introduction to python

why python?

- python is a general-purpose, high-level programming language

- designed emphasizing readability

- syntax allows programmers to express concepts with fewer lines of code (e.g. compared to C)

- large & comprehensive standard library

- supports object-oriented programming (not used in this course)

python

- since 2008, ranked in the top 8 most popular programming languages

- large organisations often use python (Google, Yahoo!, CERN, NASA) and conduct programming interviews with python as an option

- can be used for scientific computing (numpy, scipy, matplotlib) as well as machine learning (scikit-learn)

good learning resources

- http://www.sthurlow.com/python/

- Google's python class: https://developers.google.com/edu/python/

- Code Academy Python: http://www.codecademy.com/tracks/python

textbooks

- Python Cookbook by David Beazley & Brian Jones published by O'Reilly
  - starts with data structures and algorithms and requires basics as a pre-requisite
  - not an introductory resource to python
  - my personal favourite resource
- Introduction to Computer Science using Python: A computational problem-solving focus by Charles Dierbach published by Wiley
  - an introductory book for non-CS students
- Many others on Amazon (check reviews)

code academy

- http://www.codecademy.com/tracks/python
- 13 hour guided free course for beginners!
- starts from the very basics
- beginners please start with this course asap
- *start with: python syntax, strings and console output, conditionals and control flow*

pycharm

- http://www.jetbrains.com/pycharm/
- free integrated development environment (IDE) for running python code
- contains a syntax corrector
- debugger
- hello world example

alternative setup

- Sublime Text 2 (text editor)
- command line for running
- pdb for debugging
- hello world example

variables

- A variable is a name (identifier) that is associated with a value

- `x = 1`
- `y = True`
- `z = False`
- `float_x = 1.0`

- Certain keywords are reserved and cannot be used as identifiers in python (example and, not, with, if, else, false)

- To see the full list, type help() in a Python shell and then type keywords (type ‘q’ to quit)

comments

- to comment in python use a “#”
- # this is how you would write a comment in python
- use # for each comment line, or
- use “”” for a multi-line comment start and stop
- note these are quotes not hashtags!!

operators

- An operator is a symbol that represents an operation that may be performed on one or more operands.
- The + symbol represents the operation of addition.
- An operand is a value that a given operator is applied to (such as 2 and 3 in the expression 2+3).
- Python provides the arithmetic operators: +, -, /, *, //, %, **
- exponent use **
- for example, ten_squared = 10 ** 2

strings

- use double or single quotes to create a string
- `name = “Kate”`
- `age = “75”`
- `email = ‘kate@gmail.com’`
- how can I return the first character of the variable name?

string methods

- Search google for “string methods” python
- https://docs.python.org/release/2.5.2/lib/string-methods.html

- `name = “Kate”`
- `print name.upper()` —-> KATE
- `print name.lower()` —-> kate
- convert a non-string to string by using `str()`

Indentation

- python uses whitespace indentation to delimit blocks of code
- there are no “start/end” or curly braces to mark where a function or block of code starts or ends
- the indentation of the code itself marks the blocks of code

```
def fib(n):
   print 'n = ', n
   if n > 1:
      return n*fib(n-1)
   else:
      print 'end of the line'
      return 1
```