

Q Top k frequent elements

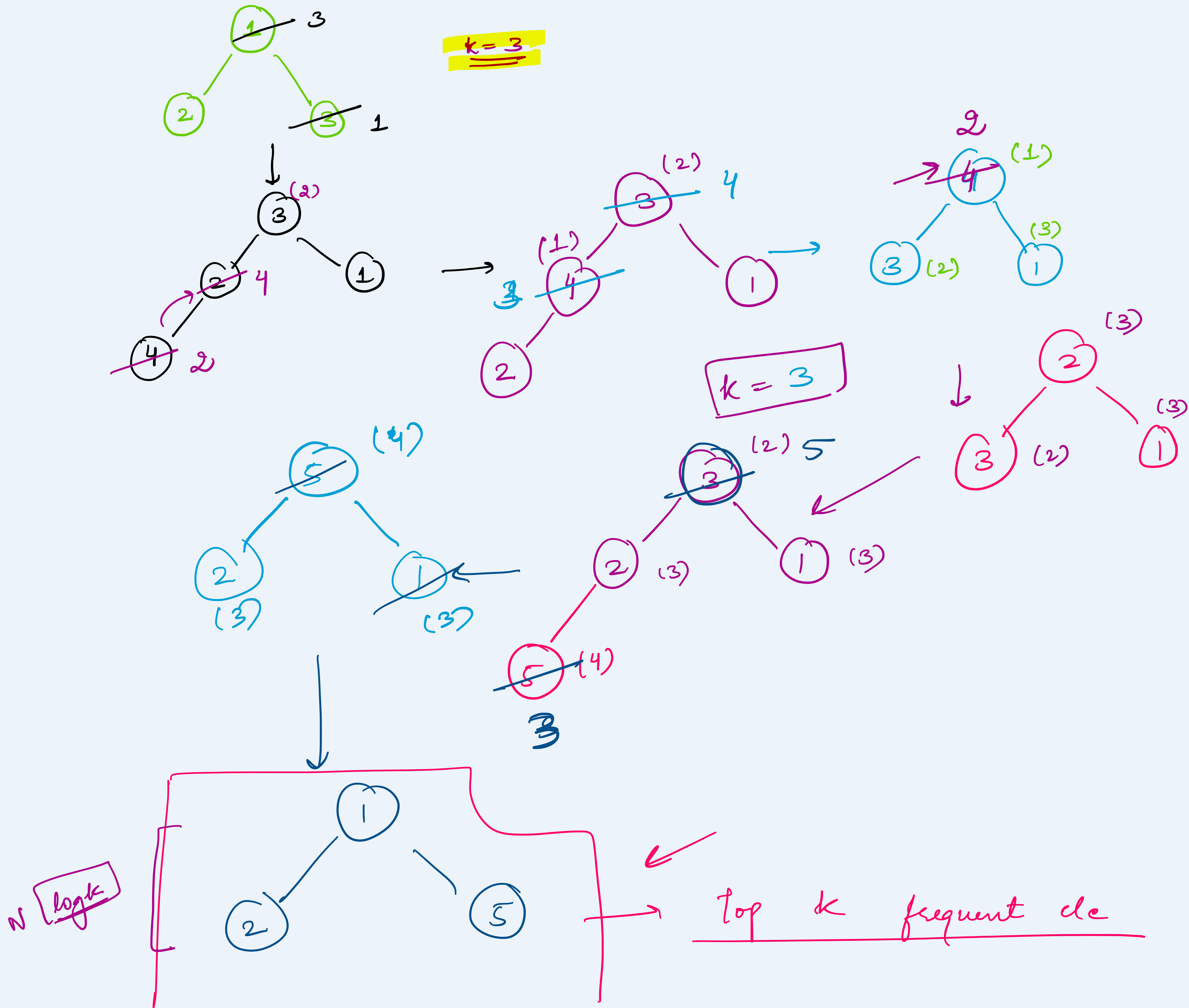
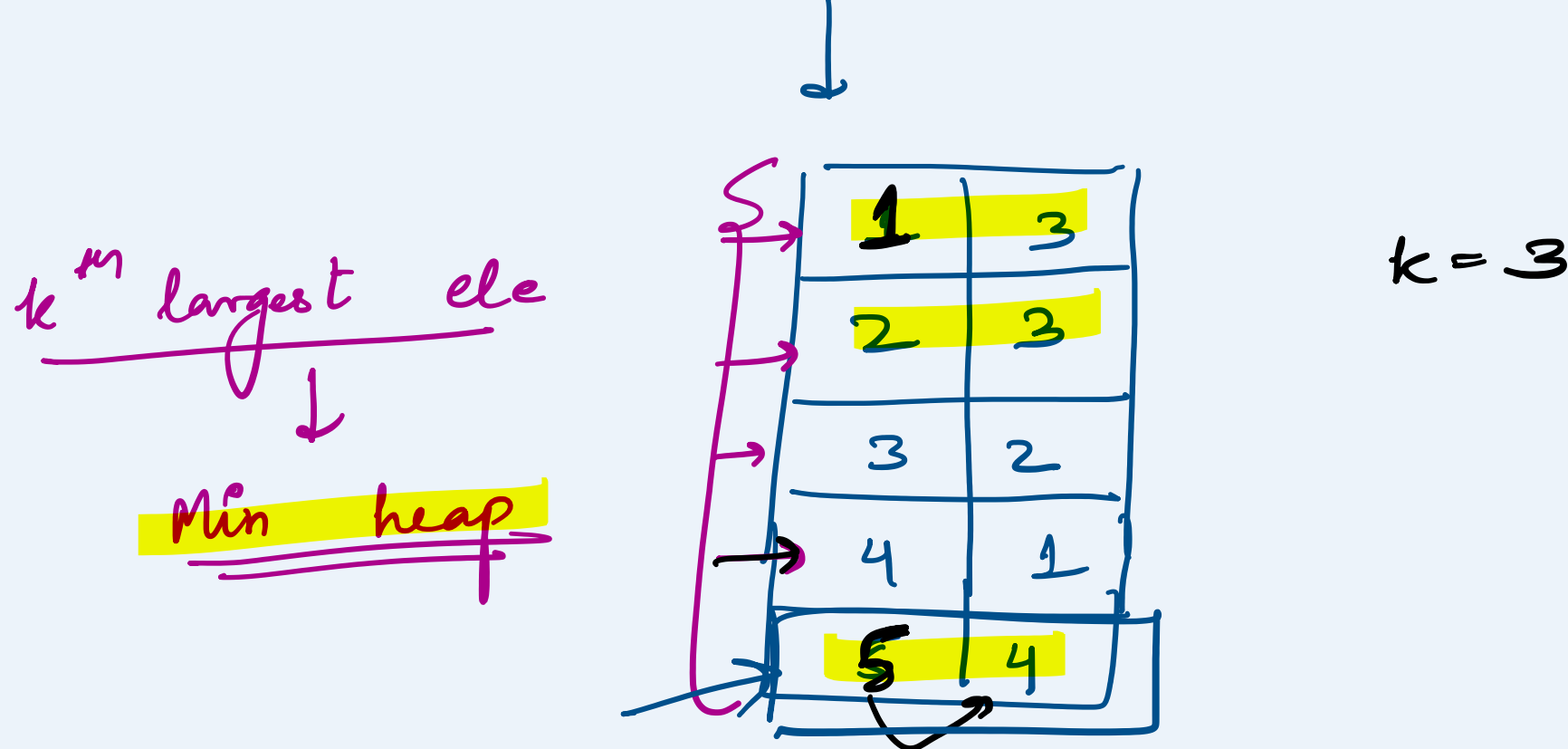
Given an integer array, and a value k, find k most frequent elements.

