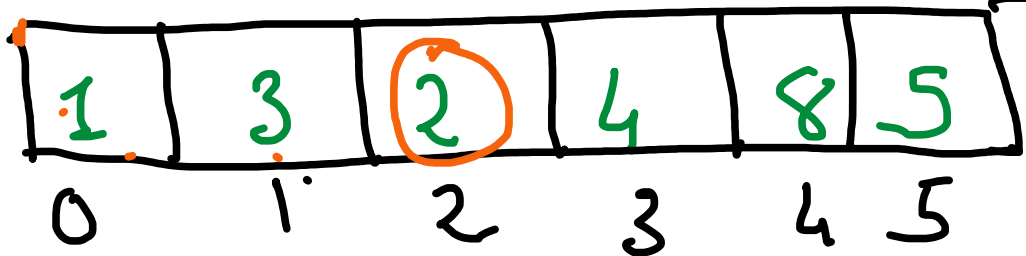


Quick Select:-

→ like quick sort,

Sort entire array.

Q Search single elem $k = 2^{nd}$ largest



✓ naive one } \Rightarrow sort it } $\boxed{88}$ 20 steps
 \rightarrow return kth index.

A B } $A = O(x)$ }
 $\rightarrow B = O(x^2)$

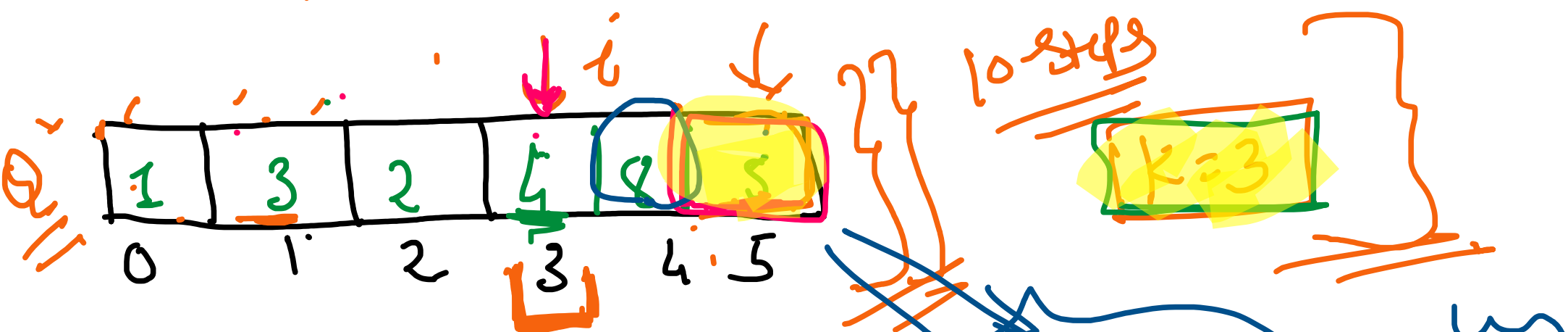
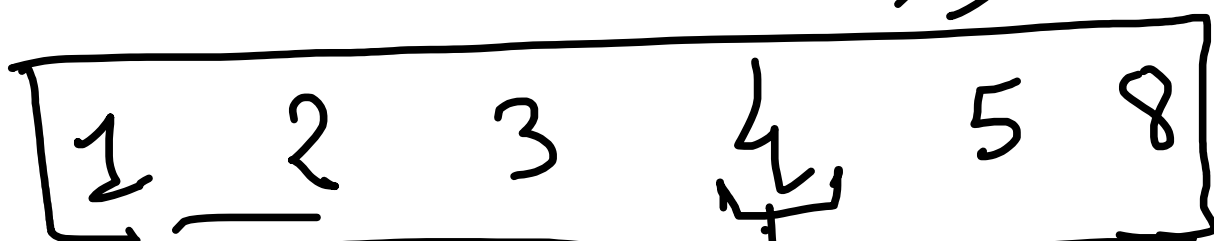
Bubble
Selection
Insertion

