where is Python being used?

System Administration



Application Development



Big Data

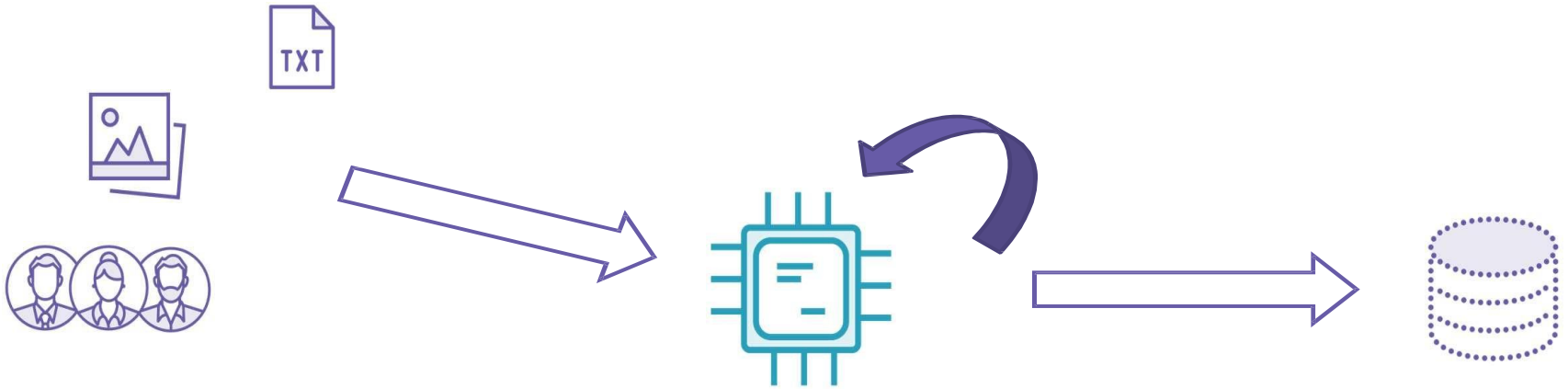
Kilobytes Megabytes Gigabytes

Terabytes Petabytes Exabytes

25000000000000000000 bytes/day

New Systems Are Needed!

