Whiteboard

Wednesday, April 8, 2020

Swap:

EX Suppose we have a list

$L = [0, 4, -3, 10]$

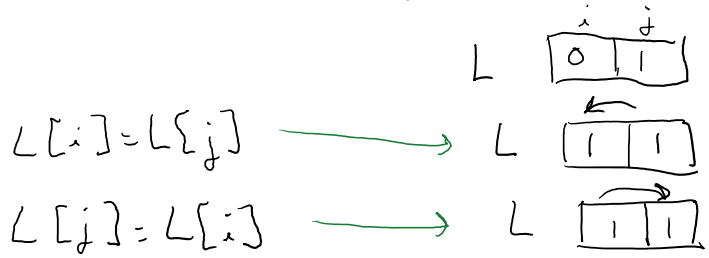
swap(0, 2, L) should swap the 0th & 2nd elements of L:

$L = [-3, 4, 0, 10]$

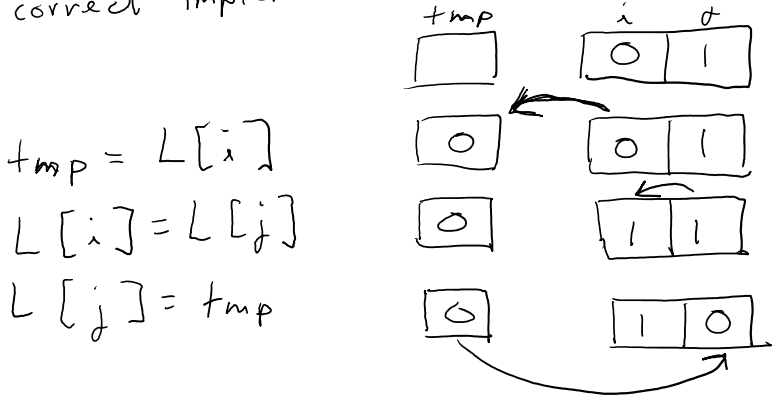
An incorrect implementation:

```
def swap(i, j, L):
    L[i] = L[j]
    L[j] = L[i]
```

Suppose $L = [0, 1]$, what happens if we call swap(0, 1, L):



A correct implementation (use an extra variable)



Bubble sort

Idea: Compare pairs & swap if they are out of order

EX 10 4 3 ϕ

Iteration #1: (10) (4) 3 ϕ

4 (10) (3) ϕ

4 3 (10) (ϕ)

(4) (3) ϕ 10 ← notice largest element is at the end!

Iteration #2: 3 (4) (ϕ) 10

(3) (ϕ) 4 10

Iteration #3: ϕ (3) (4) 10

ϕ 3 (4) (10) done!

```
def bubblesort(L):
    for i in range(len(L)):
        for j in range(1, len(L)):
            if L[j-1] > L[j]:
                swap(j-1, j, L)
```

← We can improve performance by not going through the whole list each iteration (bc fact that largest value will be at the end of the sublist)