Algorithmic Approaches for Biological Data, Lecture #9

Katherine St. John

City University of New York
American Museum of Natural History

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Outline

- Container Data Types

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- Lists

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- *Demo*

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- There are additional container data types used in popular modules such as `numpy`.

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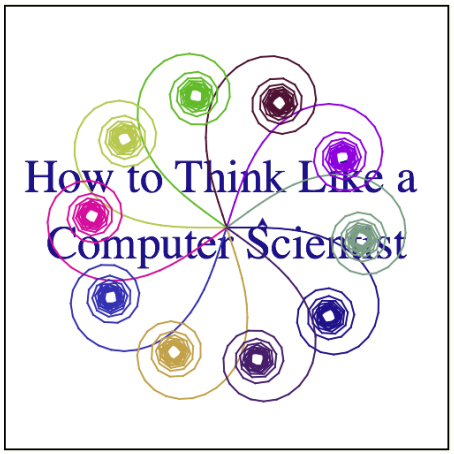
- Like strings in many ways and many built-in functions work for either.
- Note: difference between Python 2 and Python3– can't clone or test equality of elements in Python 2 (book is written for Python 3).

In Pairs

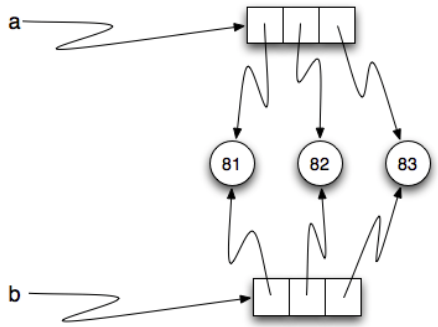


In pairs, work through:

1. *Think CS* Lists Chapter: List Length
2. *Think CS* Lists Chapter: Accessing Elements
3. *Think CS* Lists Chapter: List Membership
4. *Think CS* Lists Chapter: Concatenation and Repetition
5. *Think CS* Lists Chapter: List Slices
6. Write code that reverse a list and concatenates it to itself.

Changing Lists

- Lists are mutable.



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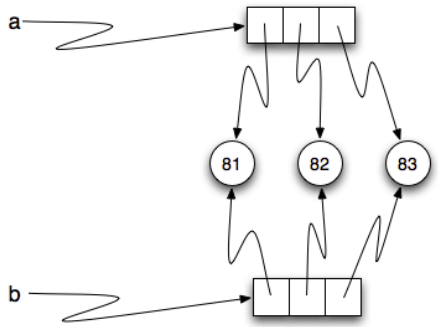

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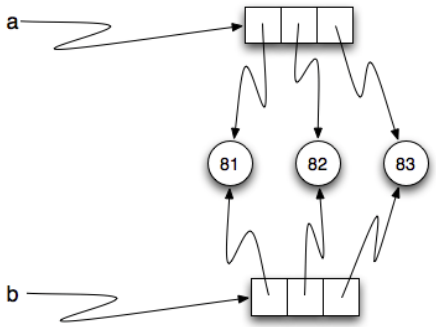

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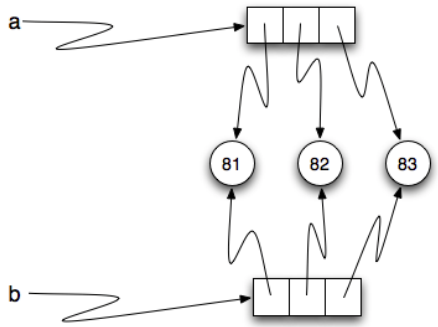

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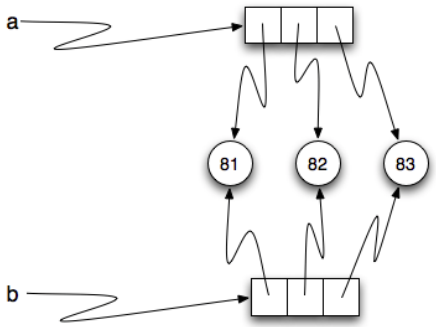

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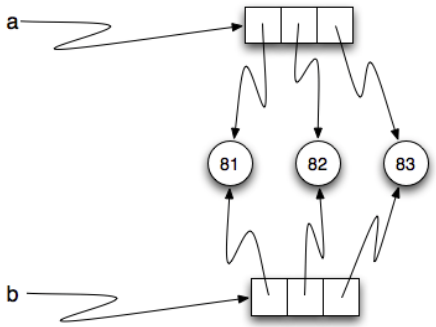

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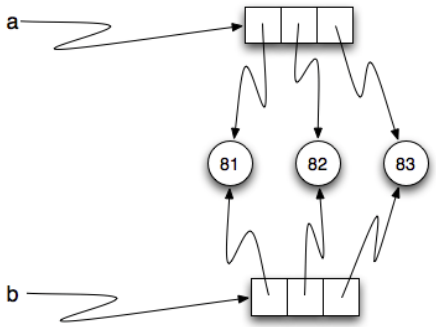

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print a is b
print a == b
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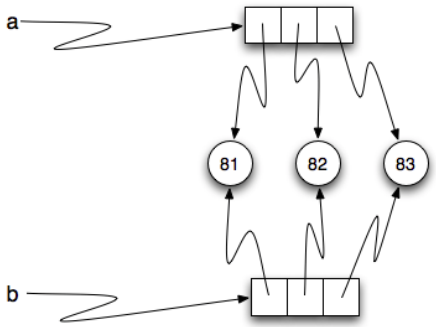

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- Different behavior in Python 3: equality will test elements and print True.

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```
squares = []
for i in range(-4,4):
    squares.append(i**2)
print squares
```

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	Running Sums:	Running Products:	Accumulating Strings:	Accumulating Lists:
Initialization:	s = 0	p = 1	s = ""	s = []
Update Action:	for ... s=s+newValue	for ... p=p*newValue	for ... s=s+newValue	for ... s.append(newValue)

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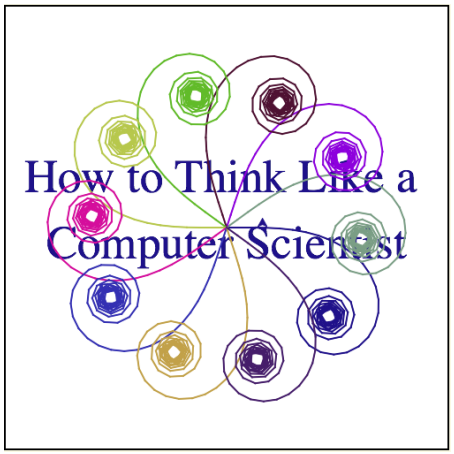

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2. *Think CS* Lists Chapter: List Deletion
3. *Think CS* Lists Chapter: Repetition & References
4. *Think CS* Lists Chapter: Lists & `for`-loops
5. Create a list that contains the first 10 cubes.

Break

Asia Collections, AMNH

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alist = [ [4, [True, False], 6, 8], [888, 999] ]
if alist[0][1][0]:
   print(alist[1][0])
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In Pairs

In pairs, work through:

1. What does the following print:

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a = []
for i in range(5):
    b = []
    for j in range(5):
        b.append(i+j)
    a.append(b)
print a
print a[1][2]
```

2. What does the following print:

```
c = [k-5 for k in range(5,0,-1)]
print c
```

3. What does the following print:

```
m = sum([x for x in range(11)])/10.0
s = sum([x-m for x in range(11)])/10.0
print m,s
```

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