CS21: INTRODUCTION TO COMPUTER SCIENCE

Prof. Mathieson

Fall 2018

Swarthmore College

Outline Oct 3:

Right now: sit at a new computer!

- Recap lists
- Functions that modify (mutate) lists
- Swapping values
- Stack diagrams with lists (+ Handout 2)

Notes

- **Quiz 2** on **Friday**
- **Ninja session TONIGHT** in this room! 7-10pm
- Go through **Quiz 2 study guide** on paper
- **Lab 4** due **Saturday** night
- Office Hours **3-5pm Friday** (or by appointment)

Quiz practice example of making a table for things that change throughout the loop

i	lst[i]
0	3
1	4
2	5

lst = [3, 4, 5]

0 1 2

```
for i in range(len(lst)):
    print(i, lst[i])
```

Recap Lists

Mini-quiz (discuss with a partner)

Which are valid ways of creating test_lst with 5 user-entered numbers?

A)
```
test_lst = []
for i in range(5):
    num = int(input("Enter a number: "))
    test_lst = test_lst.append(num)
```

B)
```
test_lst = []
for i in range(5):
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```

C)
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test_lst = []
for i in range(5):
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D)
```
test_lst = []
for i in range(5):
    num = int(input("Enter a number: "))
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E)
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test_lst = []
for i in range(5):
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F)
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YES. This is a classic accumulator, but is not very efficient for lists.

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YES. This is the best way! Uses list mutability to add an element to test_lst.

Lists as a mutable data structure

- Lists are an essential data structure, can contain basically anything (even other lists!)
- Lists are mutable (we can change their data)

```
lst1 = [5, 3, 1]
lst1[0] = 10
lst1
[10, 3, 1]
```

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lst1.append(7)
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```

- We can add elements to a list

```
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lst1
[10, 3, 1, 7]
```
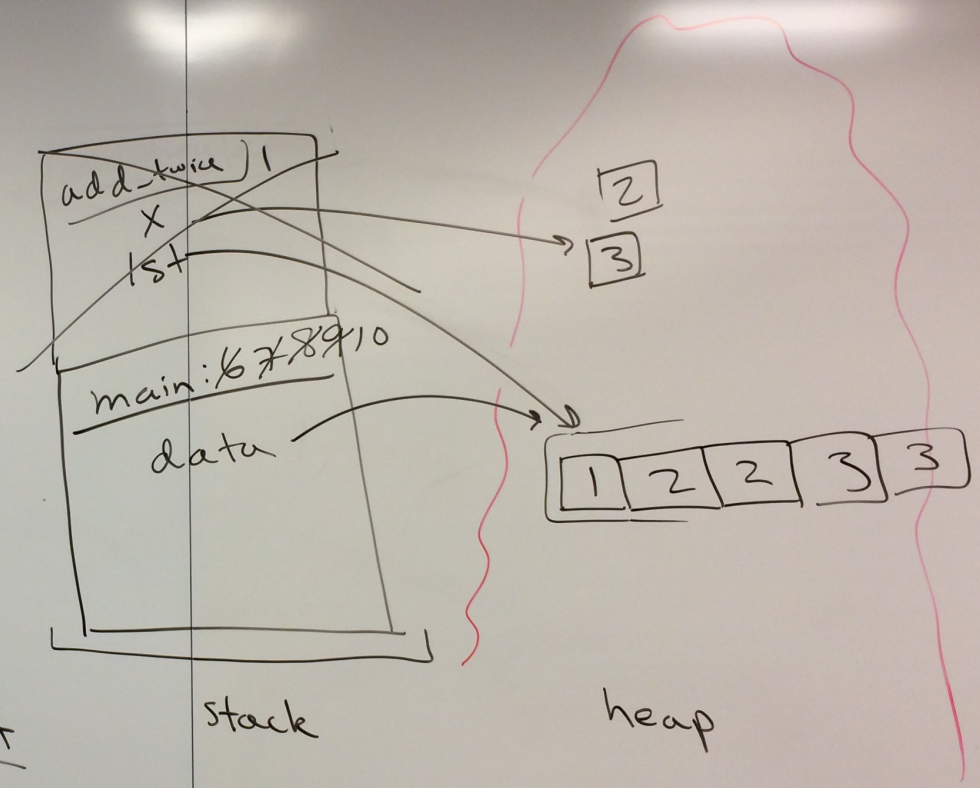

- Concatenating lists

```
lst2 = [20, 25]
lst1 + lst2
[10, 3, 1, 7, 20, 25]
```

Stack Diagrams

```
1  def add_twice(x, lst):
2      lst.append(x)
3      lst.append(x)
4
5  def main():
6      data = [1]
7      add_twice(2, data)
8      print(data)
9      add_twice(3, data)
10     print(data)
11
12 main()
```



