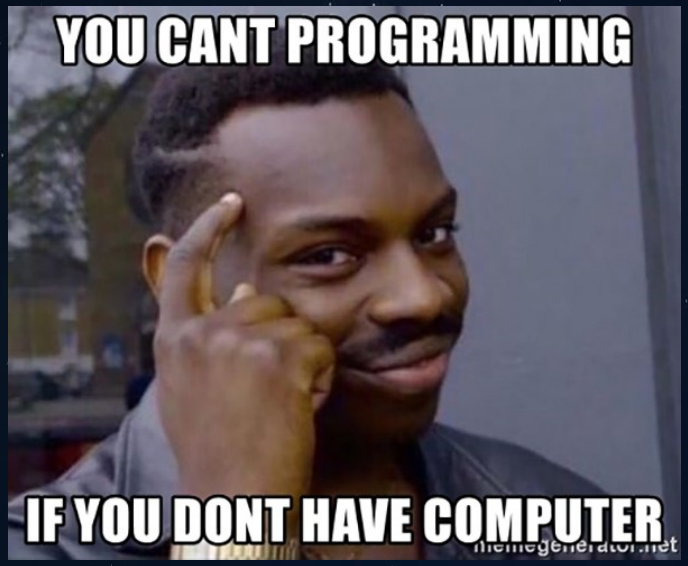
Demystifying Code: Intro to Python

by Aaron Johnson
Fall 2019

Programming languages

- Can be thought of as simply a program that you feed commands to
- You can write scripts or programs that make the computer do whatever you can dream up
- There are many programming languages at least 700 or so according to Wikipedia



Brief history of programming languages

- Aaron's list of most popular languages
  - 1957 - FORTRAN - Compiled
  - 1964 - BASIC - Interpreted
  - 1970 - Pascal - Compiled
  - 1972 - C - Compiled
  - 1980 - C++ - Compiled
  - 1991 - Python - Interpreted
  - 1991 - Visual Basic - Compiled
  - 1995 - Ruby - Interpreted
  - 1995 - Java - Compiled (JVM)
  - 1995 - JavaScript - Interpreted
  - 1995 - PHP - Interpreted
  - 2001 - C# - Compiled (CLR)
  - 2009 - Go - Compiled (Google - produces statically linked native binaries without external dependencies.)
  - 2011 - Dart Compiled/Interpreted (Google - AOT-compiled to JavaScript)

Interpreted vs Compiled

- Compiled languages - converted directly into machine code that the processor can execute. As a result, they tend to be faster and more efficient to execute than interpreted languages.
- Interpreted languages - the source code is not directly translated by the target machine. Instead, a different program, aka the interpreter, reads and executes the code.

Scripts vs Programs

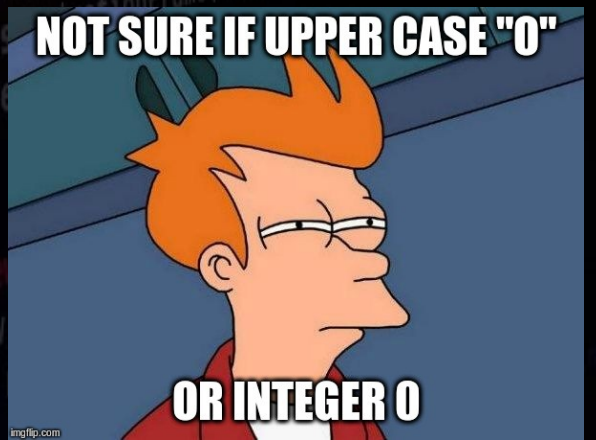
- Scripts are usually interpreted (but not always, such as with golang scripts)
- Programs can be either compiled (C++, C#, Java) or interpreted (Python, Ruby, PHP)
- The biggest difference is that scripts are written to control an existing program
- Scripts often automate manual tasks to make work easier to accomplish
- Scripts can accomplish many important tasks and are often written by a single person
- Programs usually have very ambitious goals and often take a large amount of time and money to create

Common Python Data types

- Python is a dynamically typed language which means variables themselves are not bound to a specific data type. That said the following are the most commonly used data types in Python
  - Integers (123)
  - Strings (abc)
  - Boolean (True/False)
  - Lists [1, 2, 3]
  - Dictionaries {Key: Value}

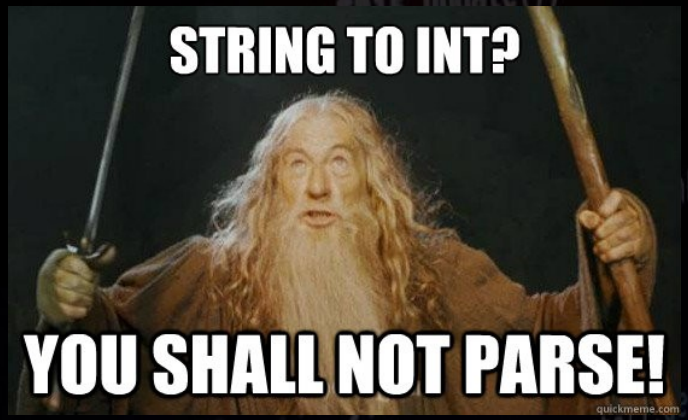
Integers

- Integers in python are positive or negative whole numbers with no decimal point
  - Python 2.7.16 (default, Oct 7 2019, 17:36:04)
    [GCC 8.3.0] on linux2
    Type "help", "copyright", "credits" or "license" for more information.
    >>> x = 1
    >>> y = 2
    >>> type(x)
    <type 'int'>
    >>> type(y)
    <type 'int'>
    >>> print(x + y)
    3



