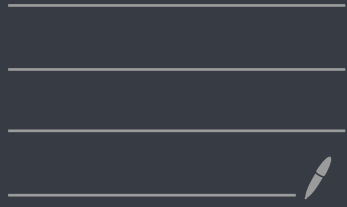
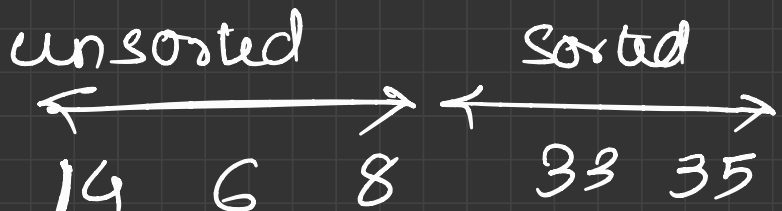
BUBBLE SORT





Biggest value should be sorted.

6 8 14 33 35

In every iteration, bubble up the max. element to its correct position

14 33 27 35 10

14 33 27 35 10

14 27 33 35 10

14 27 33 10 35

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14 27 10 33 35

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14 10 27 33 35

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10 14 27 33 35

Everytime put the biggest element in the right most side.

For first element - $(n-1)$ comparisons
&
$(n-1)$ swaps

Second element - $(n-2)$ comparisons
&
$(n-2)$ swaps

Stop : $(n-i-1)$

$$\frac{n(n-1)}{2} + \frac{n(n-1)}{2} = O(n^2)$$

No. of swaps are high in bubble sort.

Best case $\rightarrow$ $\Omega(n)$
Worst case $\rightarrow$ $O(n^2)$

* Bubble sort is stable

Q: Given an array of integers, return the kth largest element.

[4, 1, 16, 3, 2, 9] k = 2

output : 9

$n \leq 10^6$

$k \leq 10^2$

Brute force : Sort & return kth element from last.

Best soln : O(n) ⟶ quick select.

Intuition: Bubble sort in each iteration pushes the largest element at the end. Use bubble sort & decrement K (or) Do K iterations of Bubble sort.

$O(nk)$