



Stack Class-3

Special class



Love Babbar • Nov 15, 2023

→ Implement = a Min Stack

push
pop
top
getMin

$O(1)$

ISSUE

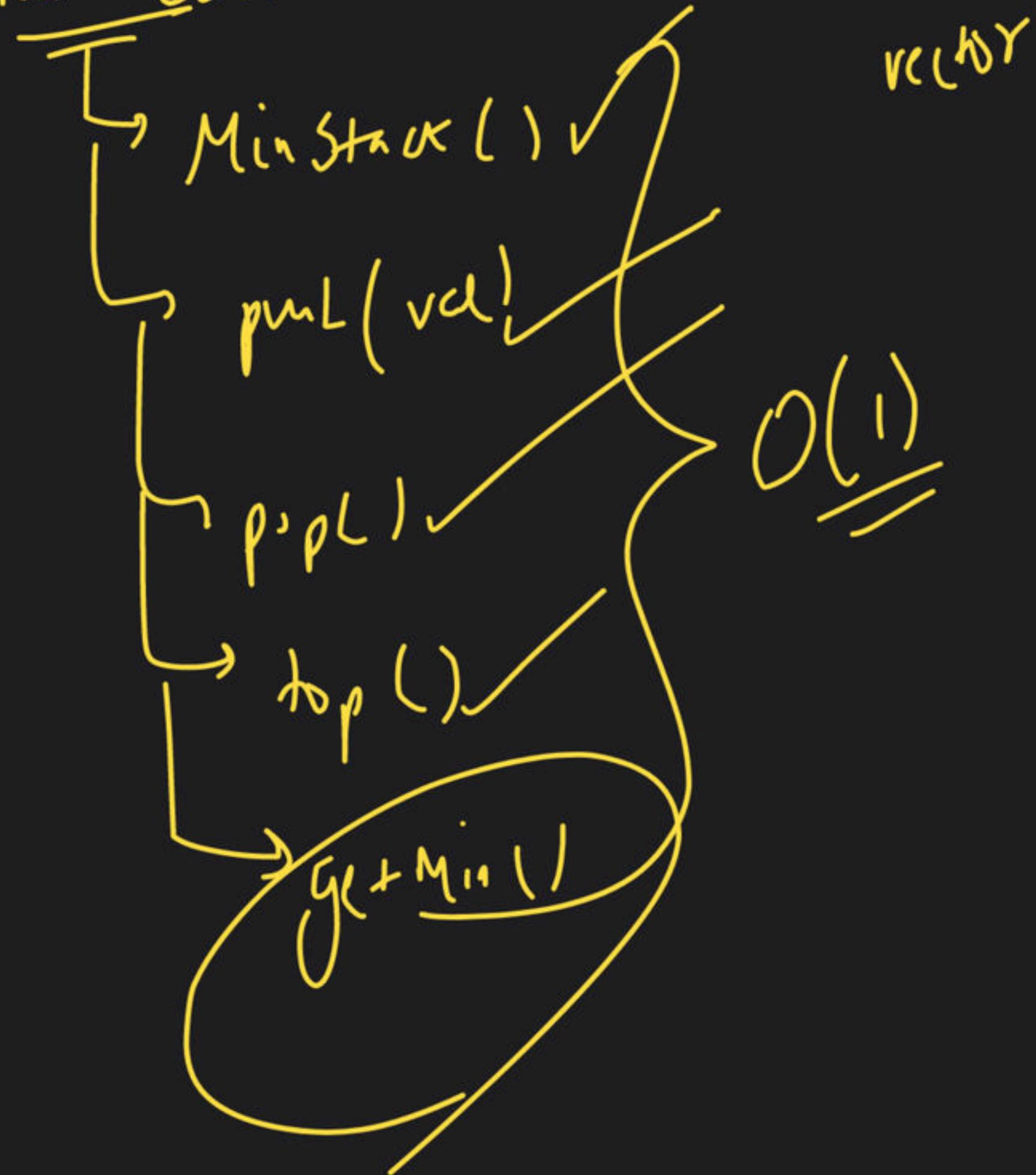
