

Interview Questions

1

Kth Largest Element

$$\text{nums} = [3, 2, 1, 5, 6, 4]$$

$$k = 2$$

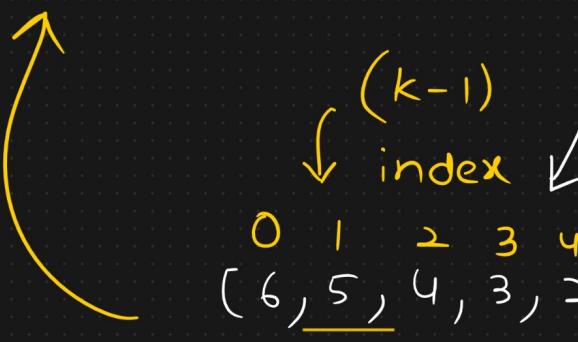
$$\text{result} = 5$$

$O(n \log n)$

MergeSort

Sort the array
(Descending Order)

Approach 1



Task 1

Implementation

Priority Queue

Approach 2

Maxheap

$O(n)$

$$\text{nums} = [3, 2, 1, 5, 6, 4]$$

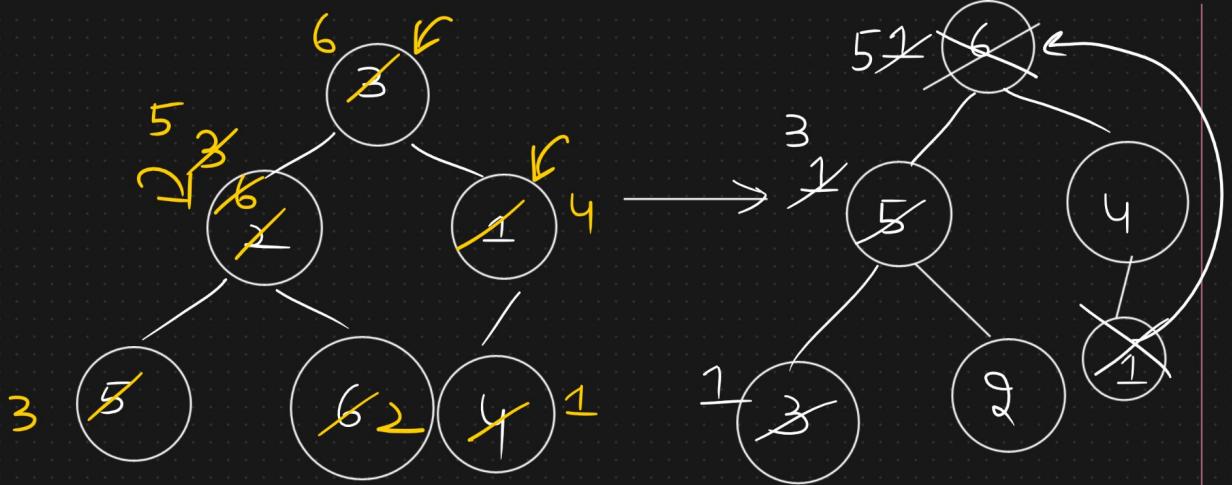
1
maxheap — creation

$O(k \log n)$