Artificial Intelligence/Machine Learning



Spam

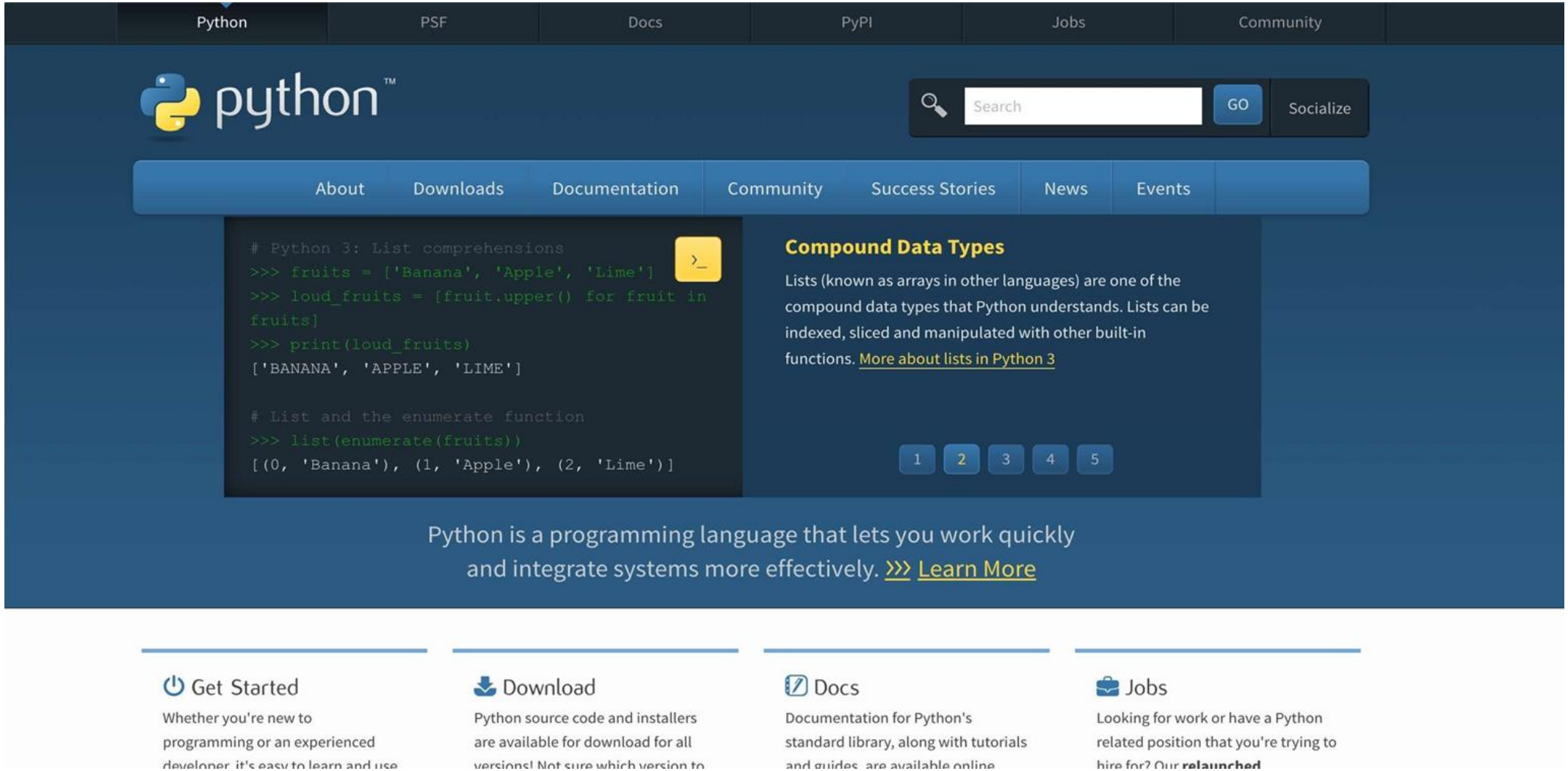
Network Intrusion Detection

Optical Character Recognition

Computer Vision

Documentation

https://python.org/



Install Python

python.org/downloads/windows/

Python Releases for Windows

- Latest Python 3 Release - Python 3.10.0
- Latest Python 2 Release - Python 2.7.18

Stable Releases

- Python 3.10.0 - Oct. 4, 2021

  Note that Python 3.10.0 *cannot* be used on Windows 7 or earlier.

  - Download Windows embeddable package (32-bit)
  - Download Windows embeddable package (64-bit)
  - Download Windows help file
  - Download Windows installer (32-bit)
  - Download Windows installer (64-bit)
- Python 3.7.12 - Sept. 4, 2021

  Note that Python 3.7.12 *cannot* be used on Windows XP or earlier.

  - No files for this release.
- Python 3.6.15 - Sept. 4, 2021

  Note that Python 3.6.15 *cannot* be used on Windows XP or earlier.

python.org/downloads/mac-osx/

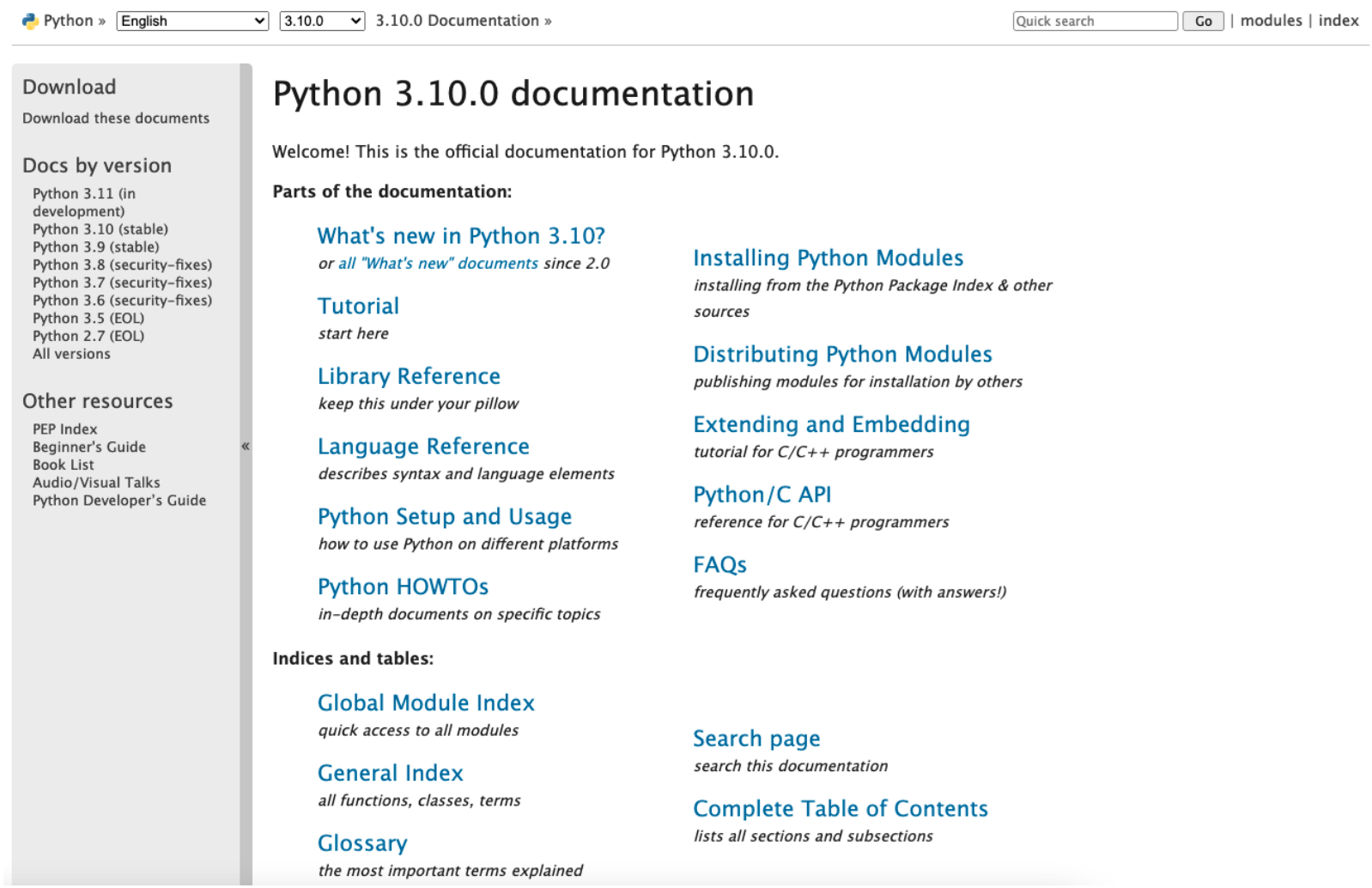
Python Releases for macOS

- Latest Python 3 Release - Python 3.10.0
- Latest Python 2 Release - Python 2.7.18