Stack

push → $O(1)$

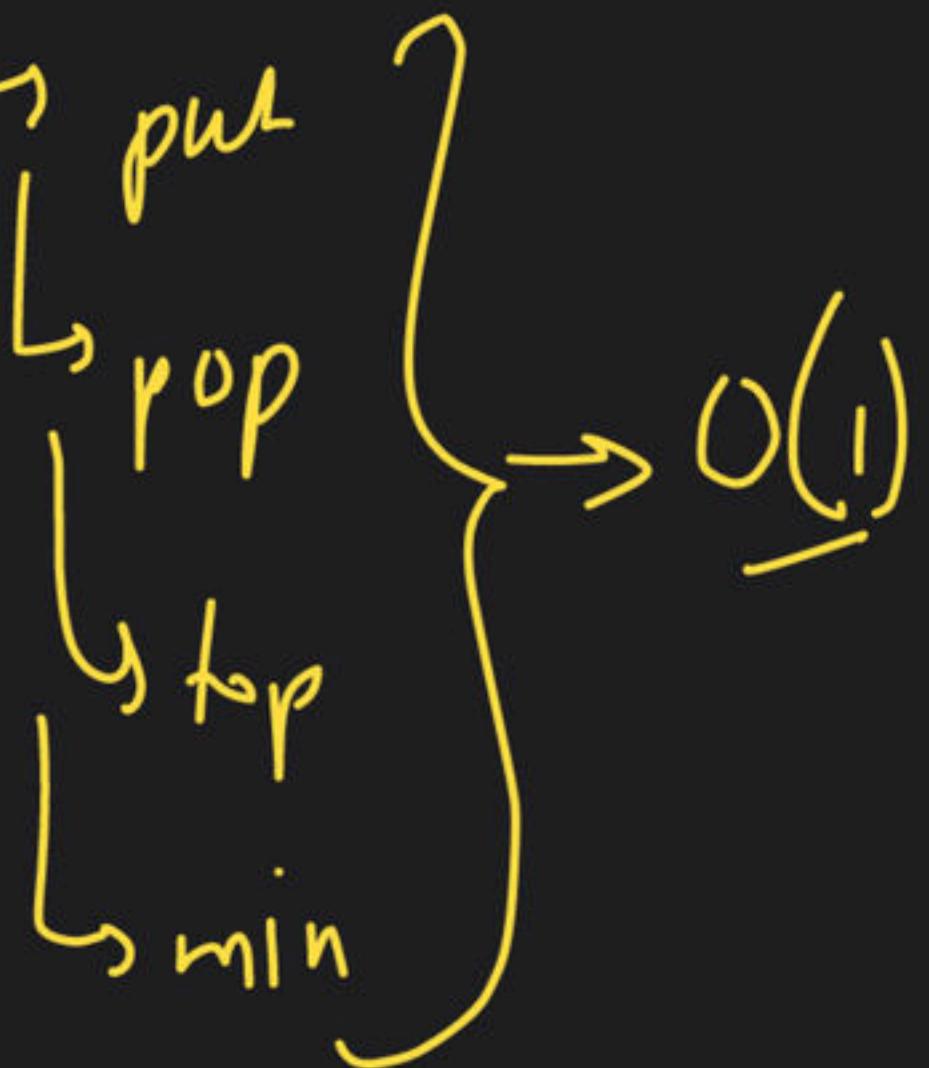
pop → $O(1)$

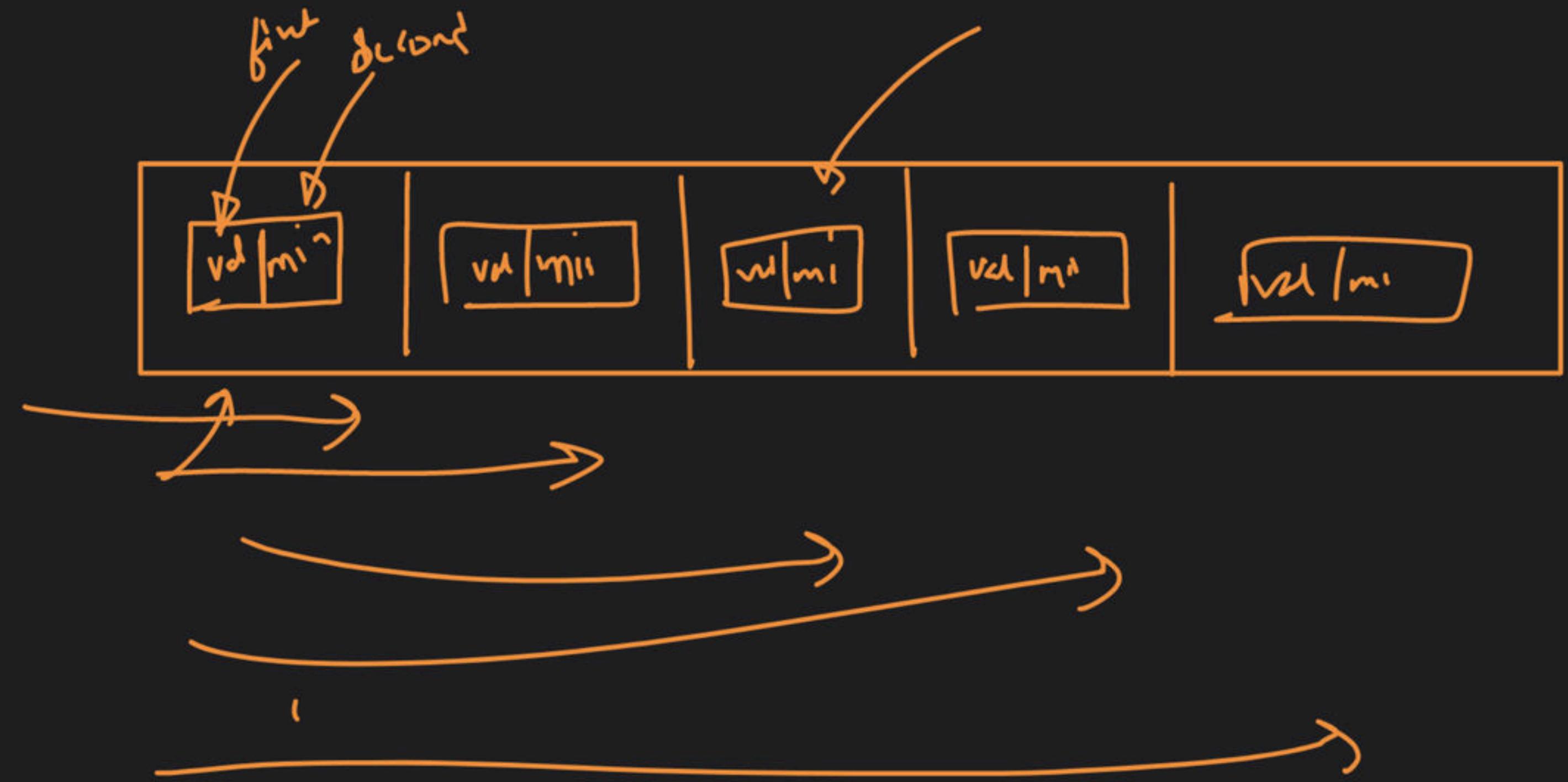
getMin → $O(n)$

Min Stack Class

