Using Color Objects in A3

- · New classes in colormodel
- RGB, CMYK, and HSV
- · Each has its own attributes
 - RGB: red, blue, green
 - CMYK: cyan, magenta, yellow, black
 - HSV: hue, saturation, value
- Attributes have invariants
 - Limits the attribute values
 - Example: red is int in 0..255
 - Get an error if you violate
- b
- >>> import colormodel
- >>> c = colormodel.RGB(128,0,0)

RGB

128

>>> r = c.red

c id1

r 128

- >>> c.red = 500 # out of range
- AssertionError: 500 outside [0,255]

How to Do the Conversion Functions

def rgb_to_cmyk(rgb):

- """Returns: color rgb in space CMYK
- Precondition: rgb is an RGB object"""
- # DO NOT CONSTRUCT AN RGB OBJECT
- # Variable rgb already has RGB object
- # 1. Access attributes from rgb folder
- #2. Plug into formula provided
- #3. Compute the new cyan, magenta, etc. values
- # 4. Construct a new CMYK object
- # 5. Return the newly constructed object

Only time you will ever call a constructor

But you get length of

a list with a regular function, not method:

len(x)

Sequences: Lists of Values

String

• s = 'abc d'



- · Put characters in quotes
 - Use \' for quote character
- Access characters with []
 - s[0] is 'a'
 - s[6] causes an error
 - s[0:2] is 'ab' (excludes c)
 - s[2:] is 'c d'

List

• x = [5, 6, 5, 9, 15, 23]



- Put values inside []
 - Separate by commas
- Access values with []
 - x[0] is 5
 - x[6] causes an error
 - x[0:2] is [5, 6] (excludes 2nd 5)
 - **x**[3:] is [9, 15, 23]

Lists Have Methods Similar to String

x = [5, 6, 5, 9, 15, 23]

- index(value)
 - Return position of the value
 - **ERROR** if value is not there
 - x.index(9) evaluates to 3
- count(value)
 - Returns number of times value appears in list
 - **x.count(5)** evaluates to 2

Lists are Mutable

- · Can alter their contents
 - Use an assignment:<var>[<index>] = <value>Index is position, not slice
- Does not work for strings
 - s = 'Hello World!'
 - s[0] = 'J' **ERROR**
- Represent list as a folder
 - Variable holds tab name
 - Contents are attributes
- $\mathbf{x} = [5, 7, 4, -2]$ 0 1 2 3

 5 **X** 4 -2
- x[1] = 8
 - id1 x[0] 5 x id1 x[1] 7

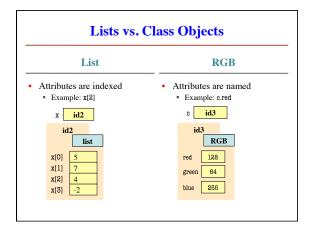
x[2] x[3]

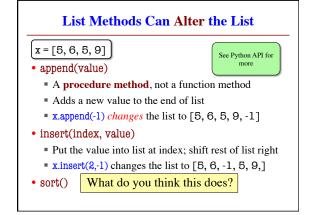
W/I /I I / I I

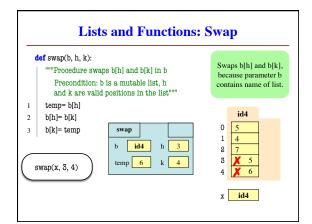
- When the value **contains** other values
 - This is what we are calling 'objects'
- When the value is mutable

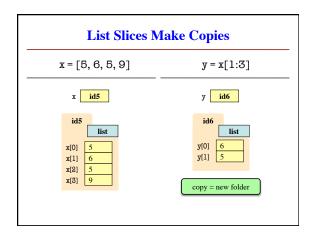
| Type | Container? | Mutable? |
|-------|------------|----------|
| int | No | No |
| float | No | No |
| str | Yes* | No |
| Point | Yes | Yes |
| RGB | Yes | Yes |
| list | Yes | Yes |

When Do We Need to Draw a Folder?









Exercise Time • Execute the following: >>> x = [8, 6, 5, 9, 10]>>> x = [5, 6, 5, 9, 10]>>> x = [5, 6, 5, 9, 10]>>> y = x[1:]>>> y = x[1:]>> y =

Lists and Expressions • List brackets [] can • Execute the following: contain expressions >>> a = 5 >>> b = 7 This is a list expression >>> x = [a, b, a+b]Python must evaluate it Evaluates each expression • What is x[2]? Puts the value in the list • Example: >>> a = [1+2,3+4,5+6]>>> a [3, 7, 11]