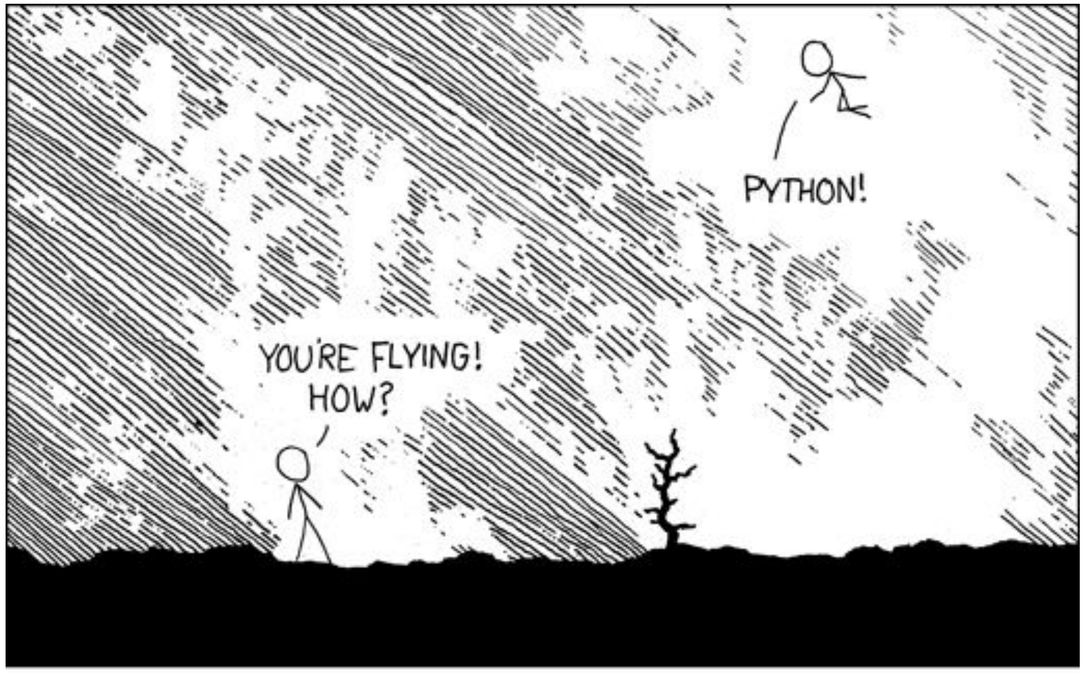
Python Scripting - Part 1

Spring 2022
PCfB Class 4
February 4, 2022



Outline

- Why Python?
- Data types
- Variables
- Methods

Why Python?