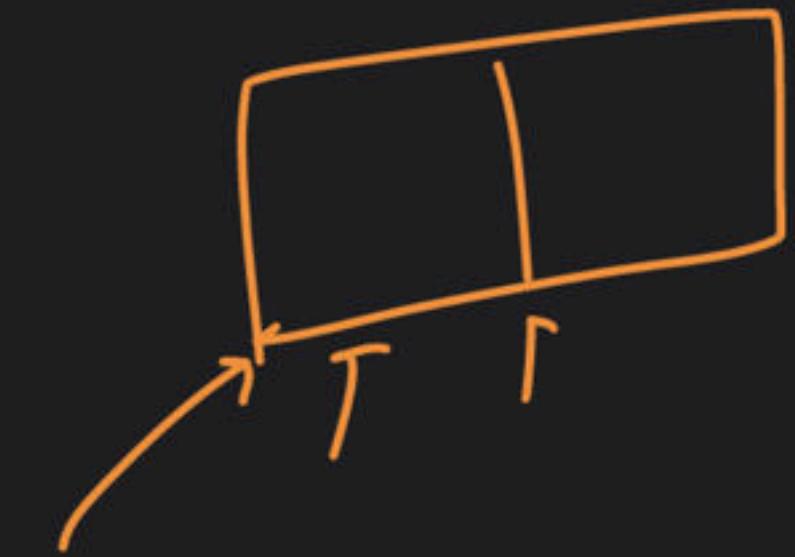


Stack



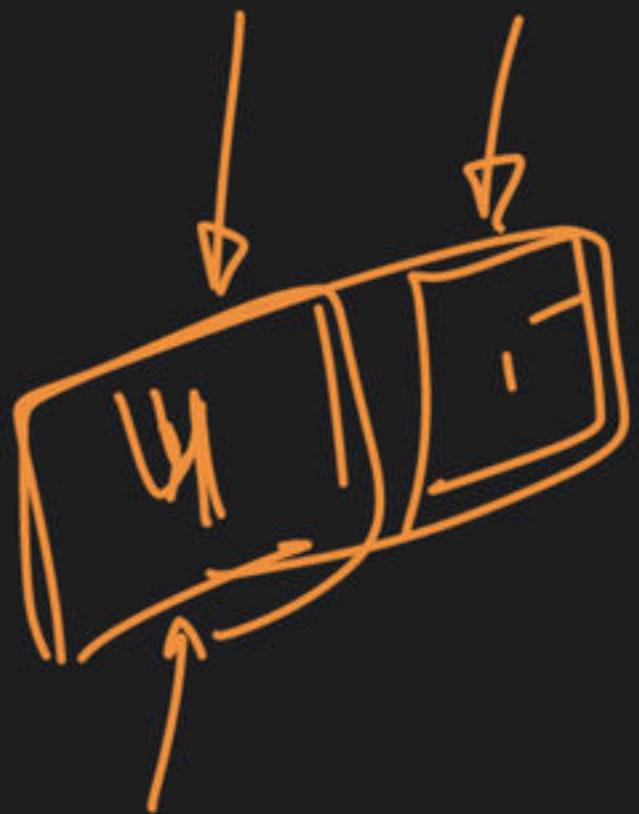


$\text{Pair} \langle \text{int}, \text{char} \rangle$



$\text{Pair} \langle \text{int}, \text{int} \rangle$





Create

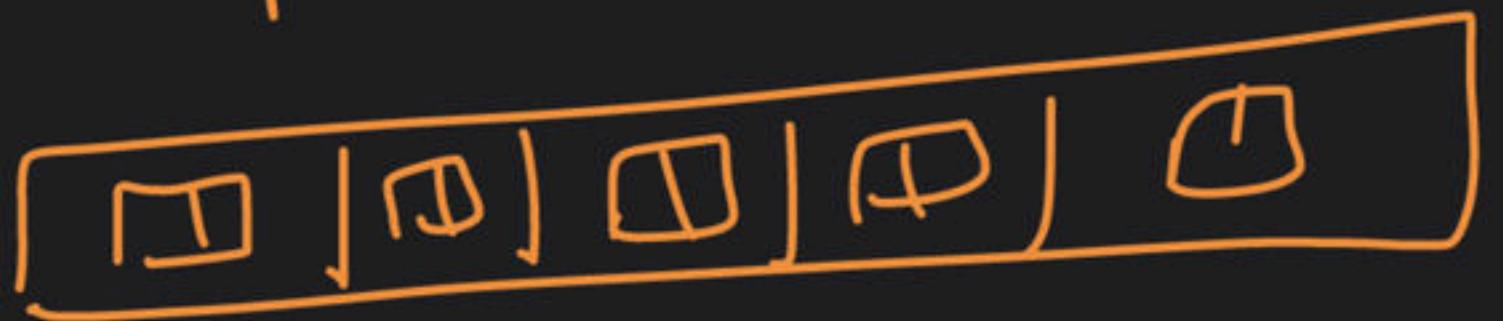
$\text{pair} \langle \text{int}, \text{int} \rangle$ $P = \text{make-pair} (\quad)$