Stable Releases

- Python 3.10.0 - Oct. 4, 2021
  - Download macOS 64-bit universal2 installer
- Python 3.7.12 - Sept. 4, 2021
  - No files for this release.
- Python 3.6.15 - Sept. 4, 2021
  - No files for this release.
- Python 3.9.7 - Aug. 30, 2021
  - Download macOS 64-bit Intel installer
  - Download macOS 64-bit universal2 installer
- Python 3.8.12 - Aug. 30, 2021
  - No files for this release.
- Python 3.9.6 - June 28, 2021
  - Download macOS 64-bit Intel installer
  - Download macOS 64-bit universal2 installer

https://docs.python.org/3/



Python Release Notes

This is the stable release of Python 3.10.0

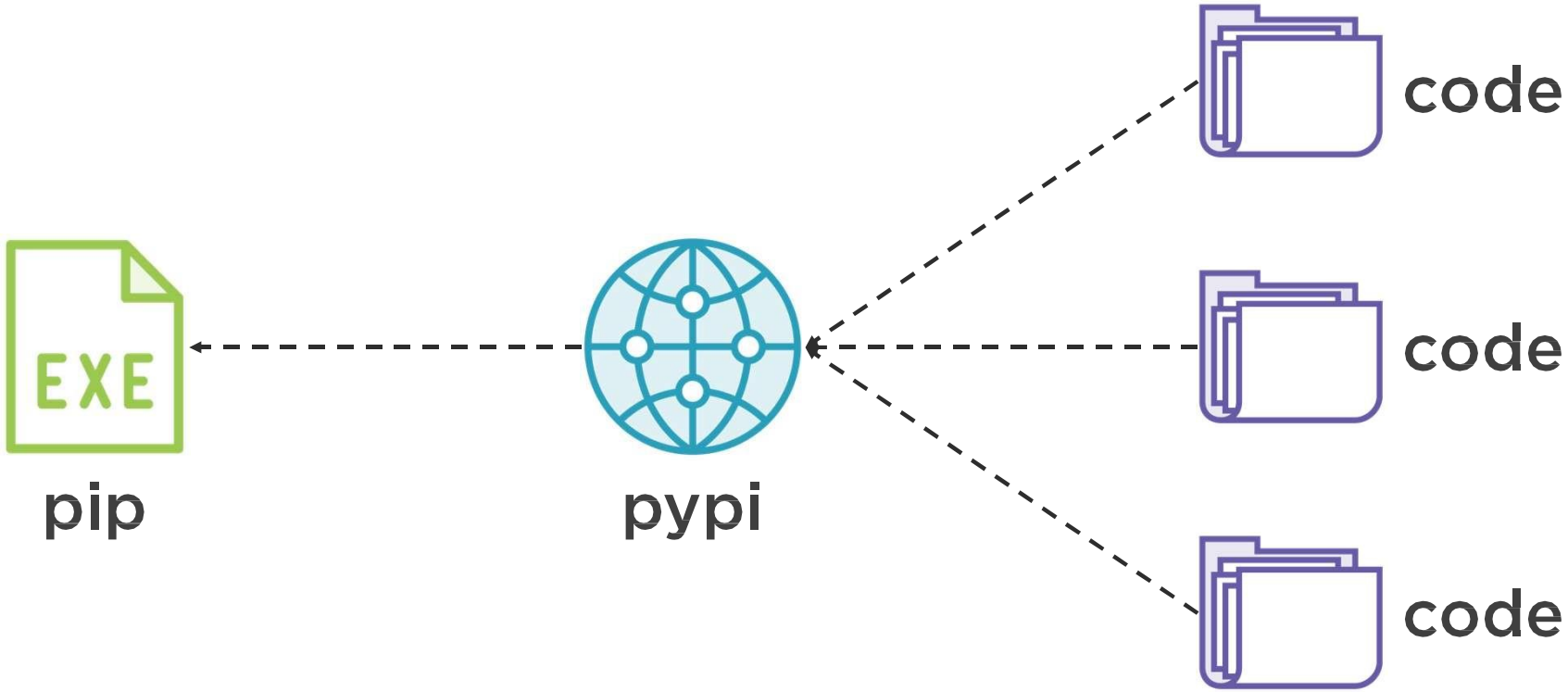
Python 3.10.0 is the newest major release of the Python programming language, and it contains many new features and optimizations.