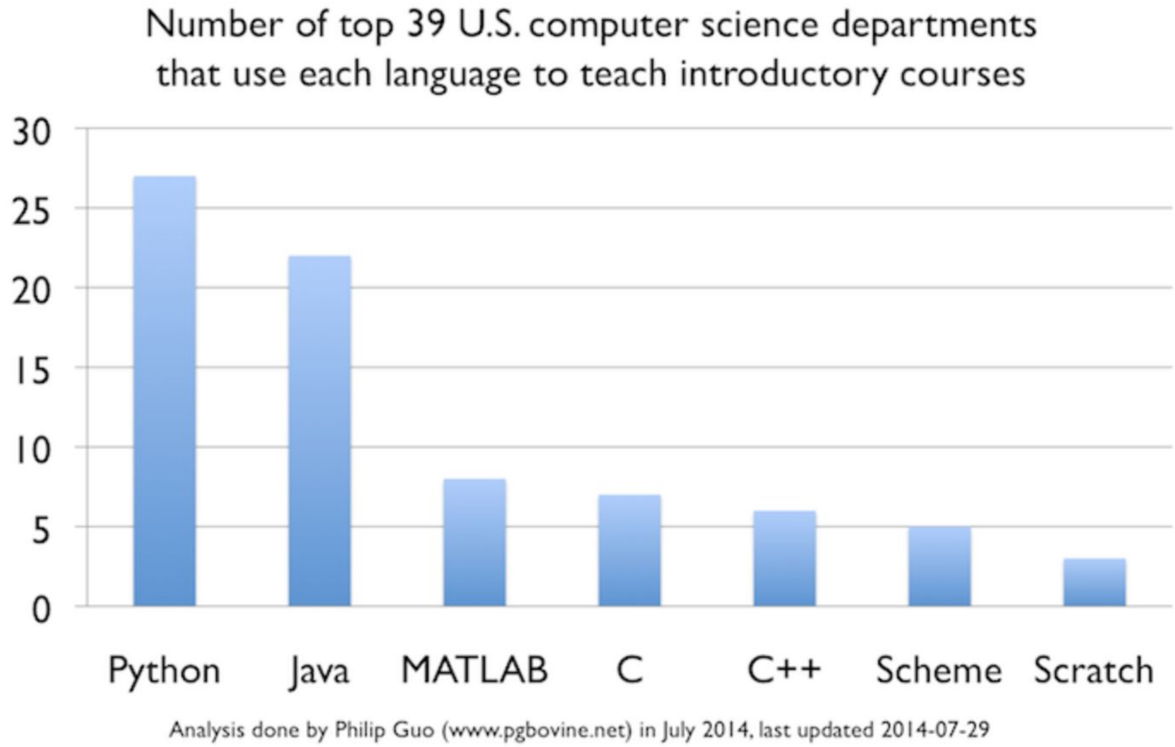
Enhanced readability

PYTHON

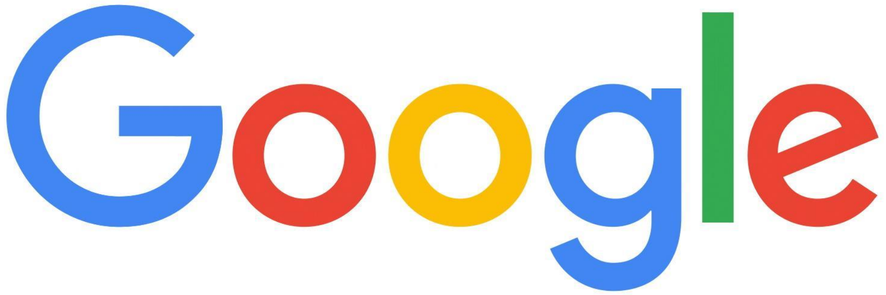
```
print('hello world')
```

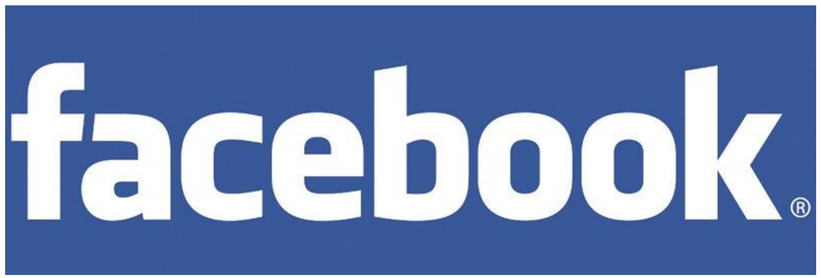
JAVA

```
public class Main {
  public static void main(String[] args) {
     System.out.println("hello world");
   }
}
```

