QUICKSELECT

“Non_Recursive”

WHAT IS QUICKSELECT:

QuickSelect is a selection algorithm to find the K-th smallest element in an unsorted list.

Decrease & Conquer

“BY VARIABLE”

Partitioning

“LOMUTO”

Quickselect

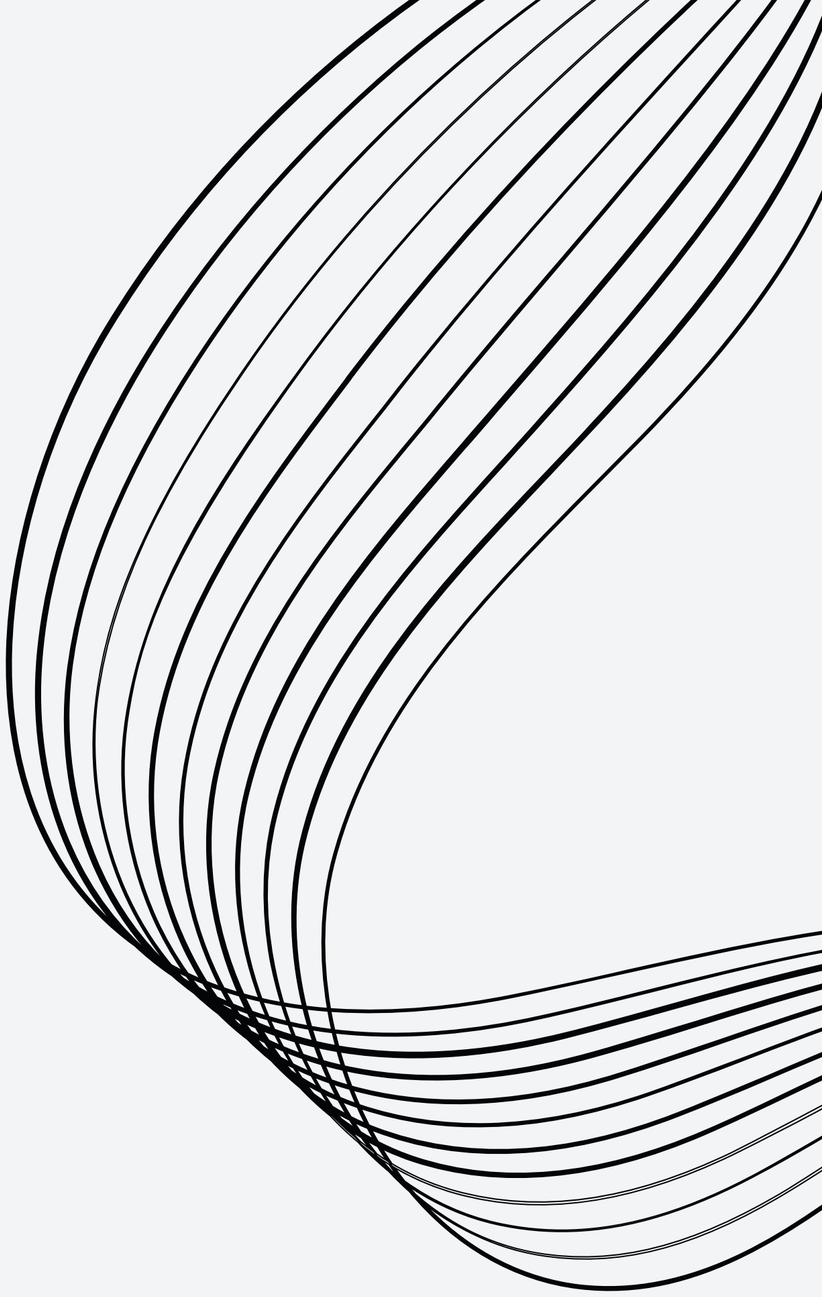
“NON_RECURSIVE CODE”

Analysis

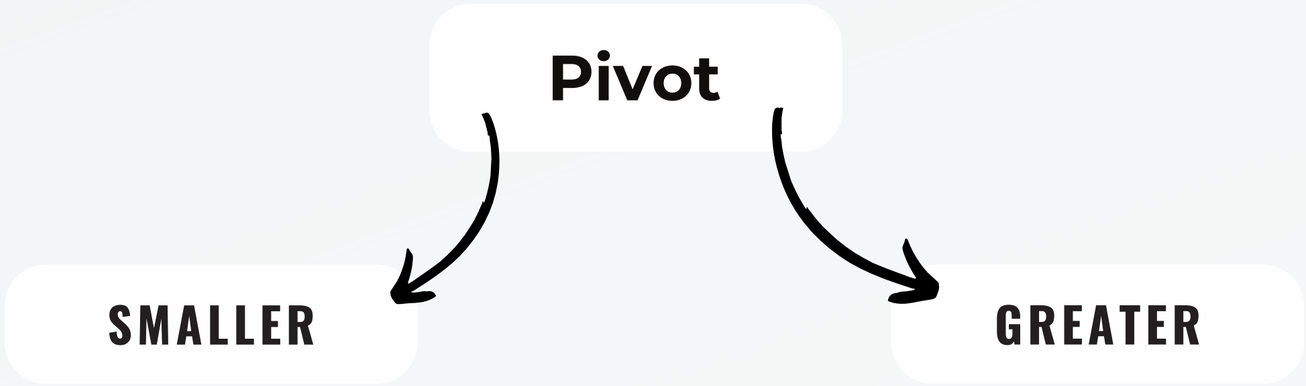
“BEST/WORST CASE”

DECREASE & CONQUER BY VARIABLE

In this variation, the size-reduction pattern varies from one iteration of an algorithm to another



PARTITIONING



a=[2,5,8,3,1,7]

Kth element : 4

Output : 5

Analysis

Base case : n

Best case : $\Theta(n)$

when QuickSelect chooses the k-th largest element as the pivot in the very first call

Analysis

Base case : n

Average case :

$$T_{avg}(n) = O(n) + O(\frac{n}{2}) + O(\frac{n}{4}) + \ldots + O(1)$$

$$T_{avg}(n) = \sum_{i=0}^{log_2 n} O(\frac{n}{2^i})$$

$$\Theta(n)$$

Analysis

Base case : n

Worst case :

$$T_n = \Theta(n) + T_{n-1}$$

$$\begin{aligned} T_n &= \Theta(n) + Theta(n-1) + \ldots + \Theta(1) \\ &= \Theta\left(n + (n-1) + \ldots + 1\right) \end{aligned}$$

$$= \Theta(n^2)$$

THANK'S FOR WATCHING