$O(n^2)$

{ merge - $O(n \log n)$ } $SC = O(n)$
 quick sort - $O(n^2)$ } $SC = O(\log n)$

TC
 \searrow
 \searrow

SC
 \searrow
 \searrow



Pivot-5
 $1 < 5$ } $i++$
 \downarrow swap

$3 < 5$ } swap

$2 < 5$ } swap

$4 < 3$ } x

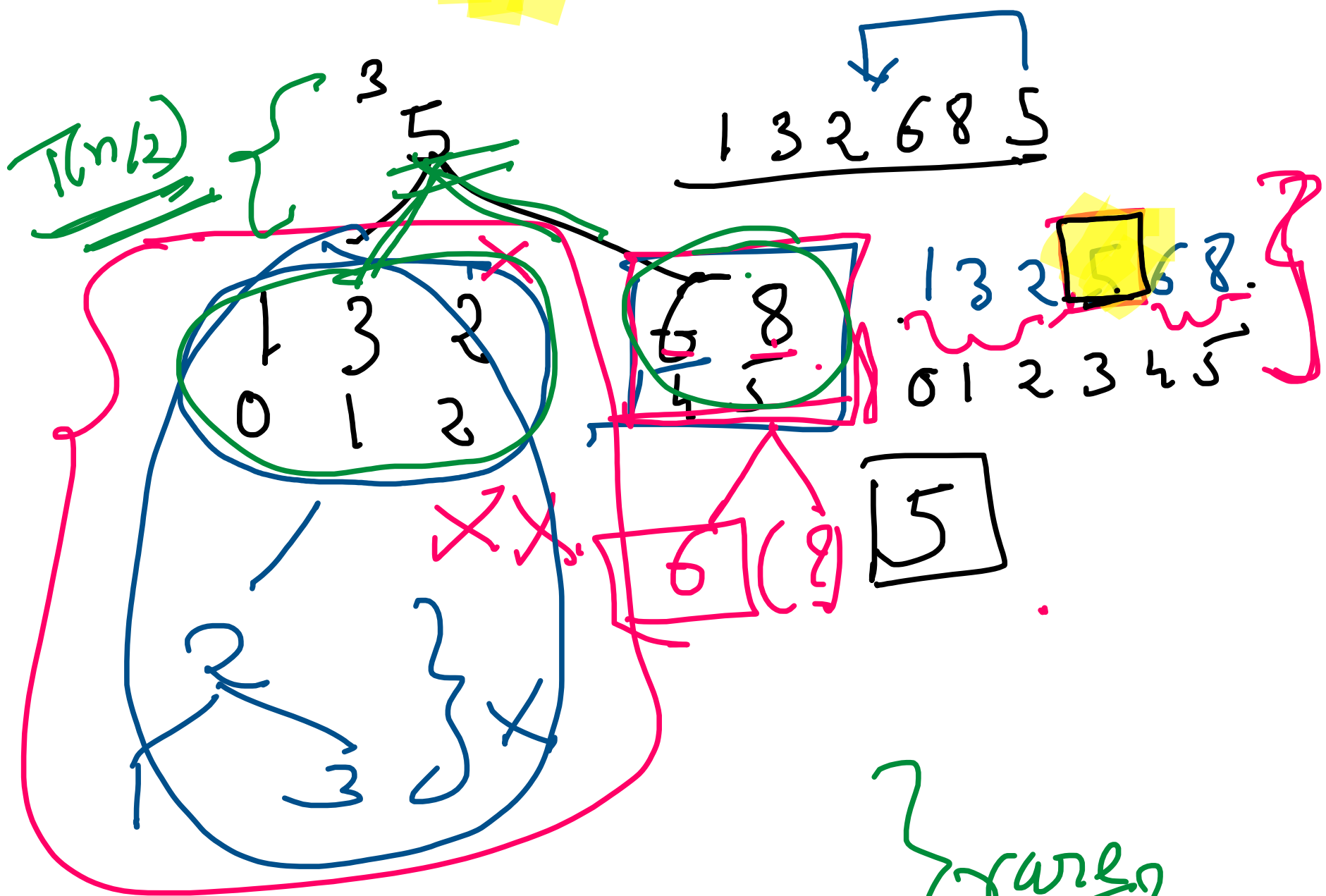
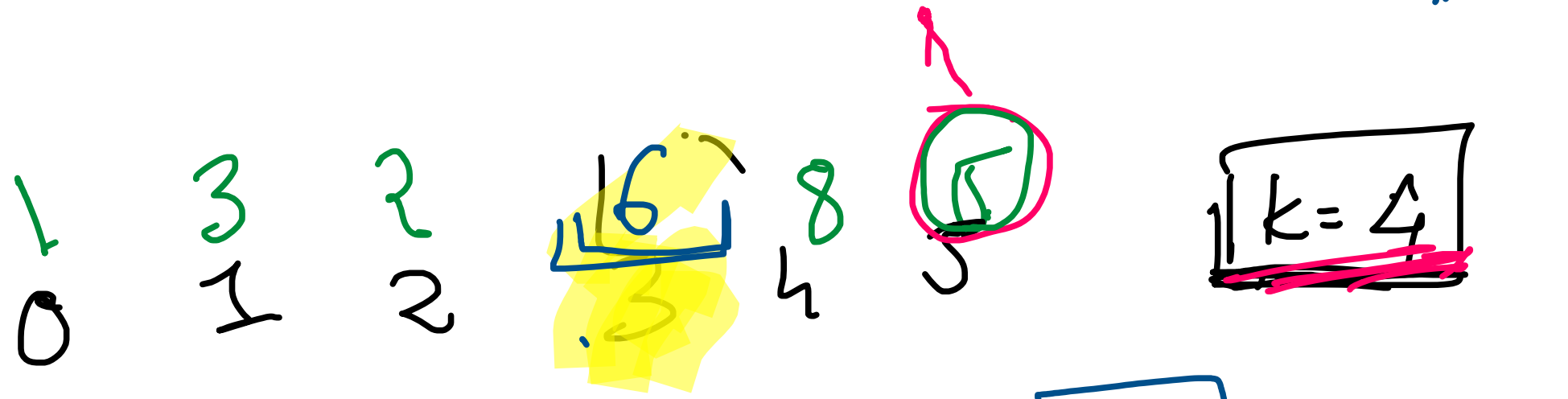
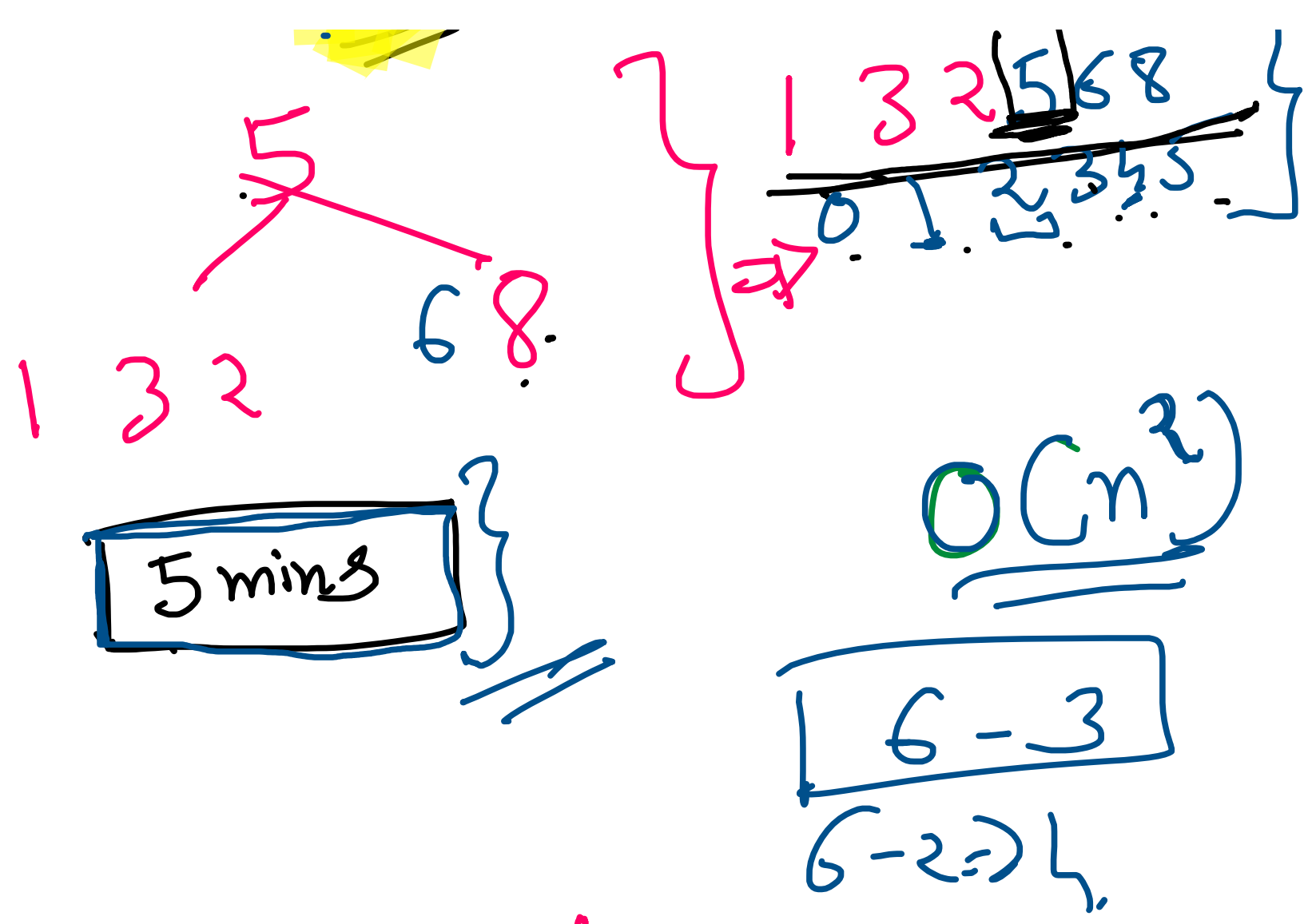
ans

