

# CS50 for MBAs

Algorithms, Data Structures

bool

float

int

str

...

dict

list

range

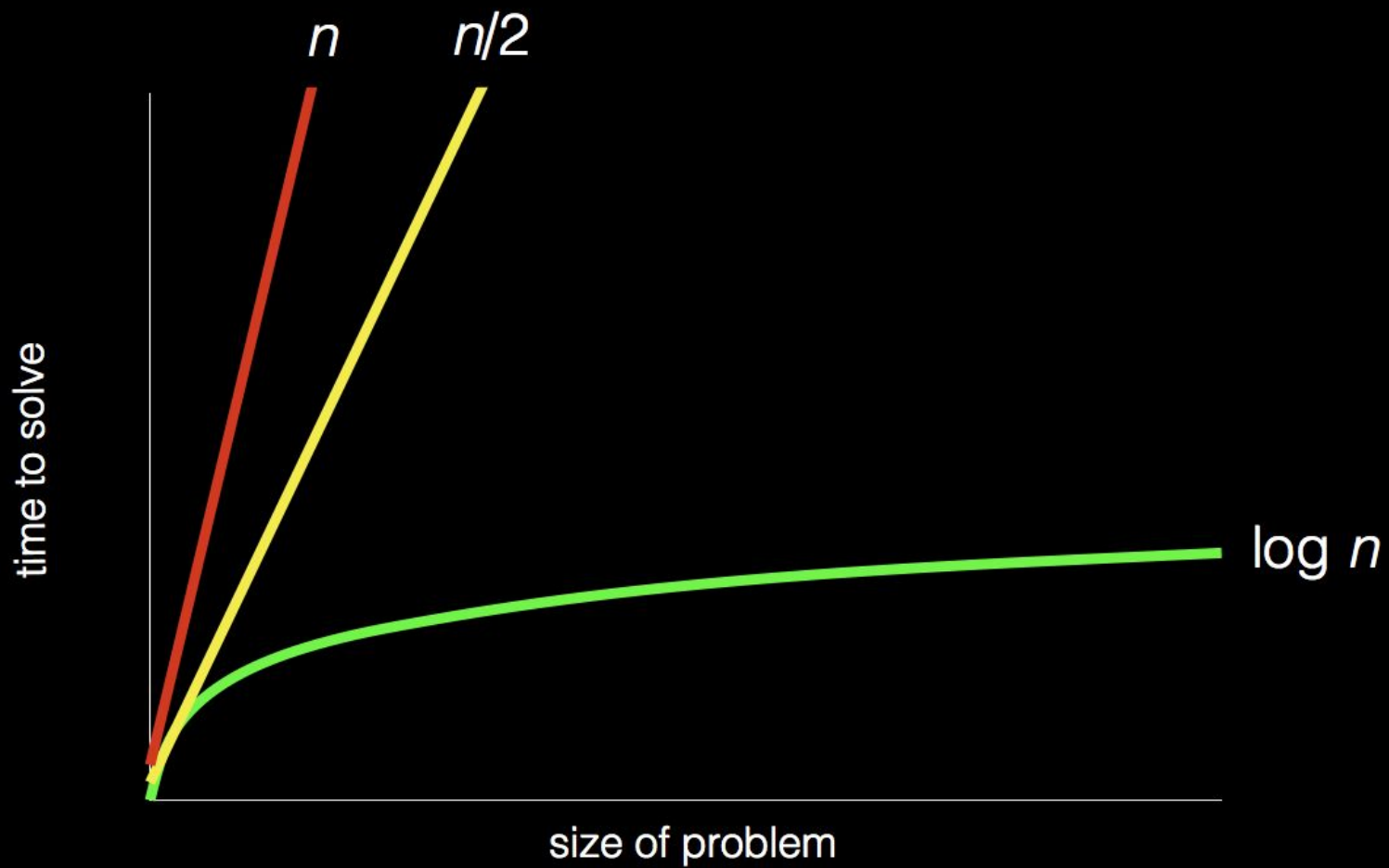
...

library

APIs

# CS50 for MBAs

Algorithms, Data Structures



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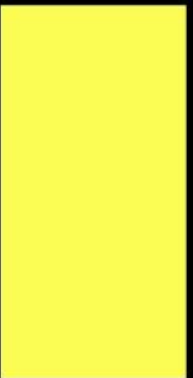
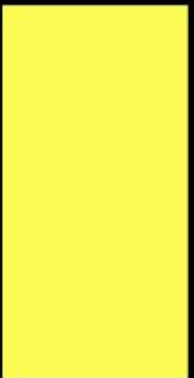
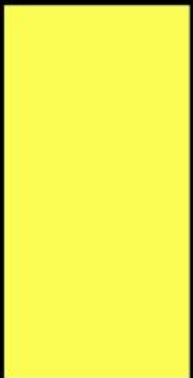
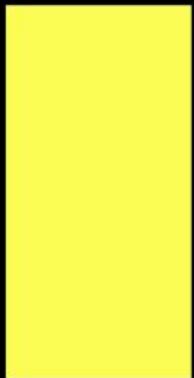


- $O(n^2)$
- $O(n \log n)$
- $O(n)$
- $O(\log n)$
- $O(1)$
- ...