Major new features of the 3.10 series, compared to 3.9

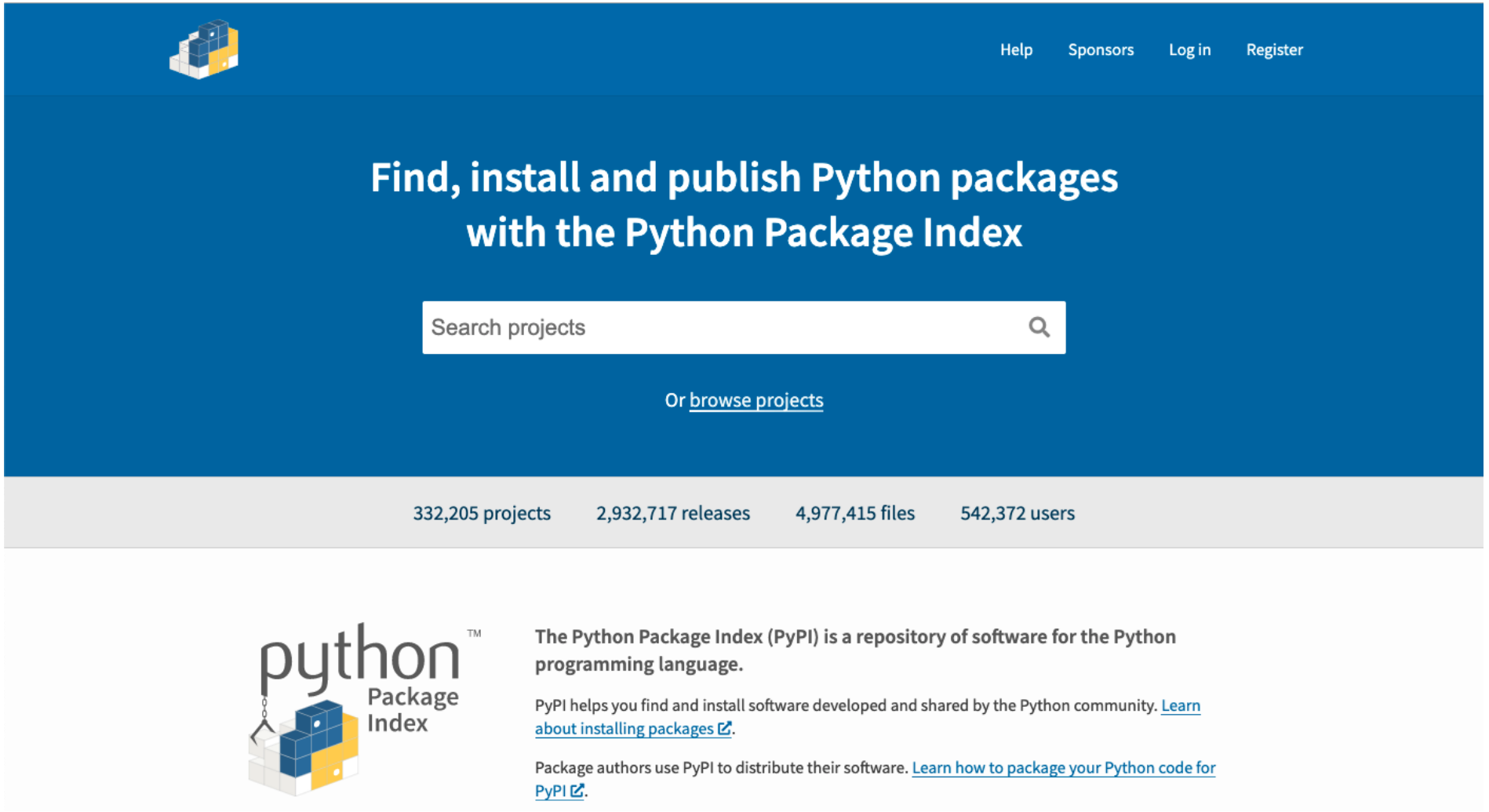
Among the new major new features and changes so far:

- PEP 623 -- Deprecate and prepare for the removal of the wstr member in PyUnicodeObject.
- PEP 604 -- Allow writing union types as X | Y
- PEP 612 -- Parameter Specification Variables
- PEP 626 -- Precise line numbers for debugging and other tools.
- PEP 618 -- Add Optional Length-Checking To zip.
- bpo-12782: Parenthesized context managers are now officially allowed.
- PEP 632 -- Deprecate distutils module.
- PEP 613 -- Explicit Type Aliases
- PEP 634 -- Structural Pattern Matching: Specification
- PEP 635 -- Structural Pattern Matching: Motivation and Rationale
- PEP 636 -- Structural Pattern Matching: Tutorial
- PEP 644 -- Require OpenSSL 1.1.1 or newer
- PEP 624 -- Remove Py_UNICODE encoder APIs
- PEP 597 -- Add optional EncodingWarning