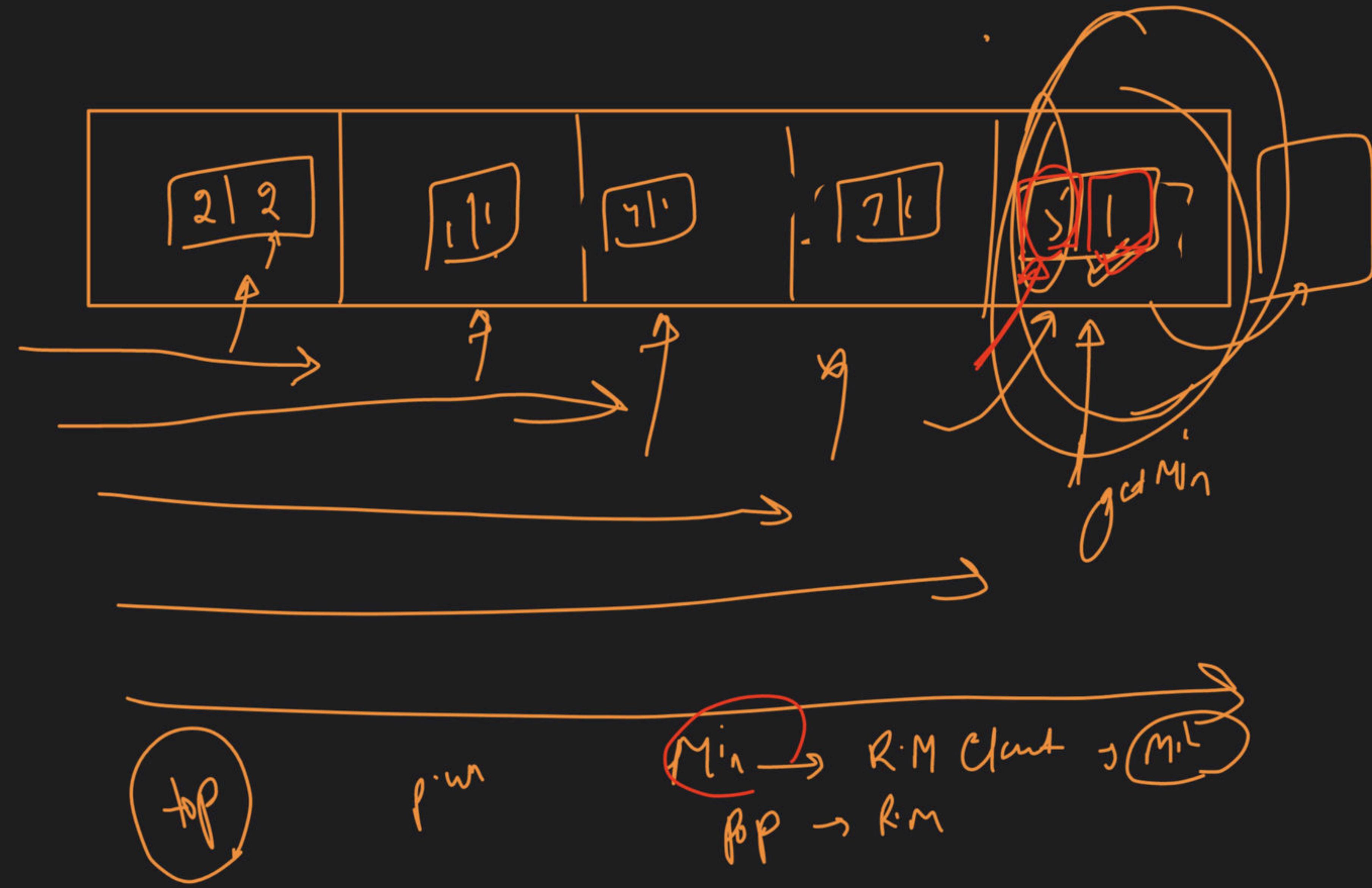
$P\text{-first} = y$

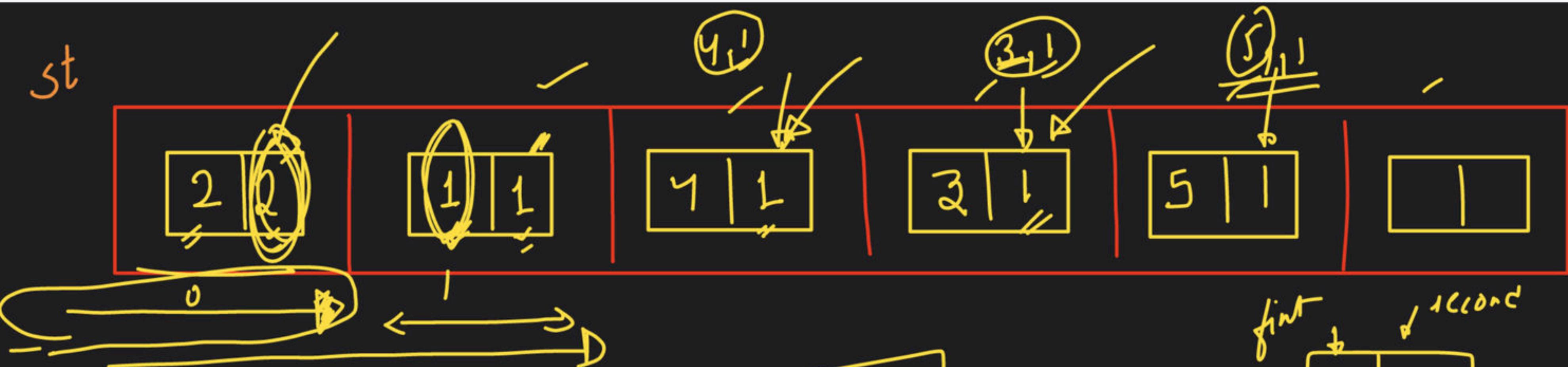
$P\text{-second} = z$

vector < int >

vector < pair < int, int > >







Push

st.push(4)

st.push(3)

st.push(1)

Not first element

st.push(1)

st.push(2)

