Python Workshop #2

November 14, 2018
Last time:

- Syntax
- Variables
  - Data types e.g. int, float, boolean, String, etc.
- Print function
- Arithmetic
- Lists, tuples, dictionaries
- Conditionals
- Loops
- Functions
Today:

- Classes
- Libraries
- Applications

If you don’t have a Python 3 environment set up, you can use: https://www.onlinegdb.com/
Classes

- Python can be modeled as an **object-oriented programming language**
- Objects in programming can be seen as individual bundles of data
- Each class instance has its own class values
class Person:
    def __init__(self, name, age):
        self.name = name
        self.age = age

jon_chong = Person("Jon Chong", 21)
print(jon_chong.name)
print(jon_chong.age)
Class Expression

- In a class expression, we perform some action on a given object of a SPECIFIC class type
- We can modify data inside the object, interact with other objects, and much more
class Person:
    def __init__(self, name, age):
        self.name = name
        self.age = age

    def birthday(self):
        self.age += 1

jon_chong = Person("Jon Chong", 21)
jon_chong.birthday()
print(jon_chong.age)
Libraries

- Packages of useful classes, functions, and values
- Readily available to import, so you don’t have to write them yourself
- Libraries and packages can be downloaded from the Internet as well
- The Python Standard Library is automatically included in Python, and contains many common useful functions
import math
jon_chong = Person("Jon Chong", 21)

print(factorial(jon_chong.age))

Reference: https://docs.python.org/3/library/math.html
Exercise!
The Situation:

You are given a list of students, who have a name and a GPA. You need to find the 3 students with the highest GPA and print their names.
Format

The list of students will be given as two lists, one with names, and one with GPAs. Student $x$ will have name $\text{name}[x]$ and GPA $\text{GPA}[x]$.

You must take these lists and load the data into a list of Student class objects.

The lists can be found at https://people.ucsc.edu/~yilang/python/students.py
Tips

Two possible ways to solve this:

1. Keep track of the 3 highest GPAs at all time
2. Sort the list by GPA, using a **key function**

Remember to use loops!

The length of a list is returned by `len(list)`, and we can use `list.append(Student)` to add an instance to a list.