CS-21 LECTURE #2

- Use 'wc' to see # of input to # of output lines
  - Helpful for debugging

Data Structures

- A collection of data that is characterized by the operations used to access & modify data

Ex: Arrays, Dynamic arrays, vectors, Linked List, Stacks, etc...

Two sorting algorithms:

- Insertion sort
- Merge sort

key: General use etc characterstics
WILL NOT CODE THEM.

Algorithm Efficiency

Array

- Time efficiency
- Space efficiency
  - In Place: Algorithm that runs on storage of data
  - Not in place: Algorithm that doesn't run just on storage of data
    - Ex: Bubble Sort reorganizes inside 1 array
    - Ex: Merge sort creates multiple arrays to sort 1 array.

TIME EFFICIENCY

- "official mathematical way"
- In practice by every coder/computer scientist

"big-O" → O(n) ← "order"

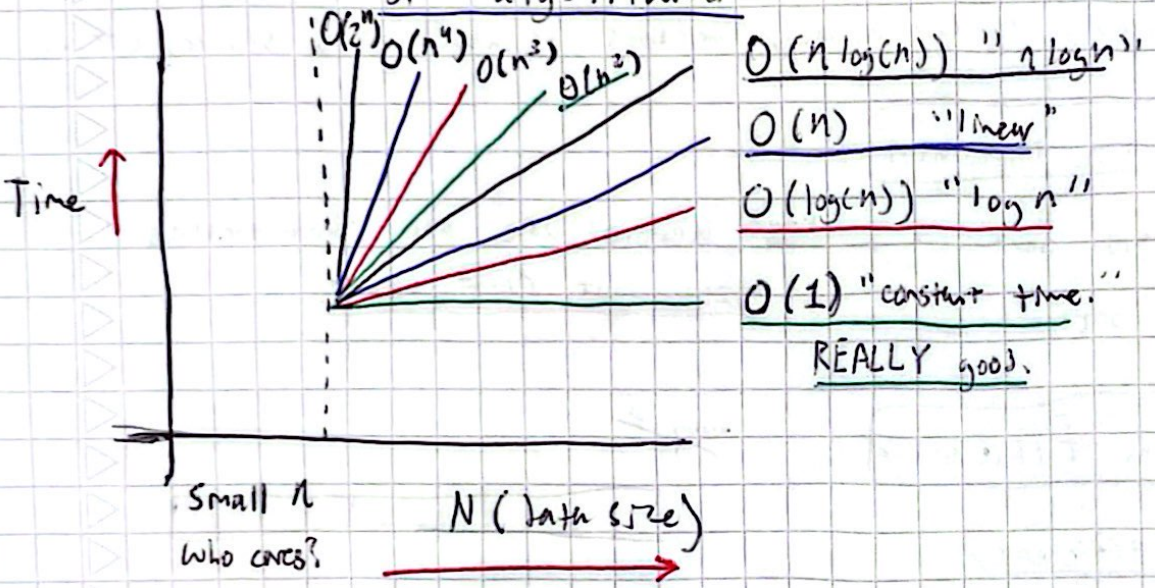
factor that relates to size or input

↑ either an "upper bound" or "tight bound"

- we will ONLY use big-O in this class

No official mathematical way!

Graph (not to scale) of common/important growth rates of algorithms.



O(n log(n)) "n log n"

O(n) "linear"

O(log(n)) "log n"

O(1) "constant time."

REALLY good.

O(n²)	O(n)	O(lg n)
Bubble Sort	find ML	binary search
Selection sort	find max	