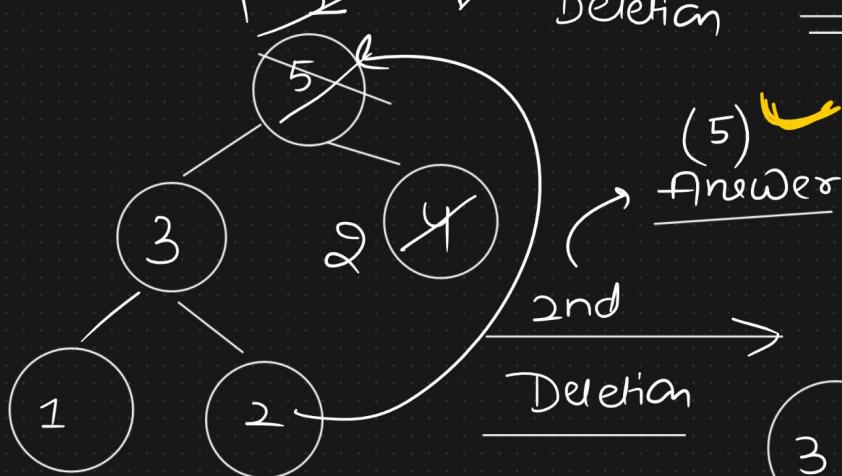
2

Delete K times from maxheap

$k \cdot \log n$



Maxheap



Implementation

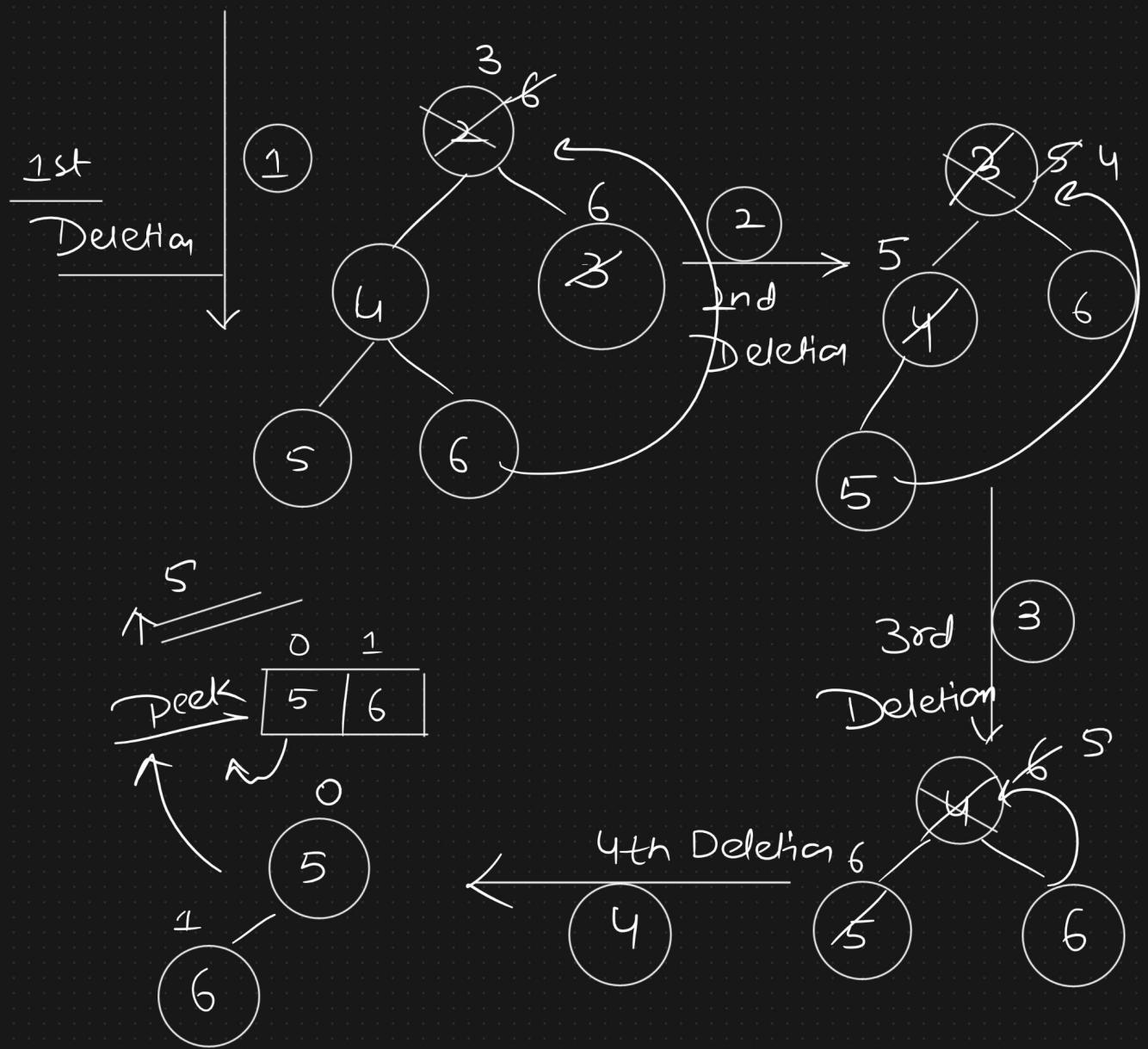
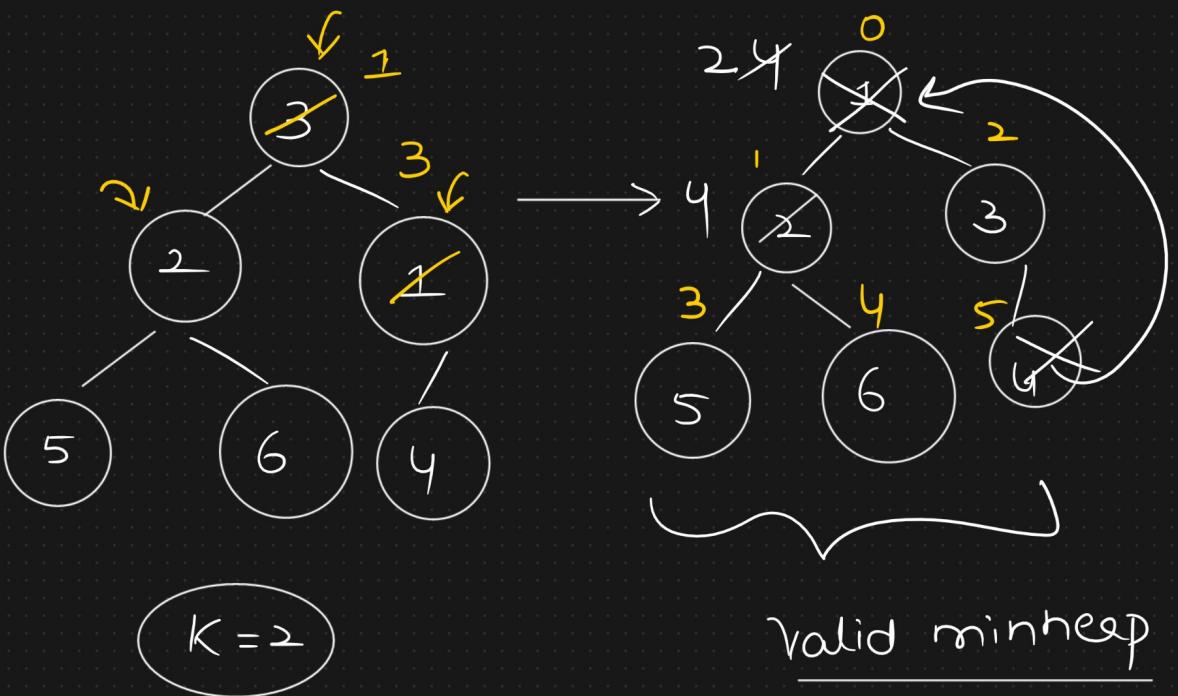
Approach 3

