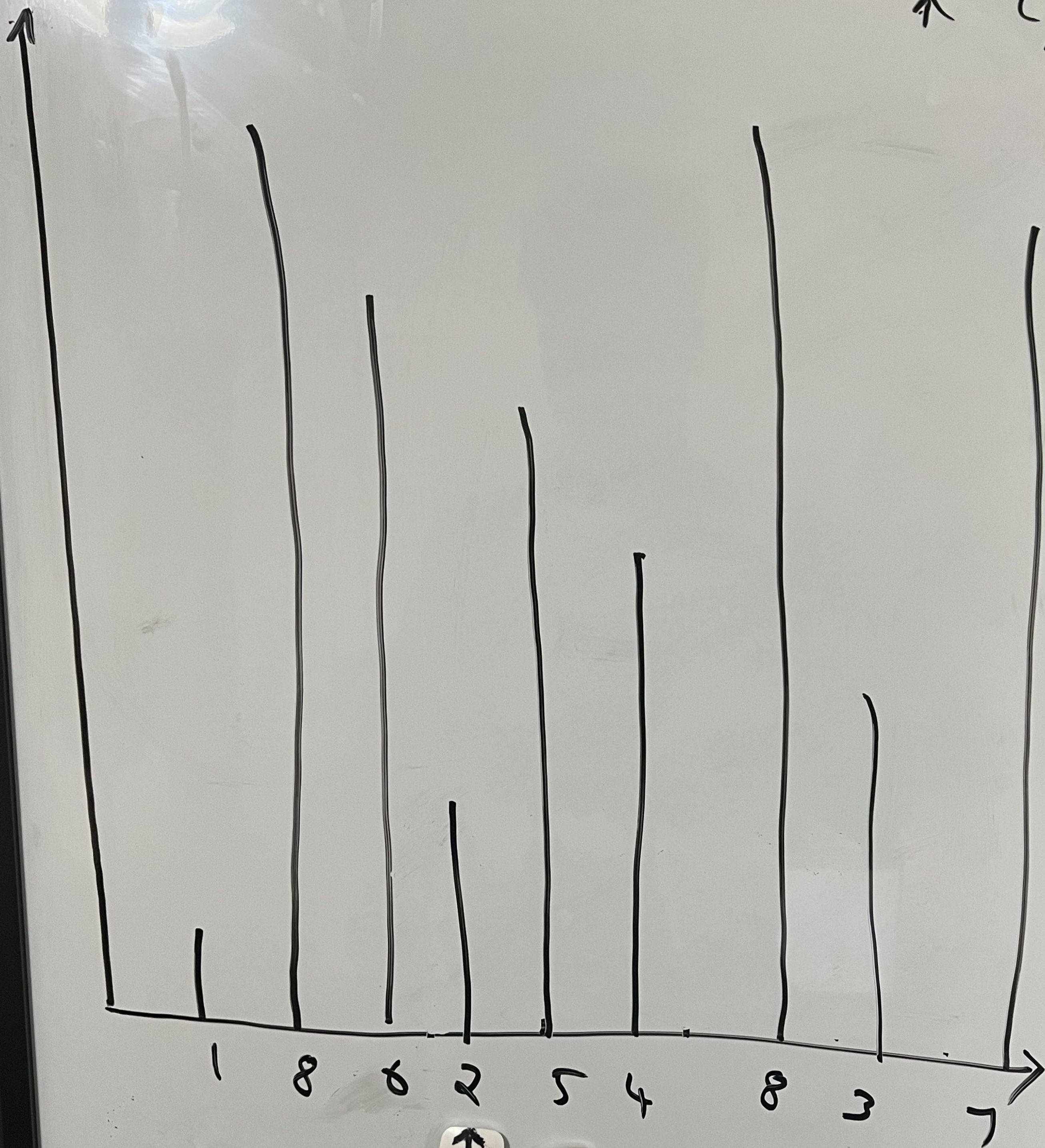


$$A = h \times w \quad \begin{matrix} \uparrow & \downarrow \\ & (-1) \end{matrix}$$



100

BF - $O(n^2)$

Seidman - $O(n)$ $tl(1)$

3Sum

$$i \neq j \ \&\& \ j \neq k \ \&\& \ i \neq k$$

$$[2, -1, -1, 1, 0, 2, -1]$$

$$\begin{pmatrix} (2, -1, -1) \\ (-1, 1, 0) \\ (1, 0, -1) \\ (-1, 2, -1) \end{pmatrix}$$

$$[0, 0, 0]$$

output[[0, 0, 0]]

$$[[2, -1, -1], [-1, 1, 0]]$$

2 Sum

$T=7$

$[2, 1, 6, 0, 3, -1]$
0 1 2 3 4 5

$[-1, 0, 1, 2, 3, 5, 4, 2]$ $7 - (-1) = 8$

Brute force = $O(n^2), O(1)$

Hash $O(n), O(n)$

TP $n \log n + n, O(1)$
(Sort)

BS $n \log n, O(1)$

$[2, 5]$

$[3, 4]$

~~$[5, 2]$~~ X
 ~~$[2, 5]$~~

$[-4, 3, 2, 0, 1, -1, -2, 0, 1, 0, 1, -1, 0, 1, 2, 3]$

$-4 + 4 = 0$
 $x = +4$
 $T = 4$

Brute force - $O(n^3), O(1)$ BS - $O(n^2 \log n), O(1)$

Hash - $O(n^2), O(n)$

TP - $O(n^2), O(1)$

$n \log n + n \times n$

$[-1, -1, 0, 0, 1, 1]$

$\uparrow \quad \uparrow$
 $p_1 \quad p_2$

$[-0, -1, 1]$

$[0, -1, 0, 0, 1, 1]$

$[0, 0, 0]$

\uparrow
 p_1

\uparrow
 p_2