

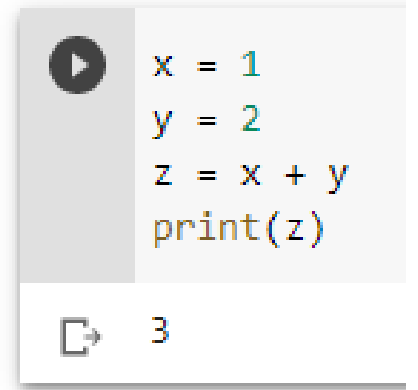


Introduction to Python

Justin Waterfield, MMCI
RTI International

Brief background + history

- One of the most popular programming languages, second only to JavaScript
- General purpose language
- Philosophy is readability
- Object oriented approach helps programmers write clear, logical code for small- or large-scale projects
 - `print(z)`, objects are both data and code
- Dutch programmer Guido van Rossum created Python because he was bored over Christmas holiday in 1989.
 - Name comes from his love of Monty Python
- Licensed by the Python Software Foundation. An American nonprofit.
- Open-source
- Current version is 3.0 (released in 2008).

A small, light gray rectangular box with a dark gray border, representing a code execution environment. On the left side of the box is a dark gray vertical bar containing a white play button icon. To the right of this bar, the following Python code is displayed in a monospaced font: `x = 1`, `y = 2`, `z = x + y`, and `print(z)`. The numbers 1 and 2 are colored blue, and the string 'z' is colored orange. Below the code, there is a white horizontal bar containing a dark gray icon of a document with an arrow pointing right, followed by the number 3.

```
x = 1
y = 2
z = x + y
print(z)
```

3

Zen of Python

- Beautiful is better than ugly
- Explicit is better than implicit
- Simple is better than complex
- Complex is better than complicated
- Readability counts

Common Uses of Python

- Web Development
- Scientific
 - NumPy (array facility)
 - Pandas (data analysis and modeling)
- Machine Learning / Artificial Intelligence
 - Tensorflow (Developed by Google)
 - Keras (Open-source neural network library)
 - PyTorch (Open-source machine learning used for developing and training neural networks)
- Computer Vision
 - OpenCV
- Web Scraping
- Data Science & Data Analysis
 - Matplotlib
 - Seaborn

Biomedical Python Examples

- [IdentiCyte: Simple red blood cell identification software – ScienceDirect](#)
 - A program created to quickly count and identify RBCs from microscope images.
- [Jill Cates - How to Build a Clinical Diagnostic Model in Python - PyCon 2019 – YouTube](#)
 - This could be helpful for your final project.... (cough cough)

Helpful Links

- Starter's Guide:
 - [Introduction · HonKit \(swaroopch.com\)](https://swaroopch.com/introduction/)
- Video Series:
 - [Python & PyCharm Setup : Getting Started – YouTube](#)
- Anaconda Environment:
 - [Getting started — Anaconda documentation](https://docs.anaconda.com/anaconda/getting-started/)
- Medical Focused Beginner Video Series:
 - [Data Science for Healthcare: Python Fundamentals - YouTube](#)

Important Terms

- Boolean (bool)
 - True or False
- Integer (int)
 - 42
- String (str)
 - "Hello" "Student" "Test" "These are words"
- List (list)
 - [1, 2, 3, 4]
 - [1, two, 3, four]
- Range (range)
 - (1, 10)

Exercise Links

- [Bee based image manipulation exercise](#) (completed)
- [Image files for exercise](#)
- [Blank version for you to practice on](#)