$$\text{nums} = [3, 2, 1, 5, 6, 4] \quad m = 6$$

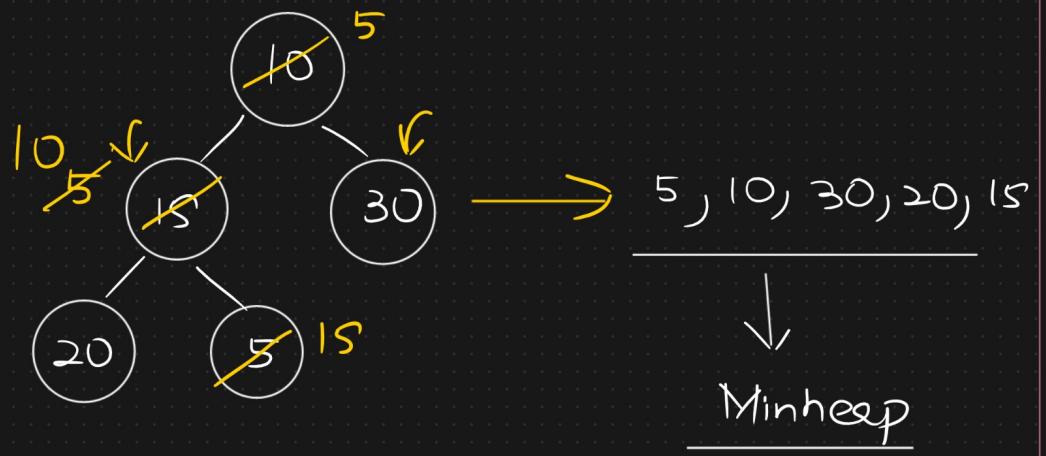
$\mathcal{O}((n-k) \log n)$

① Creation of minheap — $\mathcal{O}(n)$

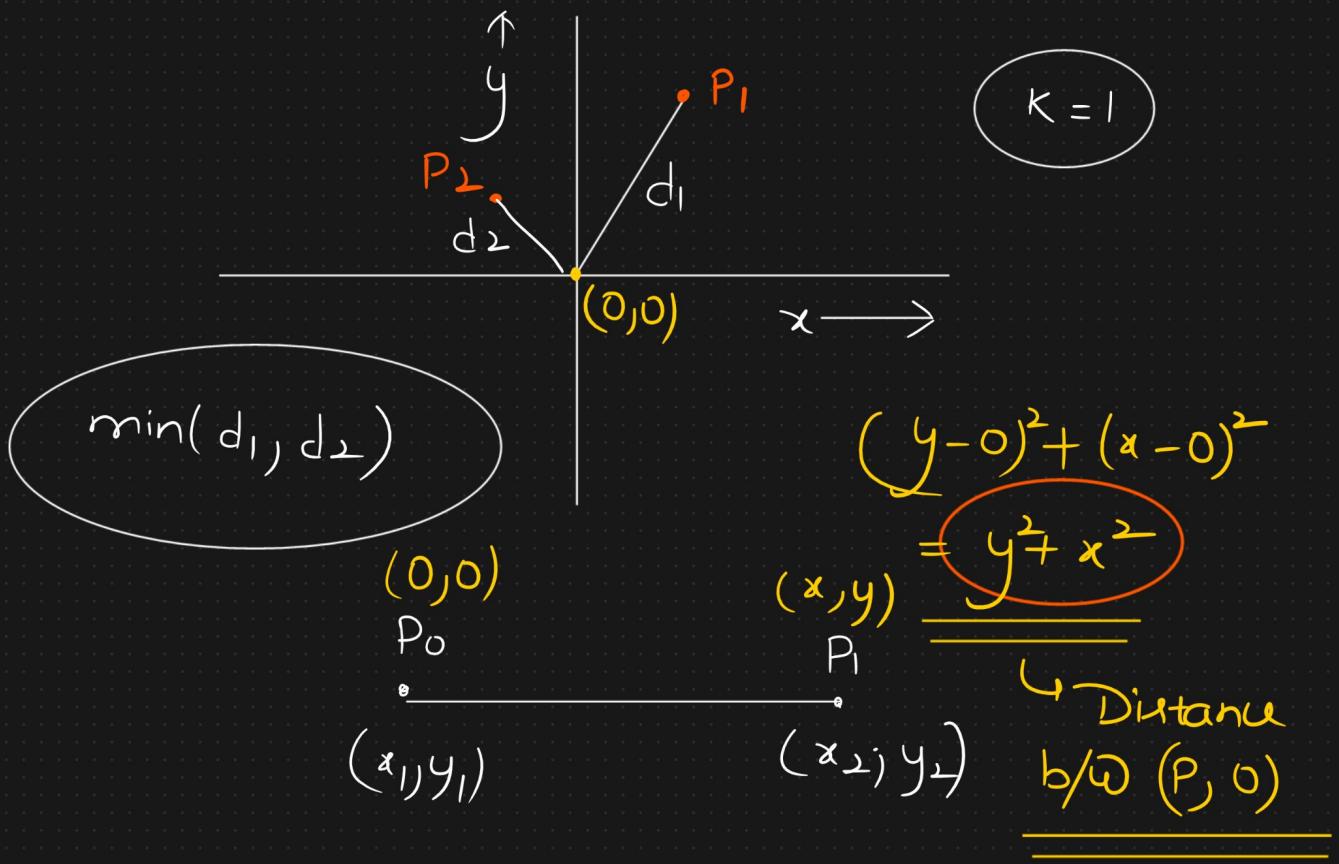
② $(m-k)$ timer deletion $\hookrightarrow (m-k) \log n$