Eg: [1, 1, 1, 2, 2, 3] k=2
ans → [1, 2]

Eg: [1] k=1
ans → [1]

① store the freq of each and every element

→ 1 1 1 2 2 2 3 3 4 5 5 5 5



TC → $O(N \log k)$
SC → $O(n + k)$

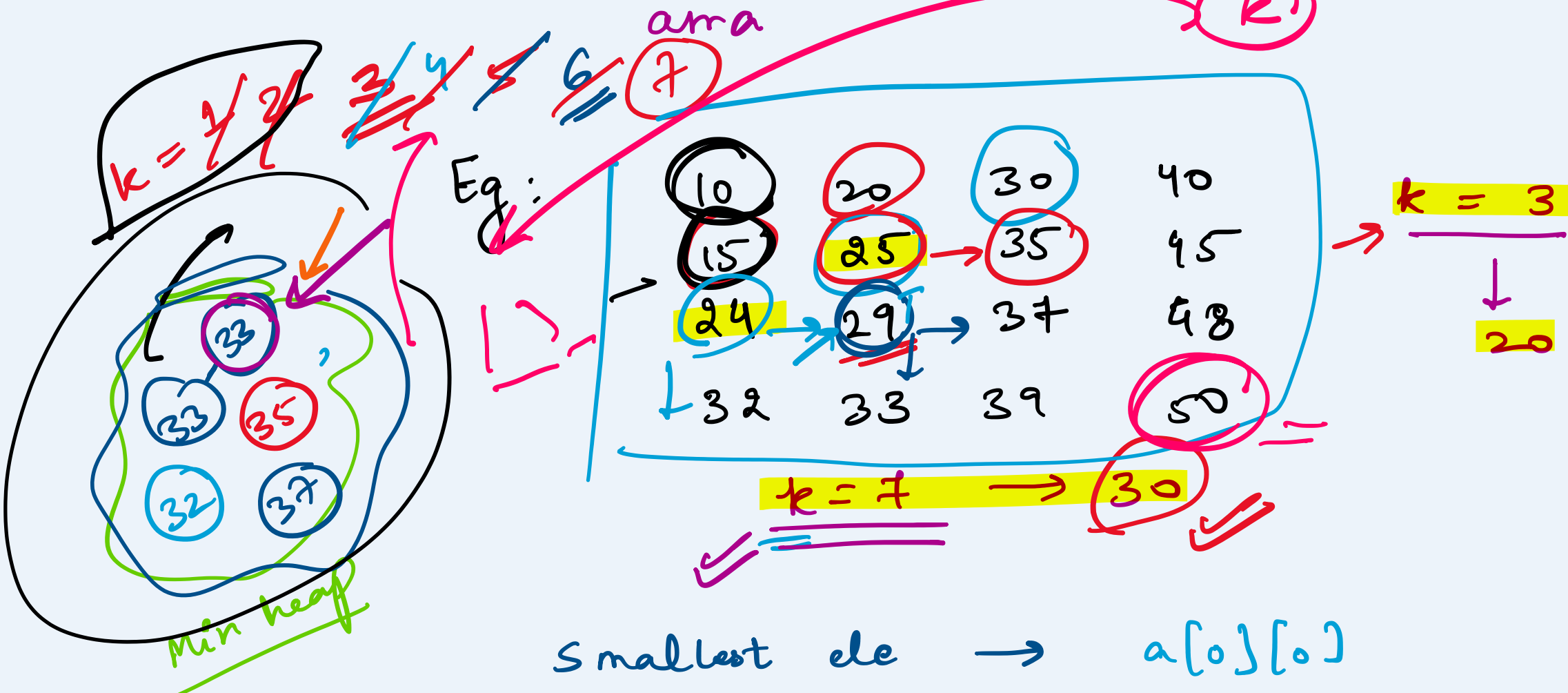
Q Given an array of n elements, where each element is almost k away from its target position.

→ sort the array.

Eg: arr = [6, 5, 3, 2, 8, 10, 9]
k=3
output → [2, 3, 5, 6, 8, 9, 10]

TC → $O(n \log k)$
SC → $O(k)$ - ✓

Q Find kth smallest element in a row-wise and col wise sorted 2-D



Smallest ele → $a[0][0]$
→ contenders to be 2nd min

$A[i][j] \rightarrow k^{th} \text{ min}$
 $A[i+1][j]$ & $A[i][j+1]$

TC → $O(k) + O(k \log k)$
SC → $O(k)$

Q Given that integers are read from a data stream. Come up with an online algorithm for finding the median of element read so far in efficient way.

Eg $\underline{5} \rightarrow 5$
Eg $15, \underline{5} \rightarrow 10$
Eg $\rightarrow 1, 15, \underline{5} \rightarrow 5$
Eg $\rightarrow 3, 1, 15, \underline{5} \rightarrow 4 \dots$

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4	3	5	2
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≤ 10

20	25	17	12
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> 10

4 3 5 2 20 25 17 12
↓ ↓
max min
 $\frac{5+12}{2} \rightarrow \text{median}$