Working with the Code of others

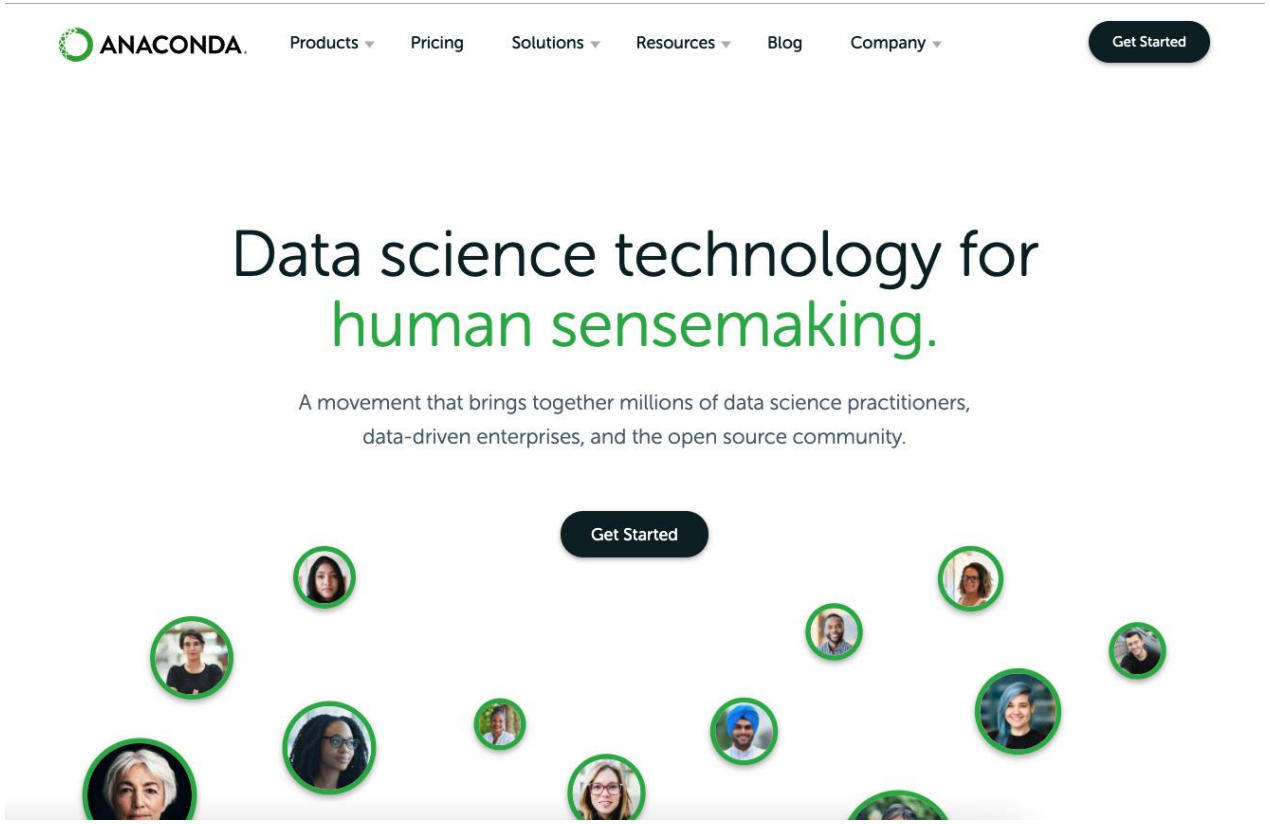


https://pypi.org/



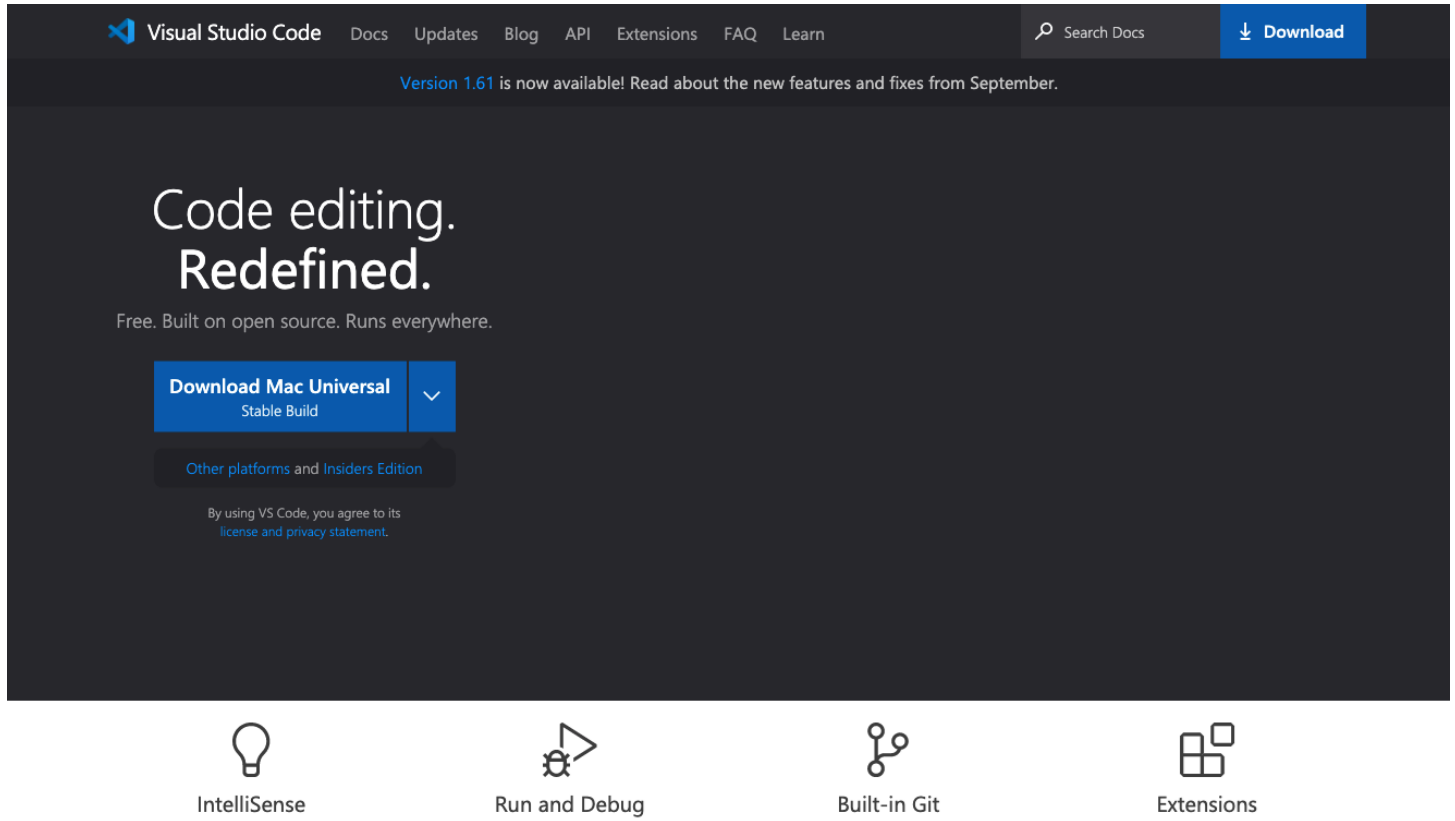
Install the Python environment

Install Anaconda



- Python and Pip will automatically be installed
- Download: https://www.anaconda.com/products/individual

Install Visual Studio Code and Extensions

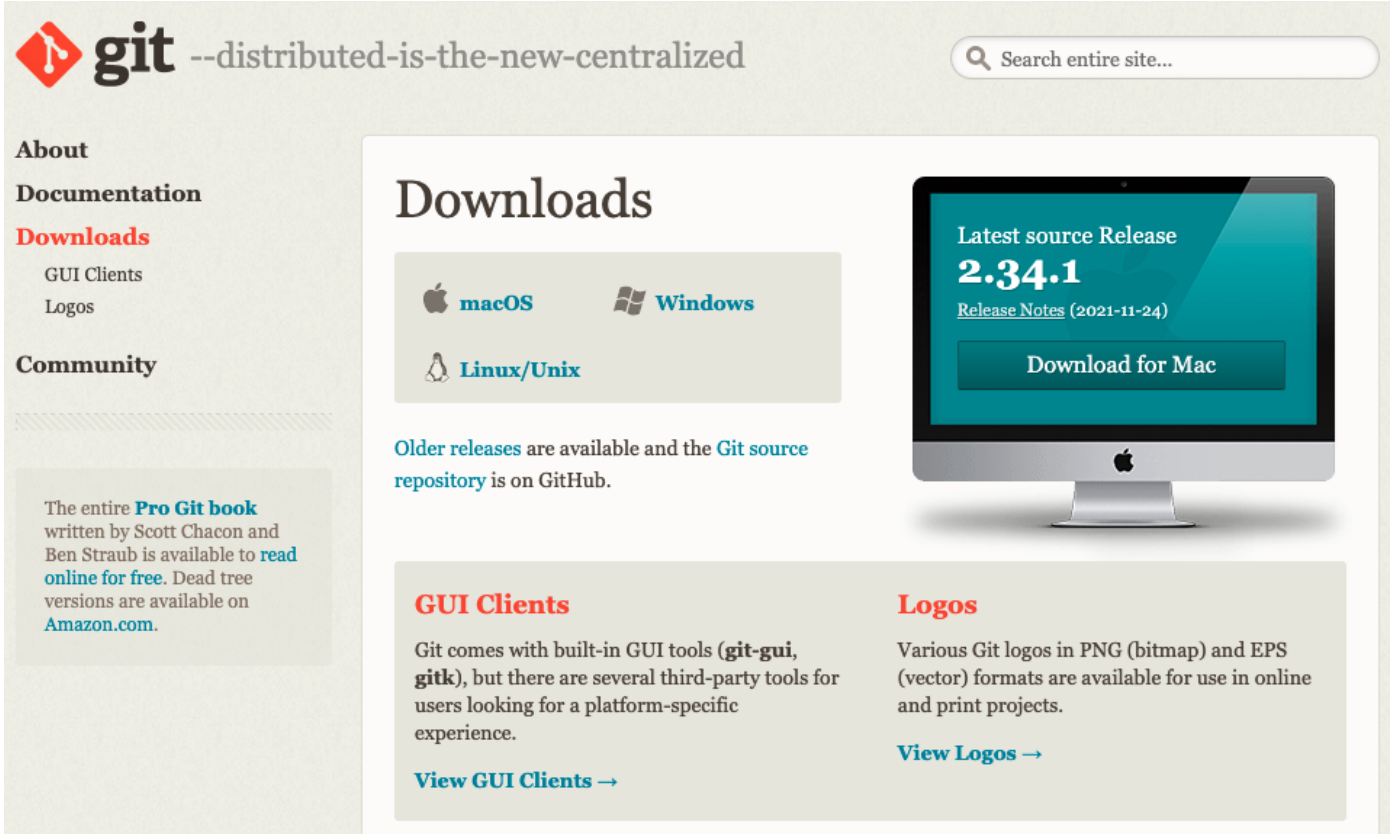


- A code editor redefined and optimized for building and debugging
- Download: https://code.visualstudio.com/download

Install Visual Studio Code and Extensions

- Install: Python, GitLens, Prettier, Todo Tree

Install Git



- Git is a free and open source distributed version control system
- Download: https://git-scm.com/downloads

Anaconda Commands

To create an environment with Python 3.7:

- conda create --name myenv python=3.7

To activate an environment:

- conda activate myenv

To deactivate an environment:

- conda deactivate

To remove an environment:

- conda remove --name myenv --all

To list all environments:

- conda info --envs

Reference: Here

Git Commands

To clone a repository into local:

- git clone <repository_url>

To download objects and refs from another repository:

- git fetch

To pull source code from a repository:

- git pull

To add file contents to the index:

- git add .