10, 15, 30, 20, 5

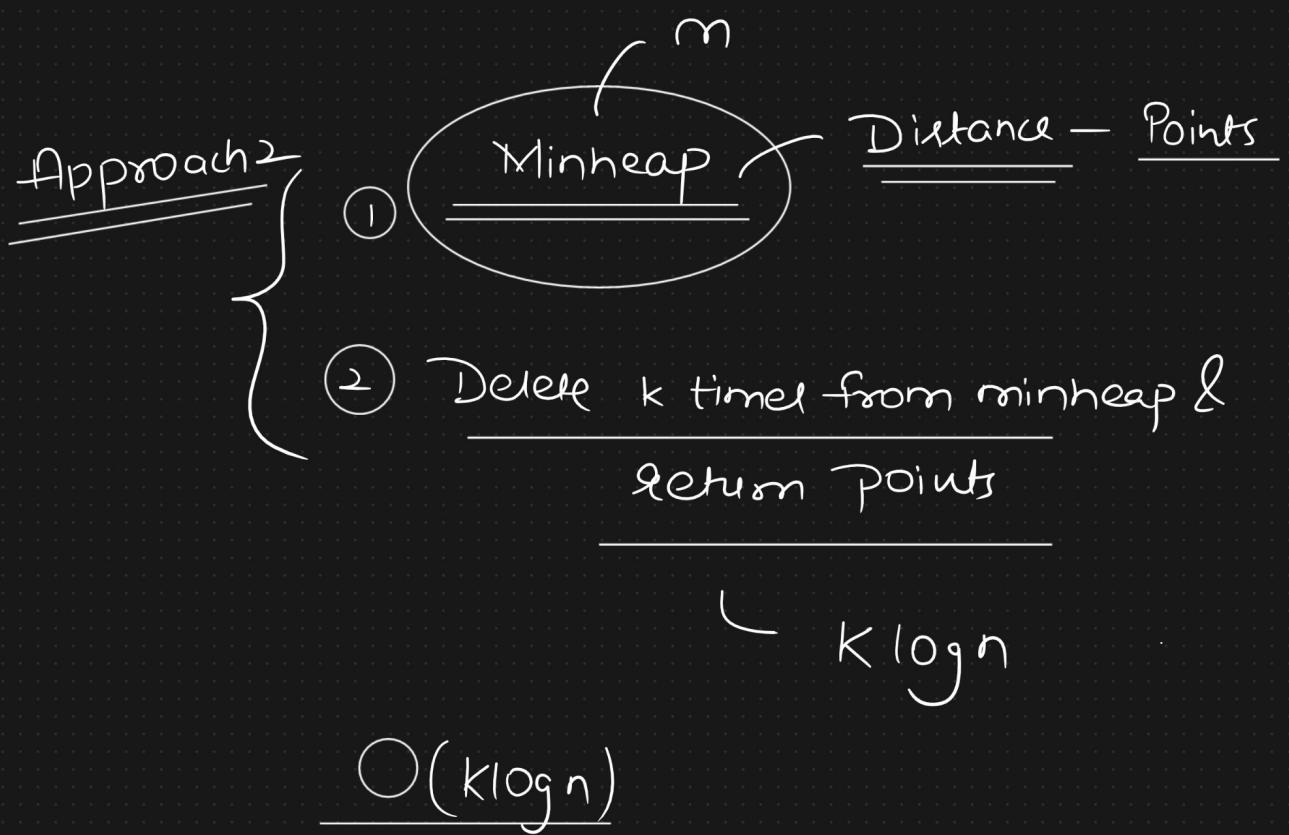
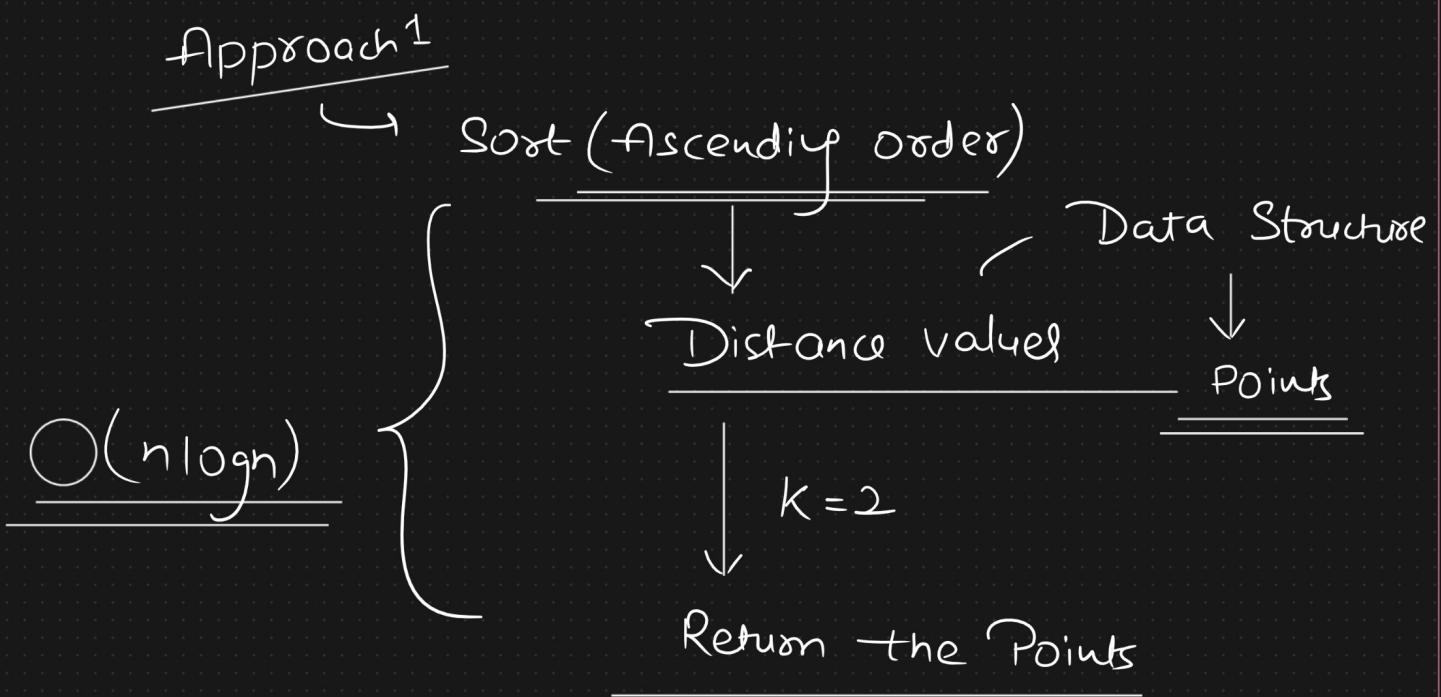
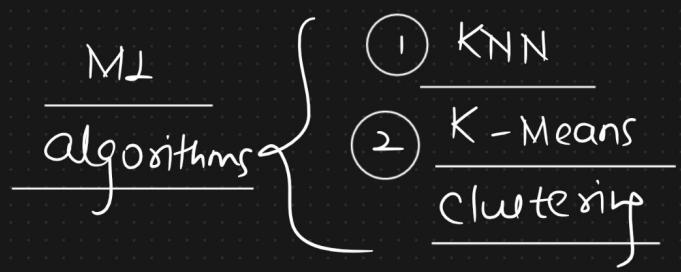


K Closest Points from Origin



Euclidean Distance formula

$$\sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$



$$\begin{bmatrix} 0 & 1 \\ 1 & 3 \end{bmatrix}, \begin{bmatrix} 0 & 1 \\ 2 & -2 \end{bmatrix}$$

$$x^2 + y^2$$

Task 2 ↴

3

Kth smallest Element

↳ Sorted Matrix

$$\begin{matrix} & 0 & 1 & 2 \\ 0 & \left[\begin{matrix} 1 & 5 & 9 \\ 10 & 11 & 13 \end{matrix} \right] \\ 1 & \\ 2 & \left[\begin{matrix} 12 & 13 & 15 \end{matrix} \right] \end{matrix}$$

$$K = 8$$

13

↑ Priority queue

① Create Minheap

{
 for (i=0 to m) {
 for (j=0 to n) {
 create minheap(a[i][j])
 }
 }

② Deletion - k times

↳ $k \log n$

$O(k \log n)$

Kth smallest/largest



Heap Data Structure

Minheap/Maxheap