$\Omega$

- $\Omega(n^2)$
- $\Omega(n \log n)$
- $\Omega(n)$
- $\Omega(\log n)$
- $\Omega(1)$
- ...





bubble sort

```
repeat until no swaps
  for i from 0 to n-2
    if i'th and i+1'th elements out of order
      swap them
```

selection sort



```
for i from 0 to n-1  
    find smallest element between i'th and n-1'th  
    swap smallest with i'th element
```



$$(n-1) + (n-2) + \dots + 1$$

$$(n - 1) + (n - 2) + \dots + 1$$

$$n(n - 1)/2$$

$$(n-1) + (n-2) + \dots + 1$$

$$n(n-1)/2$$

$$(n^2 - n)/2$$

$$(n - 1) + (n - 2) + \dots + 1$$

$$n(n - 1)/2$$

$$(n^2 - n)/2$$

$$n^2/2 - n/2$$

$$(n - 1) + (n - 2) + \dots + 1$$

$$n(n - 1)/2$$

$$(n^2 - n)/2$$

$$n^2/2 - n/2$$

$$O(n^2)$$





$$n^2/2 - n/2$$

$$n^2/2 - n/2$$

$$1,000,000^2/2 - 1,000,000/2$$

$$n^2/2 - n/2$$

$$1,000,000^2/2 - 1,000,000/2$$

$$500,000,000,000 - 500,000$$

$$n^2/2 - n/2$$

$$1,000,000^2/2 - 1,000,000/2$$

$$500,000,000,000 - 500,000$$

$$499,999,500,000$$

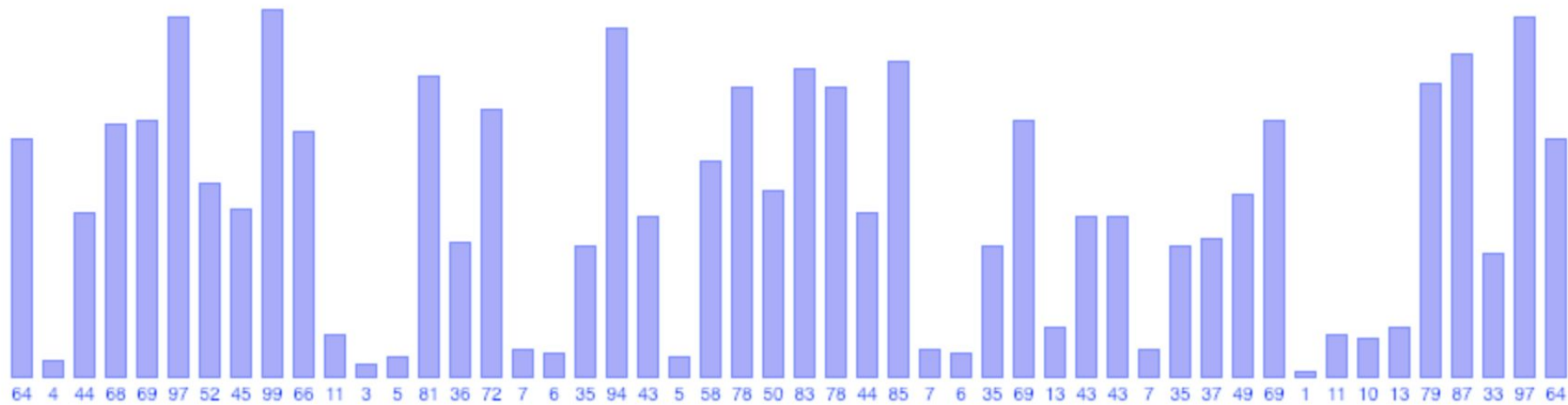
$$n^2/2 - n/2$$

$$1,000,000^2/2 - 1,000,000/2$$

$$500,000,000,000 - 500,000$$

$$499,999,500,000$$

$$O(n^2)$$















al™

4G85

9142  
N7416  
3262

8BB12  
D9HXT

4G85

8BB12  
D9HXT

4G85

dict

list

range

...

# Assignment 3