first elmnt in st

p.create

p.first = val

p.second = val

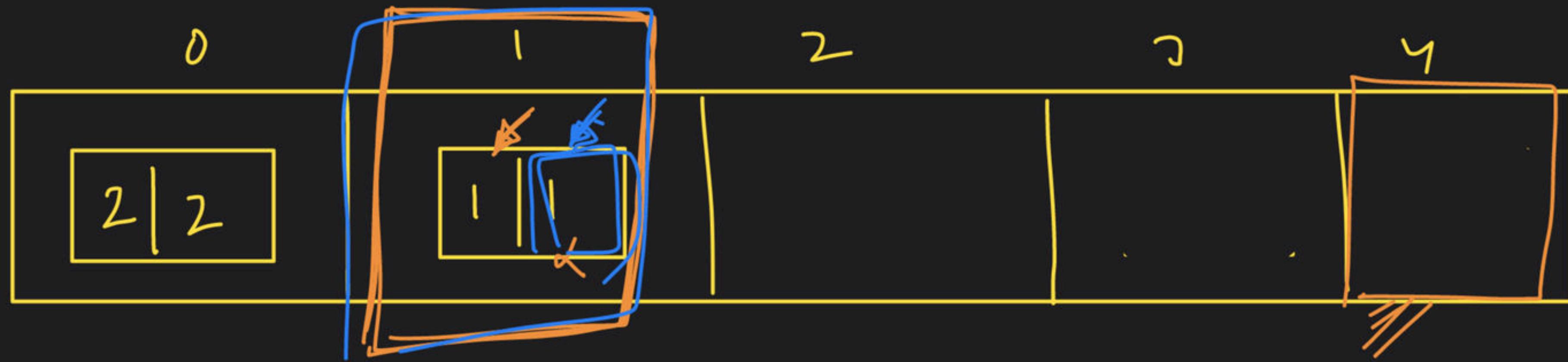
st.push_back(p)

