

CSI 33 LECTURE NOTES (Ojakian)

Topic 1: Classes in Python and C++: Basics

OUTLINE

(References: Ch. 9)

1. Python Classes versus C++ Classes

1. Built-in Classes

- (a) Python Lists.
- (b) Also sets and dictionaries (look at dictionaries below)

2. A Basic Python Class

- (a) Example: Light switch.
- (b) How initialize?
- (c) Can turn it on or off with SWITCH method.
- (d) Need a method to find out if it is on or off.
- (e) It breaks into a permanently off state after some number of switches to on

3. A Basic C++ Class

Simple case of keeping everything PUBLIC

- (a) Example: Bank account.
- (b) Keep track principal and interest rate.
- (c) Method to get the principal
- (d) Method DEPOSIT - deposit money (check anything?)
- (e) Method WITHDRAW - take out money (can't go below zero: what do if larger?)
- (f) Maybe add:
 - i. Method SimpleIncrease for some number of years - Increases principal by simple interest rate increase for those number of years
 - ii. Method CompoundIncrease for some number of years - Do with yearly compounding

4. Python versus C++ Classes

- (a) Usual Differences still apply:
 - i. Bodies: Python Indentation versus C++ Braces.
 - ii. Static versus dynamic typing
- (b) Python: Everything public
- (c) C++: Options of public, protected, and private. Try making the data private.
- (d) Python: "self" parameter; C++: not

(e) Contructor/initializer:

- i. Python: “init”.
- ii. C++: method with same name as class

(f) Passing an object to a function:

PROBLEM 1. *In both Python and C++ try passing an object, and changing the values to see if it persists after the function call.*

(g) Operator Overloading: Basically just different syntax

PROBLEM 2. *Overload equivalence checking:*

In Python: `__eq__` on light switch if both on or off (and ignore number of times left to switch it)

In C++: `operator==` on bank account if same principal and interest rate within 5 percent.

5. Dictionaries in Python

- (a) Another example of built-in class.
- (b) Consider dictionaries - See Topic 1 Python Programs

6. More involved Python Class

- (a) Example: Class roster
- (b) Keep track of a) name, b) neighborhood that person lives, c) commute time to college
- (c) Method to GET neighborhood, from name
- (d) Method to GET commute time, from name
- (e) Method RANGE, that finds the range of the commute time data
- (f) Use dictionary