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)

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In-class options (Section 3)

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</table>
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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• Run out of time in class
  50 min it too short! We will get through as much as we can (review outside class).
Lab extensions
Lab 4 extensions (implemented blackjack)

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

Section 2

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

Section 3
Binary Search
"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 ≤ 50? No
2. is x ≤ 75? Yes
3. is x ≤ 62? No
4. is x ≤ 68? Yes

x = 68

SORTED

100 100 75 62 50
Algorithm (binary search) (1st)

input: query (q), data (1st)
output: index of q in 1st
       (-1 if q not found)

low = 0 <= index of first element
high = index of last element

loop:
    if q is equal to middle element:
        done! return middle index
    if q < middle element:
        move high down
    if q > middle element:
        move low up

break out of loop:

return -1
Sorted

\[1, 2, 3, 3, 7, 8, 10, 18, 20, 21, 25, 18 = \text{?} \]

\[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\]

query = 18

\[\text{return: 7}\]

\# steps = \# of rows in table

\[\rightarrow \text{4 steps}\]
$x = 99$

$\text{return 10}$

$\text{Steps 3}$

$L = \{-20, -12, -4, 1, 7, 44, 45, 46, 58, 67, 94, 145\}$

$\text{low mid high}$

$0 \quad 5 \quad 11$

$q_0: -10 \rightarrow 44$

$q_0: -10 \rightarrow -4$

$q_0: -10 \rightarrow -20$

$q_0: -10 \rightarrow -12$

$\text{return: -1}$

$\text{steps: 5}$

$\text{mid} \rightarrow 1 \quad 1 \quad 1$

$\text{crossing of low at high}$

$\text{STOP}$

$\text{not found.}$