

Little Alchemy!



15-112
Lecture 2

Week 8 Tue
Set, Dictionaries,
Efficiency

Instructor: Pat Virtue

Discussion

Good Will Hunting

<https://www.youtube.com/watch?v=e1DnltskkWk>

Discussion

Why is being here at CMU better than a library card (or set of online courses)?



Course Feedback

Thank you!

Feedback on Feedback

Recitation

Timing

- Homework window
- Context switching
- Number of deadlines

Pace/difficulty

Announcements

Schedule

Pre-reading checkpoints

- Due on Mondays, 8 pm

Tartan Community Day

- Friday holiday
- No 112 OH or Friday sections
- HW8 due ~~Saturday~~, 8 pm

Final Exam

Optional

- Decide after midterm 2 and TP are graded
- If opting out, midterm average will replace final



Sunday

Debate

Which are better sets or lists?

Lists vs Sets

data[i]
for x in data

len(data)
if x in data

Store

Property

Indexing

Iterate over

Mutable

Mutable elements

Get length

Check contents

~~Sort different types~~

~~Sort repeated elements~~

Stored in order added

Lists

✓

✓

✓

✓

✓

✓

✓

✓

Sets

X

✓

✓

X ←

✓!!!

✓

X

X

“I feel the need, the need for speed”

-- Top Gun



Poll 1

Which of these needs to visit all N elements in the list `data`, assuming $N = \text{len}(\text{data})$?

Select ALL that apply.

✓ A. `for x in data:`
 `print(x)`

✓ B. `for i in range(len(data)):`
 `print(x)` ← $x = \text{data}[i]$

C. `if x in data:`
 `print("Found it")`

✗ D. `x = data[i]` $\text{data}[-1]$

✓ E. `x = max(data)`

F. None of the above

Poll 2

Which of these needs to visit all N elements in the **set** data, assuming $N = \text{len}(\text{data})$?

Select ALL that apply.

✓ A. for x in data:
 print(x)

~~B. for i in range(len(data)):
 ~~print(x)~~~~

← $x = \text{data}[i]$

✗ C. if x in data:
 print("Found it")

~~D. x = data[i]~~

✓ E. x = max(data)

F. None of the above

Discussion

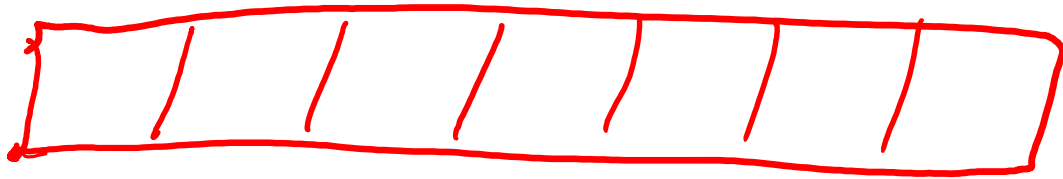
Brainstorm: How can I make finding a specific student's exam more efficient?

Set lookup is *way* faster

How do sets work?

Hashtables

buckets



$\text{len}(\text{buckets})$

$x \rightarrow \text{hash}(x) \rightarrow \text{hash}(x) \% \downarrow$

Dictionaries

Dictionaries

Map keys to values

Keys are stored like sets

Efficiency

$$O(1)$$

$$O(N)$$