

CS21: INTRODUCTION TO COMPUTER SCIENCE

Prof. Mathieson

Fall 2017

Swarthmore College

Outline Nov 8:

- Go over Quiz 3
- Binary search

Notes

- Office hours **Friday 3-5pm**

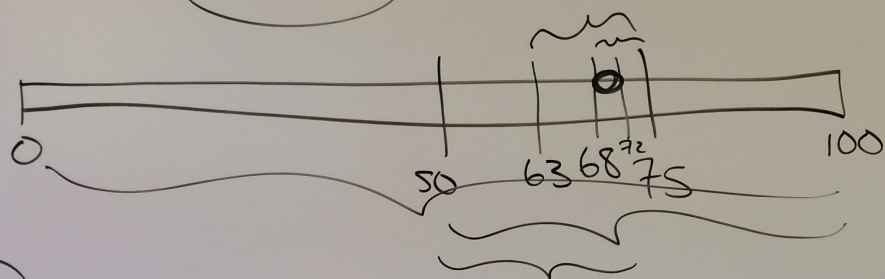
Binary Search

#Q: 6-7

Guess my number

thinking of a number between 1-100 : X
only ask Q's of the form

is $X < Y$?



① $X < 50$? no

② $X < 75$? yes

③ $X < 63$? no

④ $X < 68$? no

⑤ $X < 72$? yes

⑥ $X < 70$?

$X = 68$

Algorithm (pseudo-code)

low = 0

high = len(lst) - 1

mid =

loop (? on condition)

if ¹⁸query equal to ¹⁸middle
element \rightarrow done! return mid

if ^{to}query > ^{to}middle element

move low

if query < middle element
move high

return None if
not found.

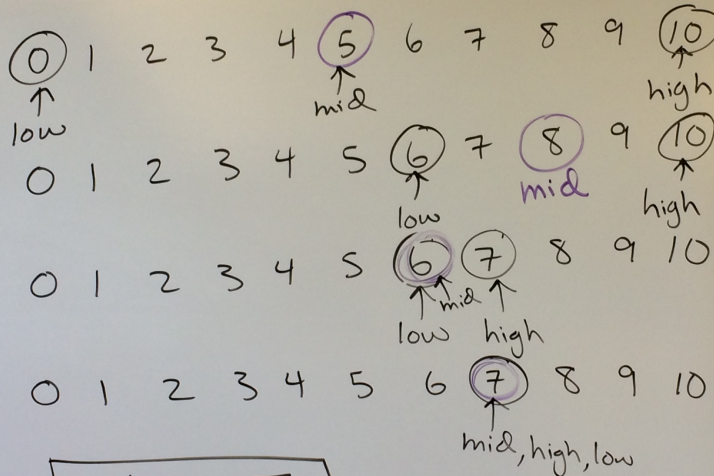
OH:
3-5 Friday

query = 18

sorted

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

indices:



low mid high

0 5 10

6 8 10

6 6 7

7 7 7

query = 3, return 2 or 3
okay.

$$\frac{0+10}{2} = 5$$

$$\frac{6+10}{2} = 8$$

$$\frac{6+7}{2} = 6.5 \rightarrow 6$$

$$\frac{7+7}{2} = 7$$