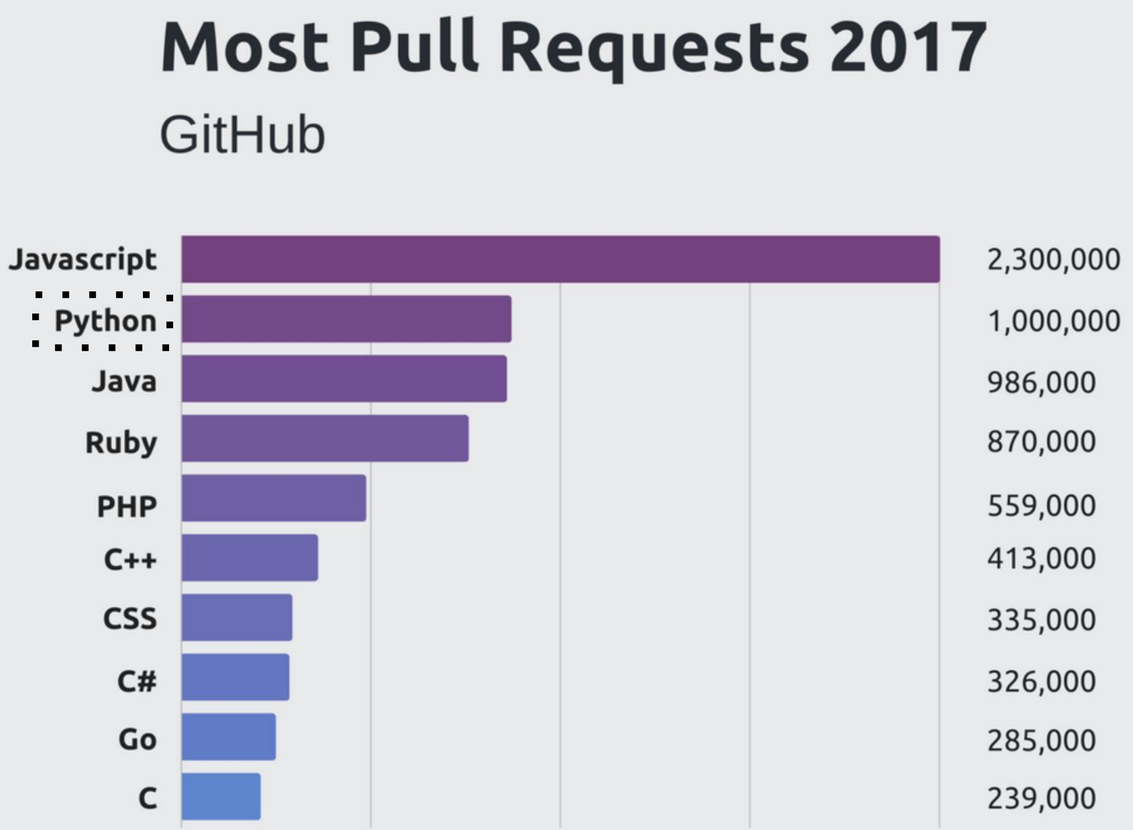


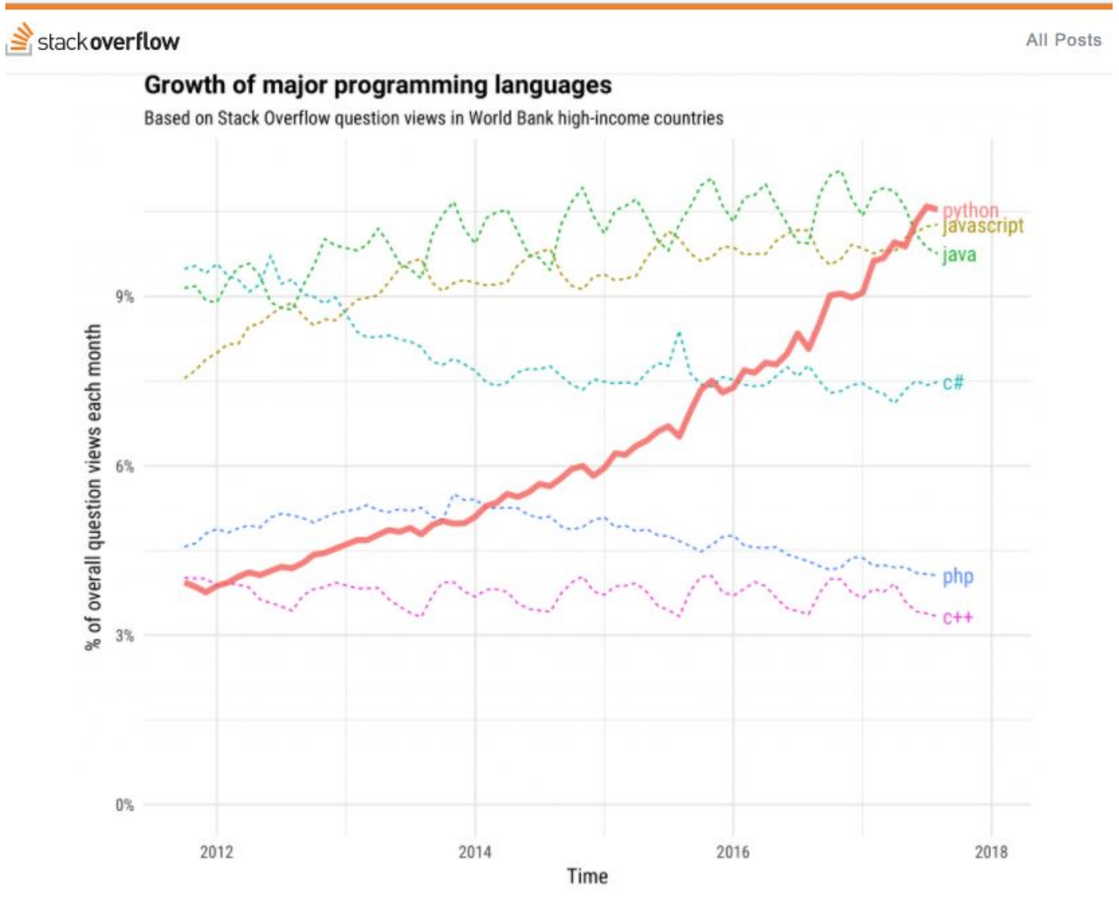
Still very powerful

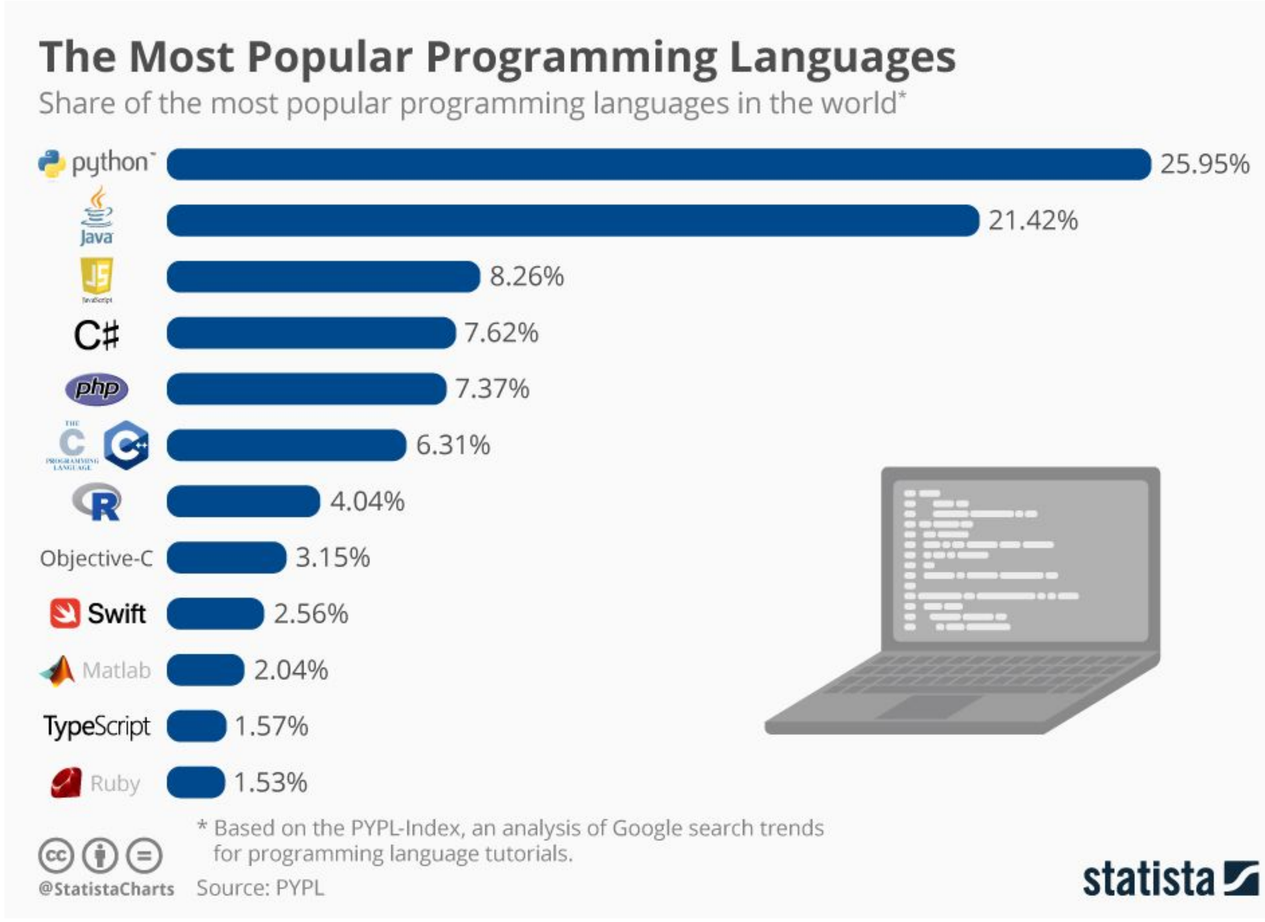




Very popular




stackoverflow
All Posts
Growth of major programming languages
Based on Stack Overflow question views in World Bank high-income countries
python
javascript
java
c#
php
c++
9%
6%
3%
0%
% of overall question views each month
2012
2014
2016
2018
Time


The Most Popular Programming Languages
Share of the most popular programming languages in the world*
python 25.95%
Java 21.42%
8.26%