To commit changes to the repository:

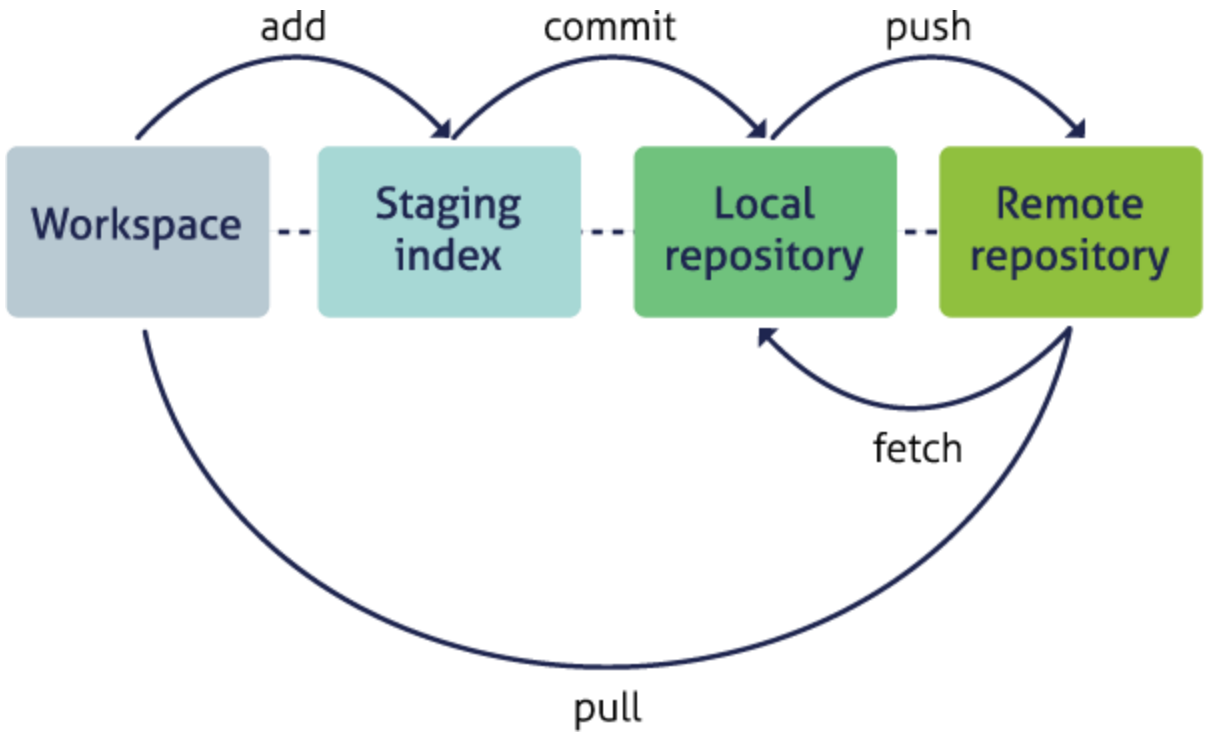
- git commit -m "This is a message"

To push changes to a repository:

