CS21: INTRODUCTION TO COMPUTER SCIENCE

Prof. Mathieson

Fall 2018

Swarthmore College

Outline Nov 7:

- Mid-semester feedback
- Recap linear search
- Binary search

Notes

•Ninja session **Tonight 7-10pm**
•Office hours **Friday 3-5pm**

Mid-semester feedback

Understand well (Section 2)

• Graphics	**11**
• Lists	7
• Stacks	4
• Functions	5
• TDD	2
• Nested loops	6

More work (Section 2)

• Nested loops & LOLs	6
• TDD	**12**
• Boolean flags	1
• Files	3
• Animation	1
• Stacks	2
• Graphics	4
• Functions	1

Understand well (Section 3)

• Graphics	6
• Lists	4
• Stacks	4
• Functions	4
• TDD	5
• Loops	**8**

More work (Section 3)

• Nested loops & LOLs	6
• TDD	8
• Boolean flags	1
• Files	5
• Animation	2
• Stacks	4
• Graphics	**10**
• Functions	2

In-class options (Section 2)

	LESS	MORE
Slides	0	5
Board	1	13
Handouts	5	8
Coding: group	4	**15**
Coding: self	3	10
Coding: partner	1	11

In-class options (Section 3)

	LESS	MORE
Slides	4	7
Board	3	10
Handouts	3	12
Coding: group	5	11
Coding: self	4	16
Coding: partner	1	**18**

What is helping your learning?

- Lab
- Coding in class
- Ninja sessions
- Office hours
- Practice
- Discussing material with others

Other feedback

- Other office hour times: Thurs afternoon and after 5pm
- Expectations for work outside class?
- Book is not very helpful for some topics
- Why do we learn stacks?
- Run out of time in class

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50 min it too short! We will get through as much as we can (review outside class).

Lab extensions

Lab 4 extensions (implemented blackjack)

Section 2

- Ella
- Julian
- Juan
- Karin
- Larkin
- Mirabai
- Angelina
- Rachel
- Robert
- Sam
- Tiffany

Section 3

- Carina
- Jason
- Egor
- Ellie
- Gene
- Ilana
- Francesco
- Sarah
- Tyler
- Maggie

Binary Search

of questions:

4

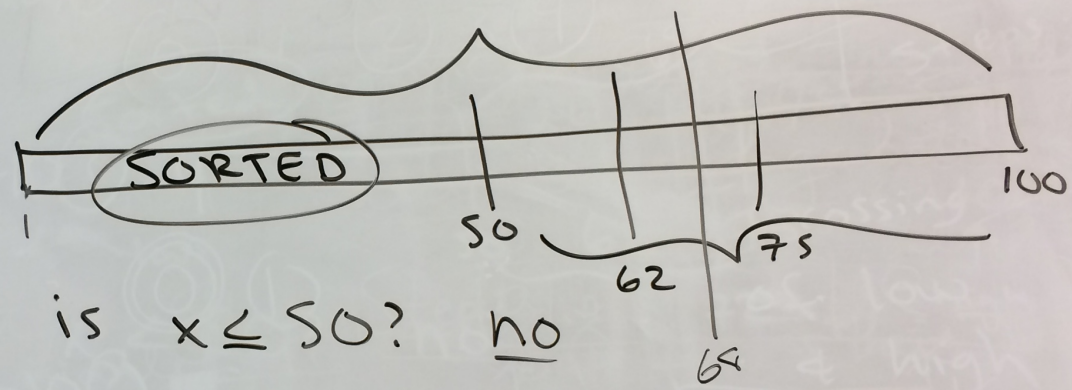
Linear search

# of questions

68

"Guess my number"

- thinking of a number between 1-100: x
- only ask me Q's of the form: "is x<y?"



1. is $x \leq 50$? no
2. is $x \leq 75$? yes
3. is $x \leq 62$? no
4. is $x \leq 68$? yes & it's equal

$\boxed{x = 68}$

Algorithm (binary search)

input: query (q), data (lst)

output: index of q in lst.
(-1 if q not found)

low = 0 ← index of first element.
high = index of last element

loop: ← break out of loop:

if q is equal to middle element:
done! return middle $\boxed{\text{index}}$

if q < middle element:
move high down

if q > middle element:
move low up

$\boxed{\text{que}}$
$\boxed{\text{ret}}$
$\boxed{\text{return -1}}$

Sorted list

18 == 8? 18 == 20?

[1, 2, 3, 3, 7, 8, 10, 18, 20, 21, 25]

0 1 2 3 4 5 6 7 8 9 10

6 7 8 9 10

6 7

7

query=18

return: 7

urn -1

steps = # of rows in table

→ 4 steps

low	mid	high	
0	5	10	$\frac{0+10}{2}$
mid+1 → 6	8	10	$\frac{6+10}{2}$
6	6	7	$\frac{6+7}{2}$ → 6.5 → 6
7	7 ☆	7	

x = 99

return 10

steps 3

x = -10

L = [-20, -12, -4, 1, 7, 44, 45, 46, 58, 67, 99, 145]

0 1 2 3 4 5 6 7 8 9 10 11

q: -10 ? 44

0 1 2 3 4

q: -10 ? -4

0 1

q: -10 ? -20

1

q: -10 ? -12

return: -1

steps: 5

Crossing of low & high

→ STOP

not found.

low	mid	high	
0	5	11	
0	2	4	← mid-1
0	0	1	← mid-1
mid+1 → 1	1	1	
2		1	