C# 7.62%
php 7.37%
6.31%
4.04%
Objective-C 3.15%
Swift 2.56%
Matlab 2.04%
TypeScript 1.57%
Ruby 1.53%
* Based on the PYPL-Index, an analysis of Google search trends for programming language tutorials.
@StatistaCharts
Source: PYPL
statista

vs.

PYTHON 2		PYTHON 3
Legacy	>	Future
It is still entrenched in the software at certain companies		It will take over Python 2 by 2020
Library	≠	Library
Many older libraries built for Python 2 are not forwards-compatible		Many of today's developers are creating libraries strictly for use with Python 3
0100 0001 ASCII	+	Unicode 0000 0000 0100 0001
Strings are stored as ASCII by default		Text strings are Unicode by default
5/2=2	≠	5/2=2.5
It rounds your calculation down to the nearest whole number		The expression 5 / 2 will return the expected result
print “hello”	≠	print (“hello”)
Python 2 print statement		The print statement has been replaced with a print () function

PYTHON 2.X  PYTHON 3.X

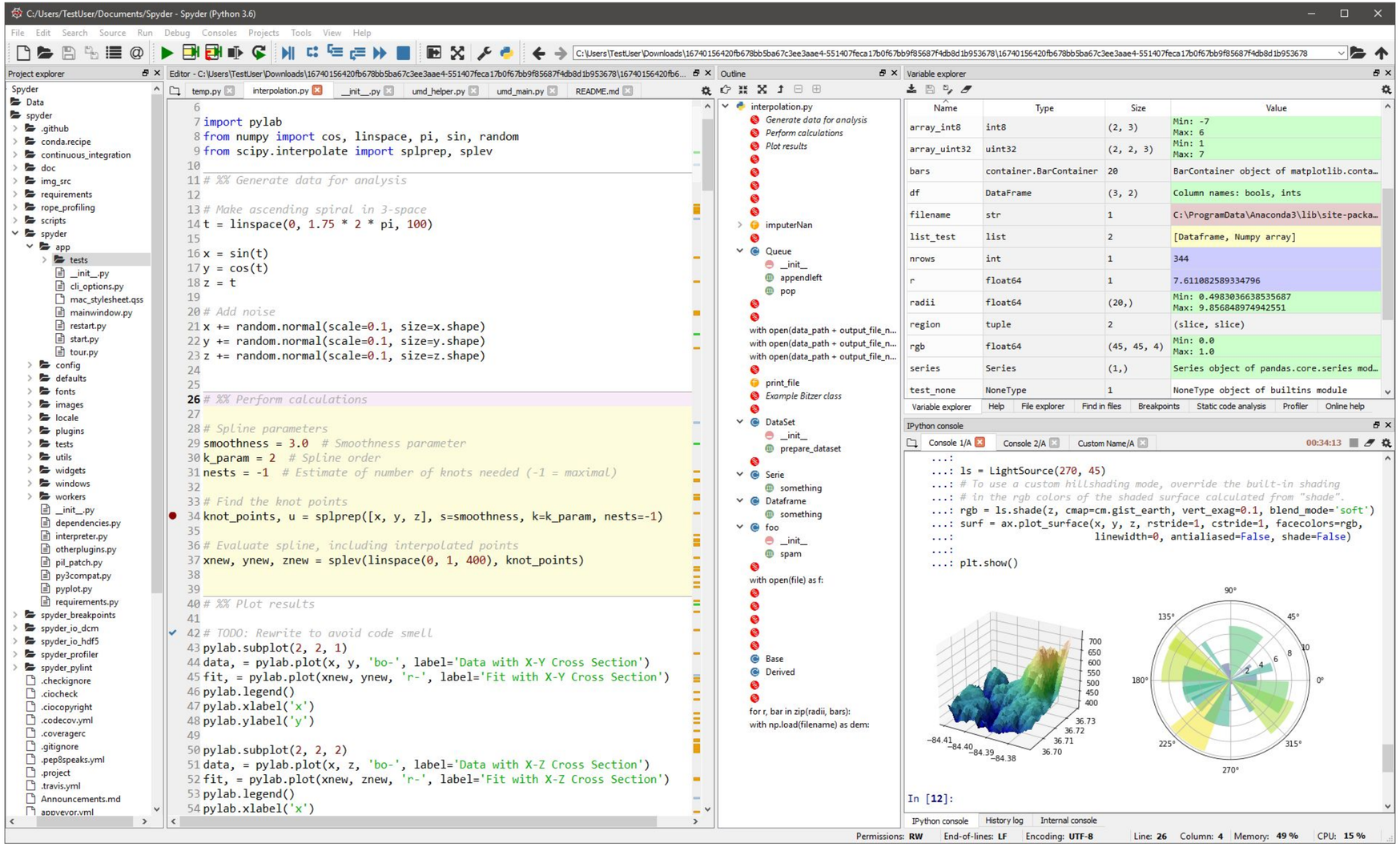
```
>>> print "Hello World!"
Hello World!
>>> print 3/2
1
>>> variable = 123456789
>>> print (type(variable))
<type 'int'>
```