naive } H/W

arr[k]

xx





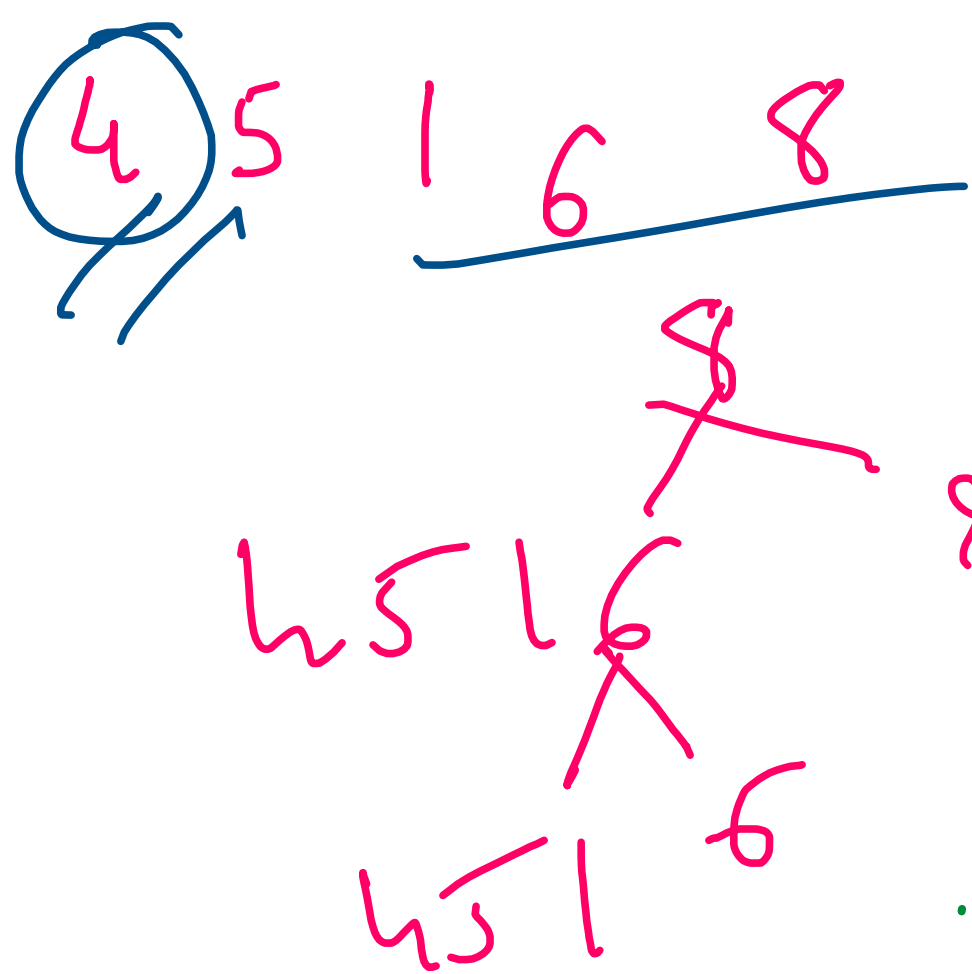
$$T(n) = T(n-1) + O(n)$$

$$\vdots$$

$$\boxed{O(n^2)}$$

$$\text{rarely}$$

$$\text{fix}$$



$$T(n) = T(n/2) + O(n)$$

$$O(n) \quad \underline{SL(n)}$$

Aug

$$T(n) = O(n) + T(n/2)$$

$$4 \ -6 \ 1 \ 7 \ 18 \ 2 \ 14 \ 28 \ 19$$

$$\left\{ \begin{array}{cccccccccc} -6 & 1 & 4 & 7 & 12 & 14 & 18 & 19 & 22 \\ 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array} \right\}$$

$n = 9$
 $g/2 \Rightarrow 4$

$$\left\{ \begin{array}{c} n/2 \\ \frac{(n-1)+n}{2} \end{array} \right\}$$