Output

[1, 2, 2]

[1, 2, 2, 3, 3]

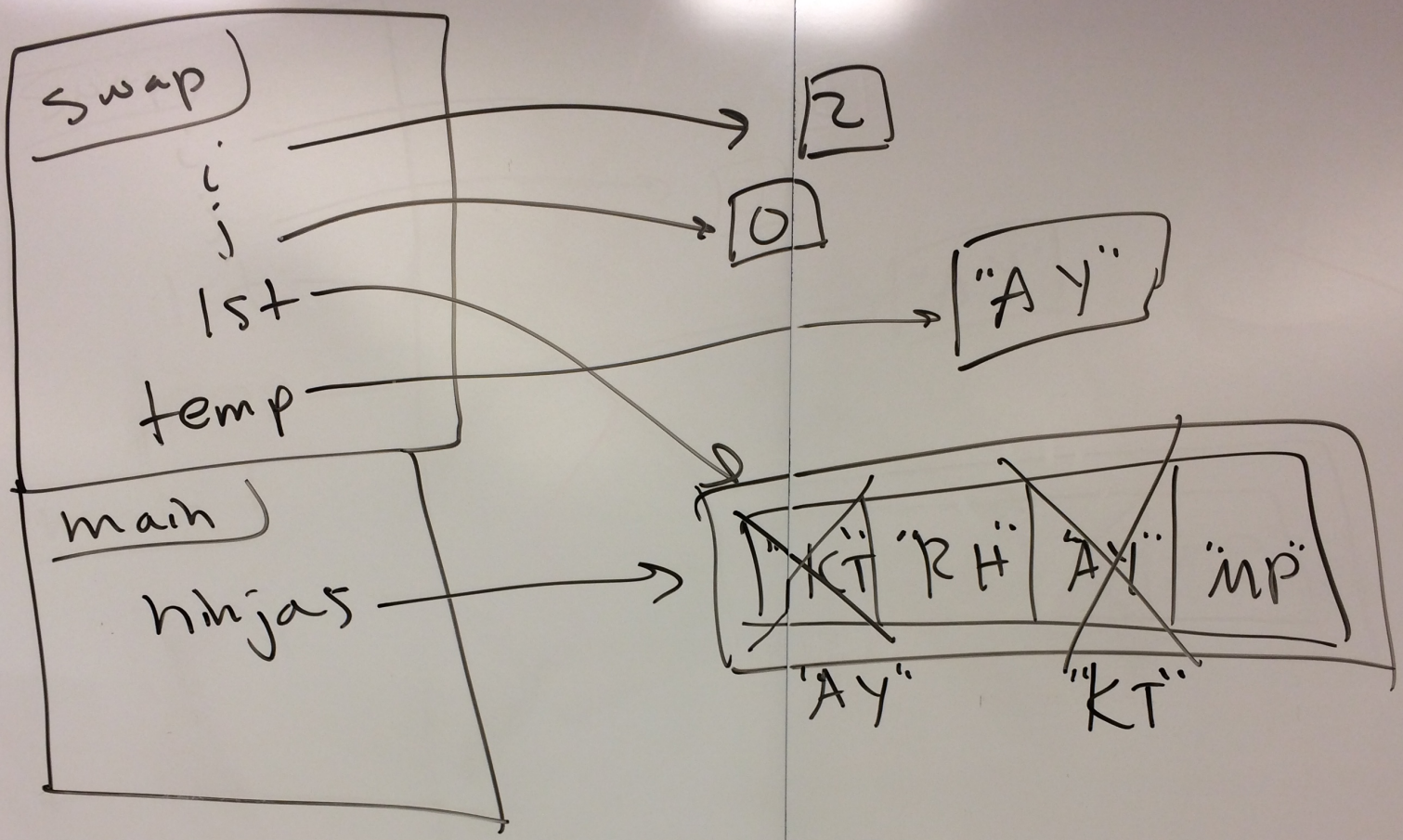
See slides posted on the website

- **A Better/Longer Stack Diagram Example**

https://www.cs.swarthmore.edu/courses/CS21Labs/f18/docs/cs21-stack-frame-tutorial.pdf

Swapping! (find and work with a partner)

- **1) Write and test the function swap in inclass/w05/shuffle_list.py**
- **2) Ask me or a ninja for Handout 2 and draw the stack for swap**
- **3) Then write and test the shuffle function**



Handout 2 solution

Output

["AY", "RH", "KT", "MP"]