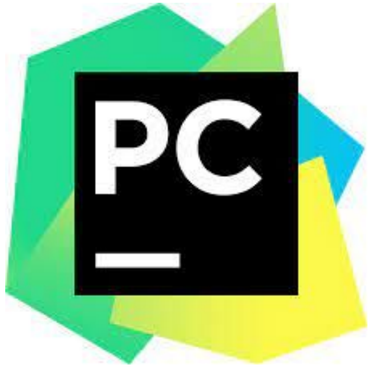
```
>>> print ("Hello World!")
Hello World!
>>> print (3/2)
1.5
>>> variable = 123456789
>>> print (type(variable))
<class 'int'>
```

Ways to use Python

1. **Stand-alone scripts**
   - Code saved in text file, executed on command line
   - As described in PCfB book
2. **Interactive mode via command line**
   - Enter commands 1-by-1 on command line
   - Good for testing
3. **Jupyter notebook**
   - Rich, web-based interface; results presented inline
   - Good for teaching purposes and sharing code

Interactive development environments (IDEs)





Data types

Data types

String

Integer

Floating point

Boolean

Converting between types

String

Integer

Floating point

Boolean

Data containers

List

```
[1, '1', 'one', [1,2]]
```

Dictionary

```
{1:'one', 2:'two', 3:'three'}
```

Variables

Methods

Dot notation

dir()

['__add__', '__class__', '__contains__', '__delattr__', '__delitem__', '__dir__', '__doc__', '__eq__', '__format__', '__ge__', '__getattribute__', '__getitem__', '__gt__', '__hash__', '__iadd__', '__imul__', '__init__', '__init_subclass__', '__iter__', '__le__', '__len__', '__lt__', '__mul__', '__ne__', '__new__', '__reduce__', '__reduce_ex__', '__repr__', '__reversed__', '__rmul__', '__setattr__', '__setitem__', '__sizeof__', '__str__', '__subclasshook__', 'append', 'clear', 'copy', 'count', 'extend', 'index', 'insert', 'pop', 'remove', 'reverse', 'sort']

#Comment, #comment, #comment

- Used to:
  - Guide others through your script
  - Indicate assumptions being made
  - Document changes made across versions
- You really can’t have too many comments!
- Most will probably be more useful to YOU than others

Demo