Strings

- In python a string is most easily identified by the use of double quotes
  - Python 2.7.16 (default, Oct 7 2019, 17:36:04)
    [GCC 8.3.0] on linux2
    Type "help", "copyright", "credits" or "license" for more information.
    >>> x = "This is a string"
    >>> type(x)
    <type 'str'>
    >>> print(x)
    This is a string



Boolean

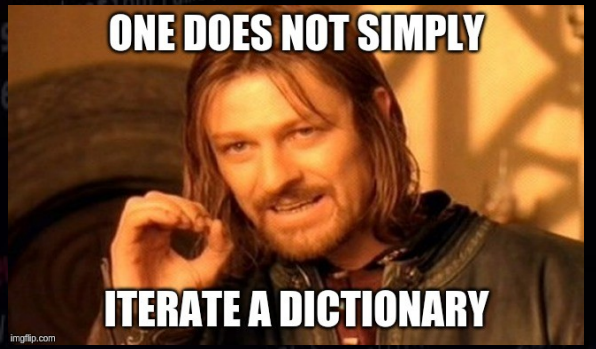
- Boolean simply means True or False
  - Python 2.7.16 (default, Oct 7 2019, 17:36:04)
    [GCC 8.3.0] on linux2
    Type "help", "copyright", "credits" or "license" for more information.
    >>> x = True
    >>> type(x)
    <type 'bool'>
    >>> if x is True:
    ...   print("Boolean is pronounced boo-lee-uhn")
    ... else:
    ...   print("Boolean is pronounced bool-yaan")
    ...
    Boolean is pronounced boo-lee-uhn

Lists

- Lists are denoted by square brackets [ ] and contain comma separated values. Another name for a list is an Array.
  If the list contains strings then it will need quotes, integers in the list wouldn't have any quotes
  - Python 2.7.16 (default, Oct 7 2019, 17:36:04)
    [GCC 8.3.0] on linux2
    Type "help", "copyright", "credits" or "license" for more information.
    >>> x = ["glass", "root beer", "vanilla ice cream", "straw"]
    >>> type(x)
    <type 'list'>
    >>> for index, ingredient in enumerate(x):
    ...   print(index, ingredient)
    ...
    (0, 'glass')
    (1, 'root beer')
    (2, 'vanilla ice cream')
    (3, 'straw')

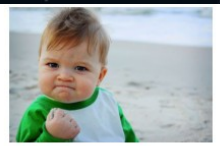
Dictionaries

- Dictionaries are denoted by curly braces { } and contain "key": "value" pairs. Another name for a dictionary is a Map.
  Dictionaries can contain all of the previously mentioned data types including integers, strings, boolean, lists and more.
  - >>> x = { "christmas": "tree",
    ... "thanksgiving": "turkey",
    ... "halloween": "jack-o-lantern",
    ... "easter": "bunny"
    ... }
    >>> type(x)
    <type 'dict'>
    >>> for key, value in x.items():
    ... print(key, value)
    ...
    ('easter', 'bunny')
    ('halloween', 'jack-o-lantern')
    ('christmas', 'tree')
    ('thanksgiving', 'turkey')



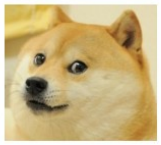
Hands-on Lab!

61544
Success Kid

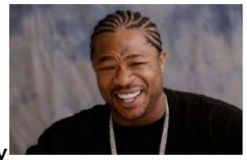


61582
Willy Wonka

8072285
Doge
(So, very, such, much come before an adjective or adverb)

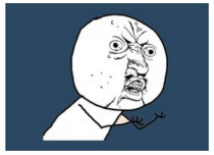


101716
Yo dawg we heard you like Y so we put some X in your X so you can Y while you Y

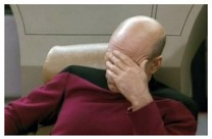


61520
Not sure if Fry

61527
Y U No
(give me good grade, hire me, etc)

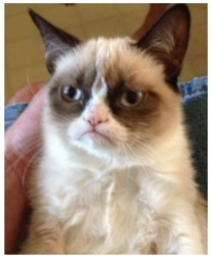


1509839
Captain Picard Facepalm



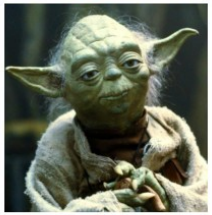
563423
Bill Lumbergh, yeah that'd be great

405658
Grumpy Cat



235589
Evil Toddler

14371066
Master Yoda



163573
Imagination Spongebob

460541
Jack Sparrow Being Chased

89655
I Want You, Thank You for your Service, USA, 'murica

16464531
None Of My Business