- git push

Reference: https://git-scm.com/docs/git#_git_commands

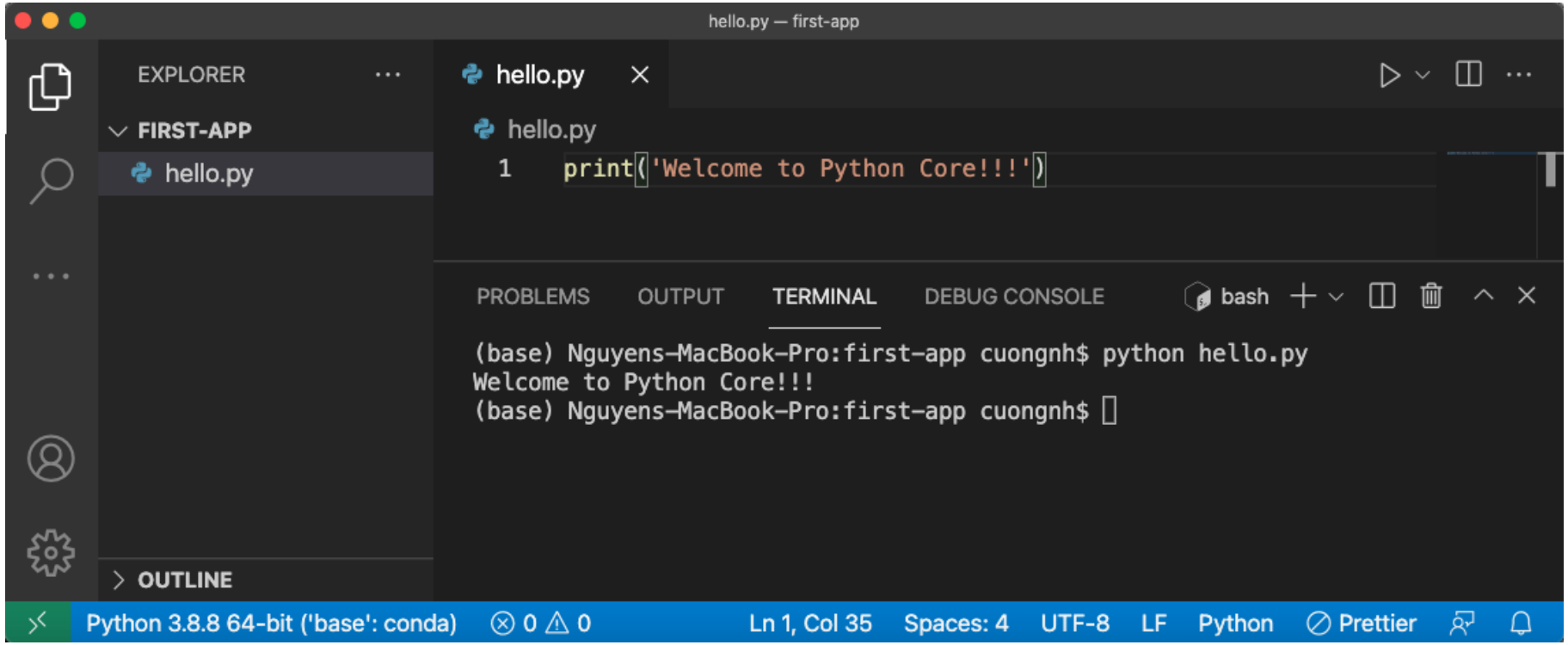
Git Commands



Run first application

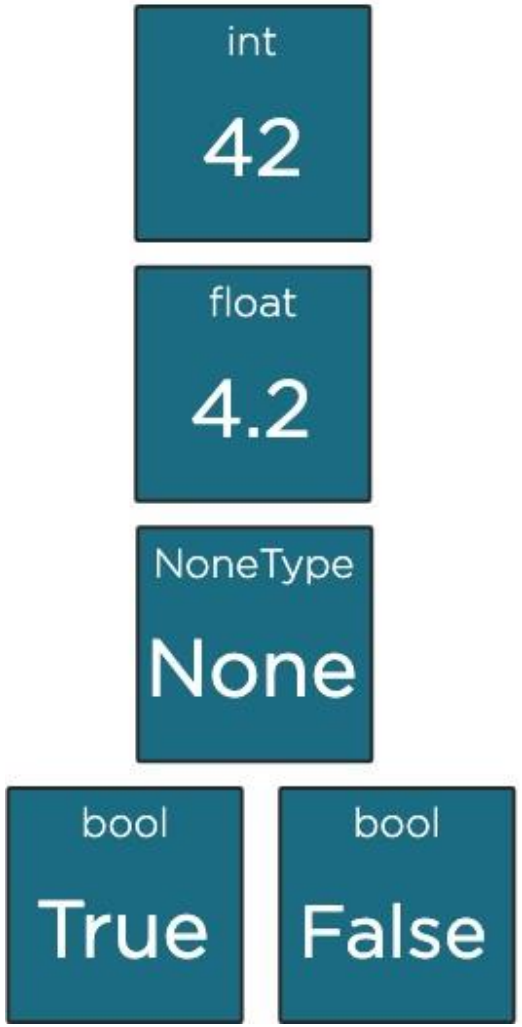
Hello World

- Create a new file with the name “hello.py”, then open the folder containing the file “hello.py” with VSCode



Scalar Types

Scalar Types



arbitrary precision integer

64-bit floating point numbers

the null object

boolean logical values

Int

```
>>> 10
10
>>> 0b10
2
>>> 0o10
8
>>> 0x10
16
>>> int(3.5)
3
>>> int(-3.5)
-3
>>> int("496")
496
```

Float

```
>>> 3.125
3.125
>>> 3e8
300000000.0
>>> 1.616e-35
1.616e-35
>>> float(7)
7.0
>>> float("1.618")
1.618
>>> float("nan")
nan
>>> float("inf")
inf
>>> float("-inf")
-inf
>>> 3.0 + 1
4.0
>>>
```

None

```
>>> None
>>> a = None
>>> a is None
True
>>>
```

Bool

```
False
>>> bool(42)
True
>>> bool(-1)
True
>>> bool(0.0)
False
>>> bool(0.207)
True
>>> bool(-1.117)
True
>>> bool([])
False
>>> bool([1, 5, 9])
True
>>> bool("")
False
>>> bool("Spam")
True
>>> bool("False")
True
>>> bool("True")
True
>>>
```

Variable

- A variable is created as soon as it is assigned a value for the first time
- No need to specify the data type when declaring the variable, Python will automatically recognize the data type through the data assigned
- Syntax: *variableName = value*
- Examples:

  x = 5

  a = b = 3.3

  name, sex = 'Michael', 1