first
second

actual
value

Min elmnt
till that
index

$$p.second = \min(val, st.back().second)$$



`pop ->`

`st.pop-back()`

`st.pop-back()`

`st.pop-back()`

`st.pop-back()`

`top`

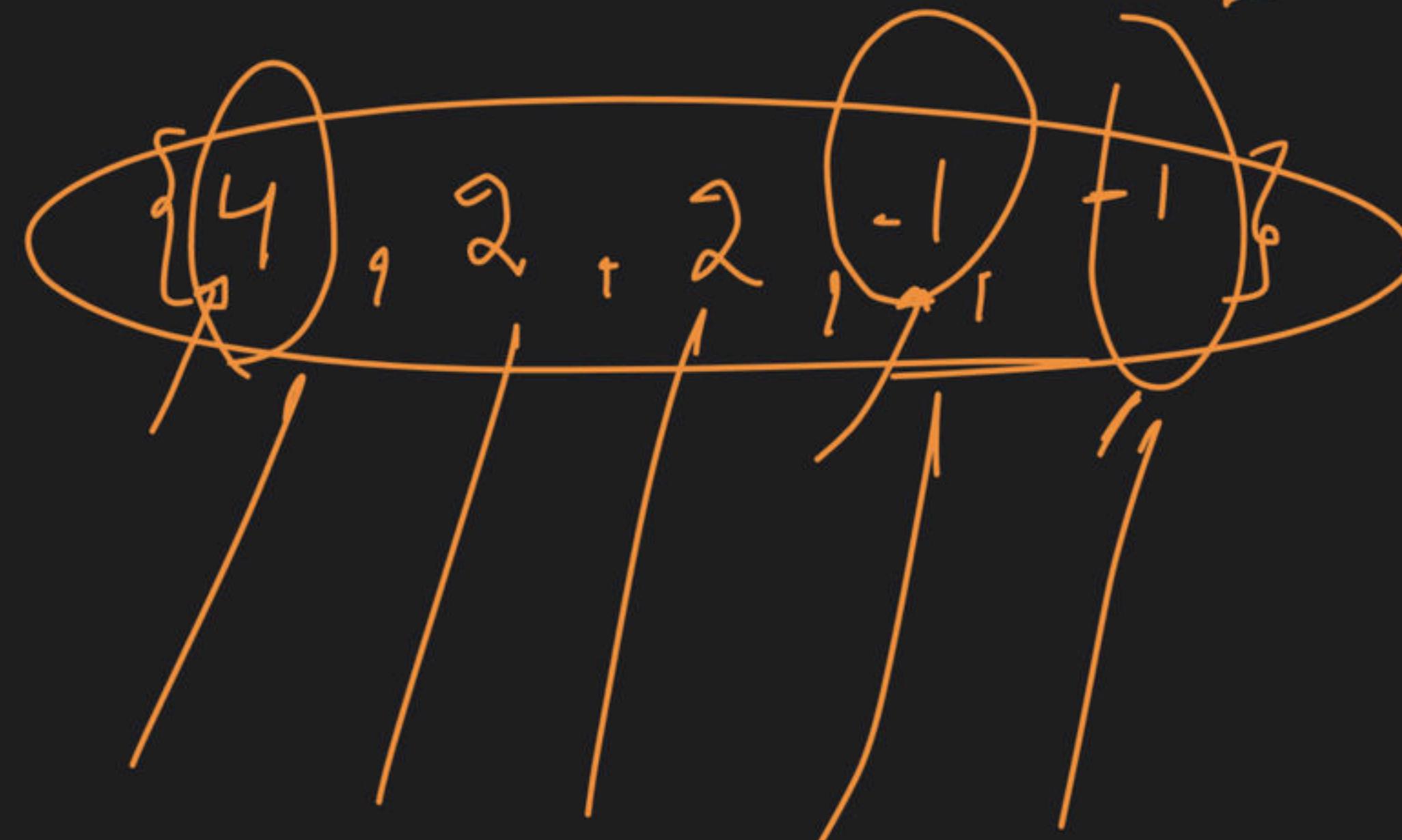
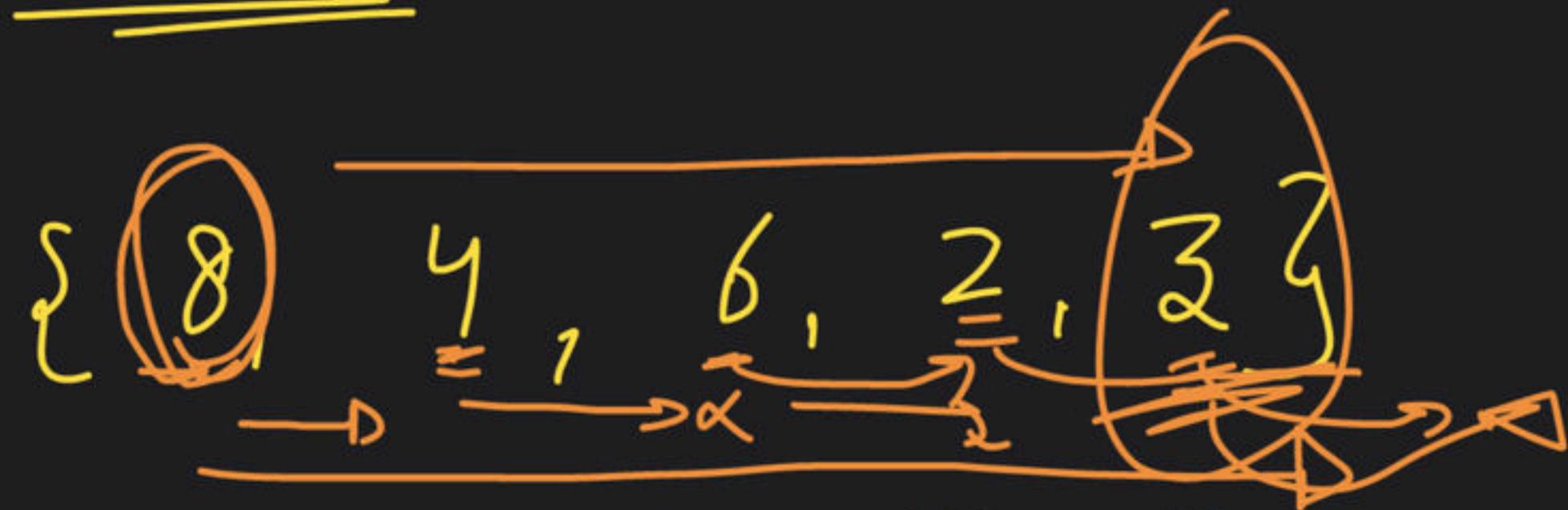
`st.back().first`

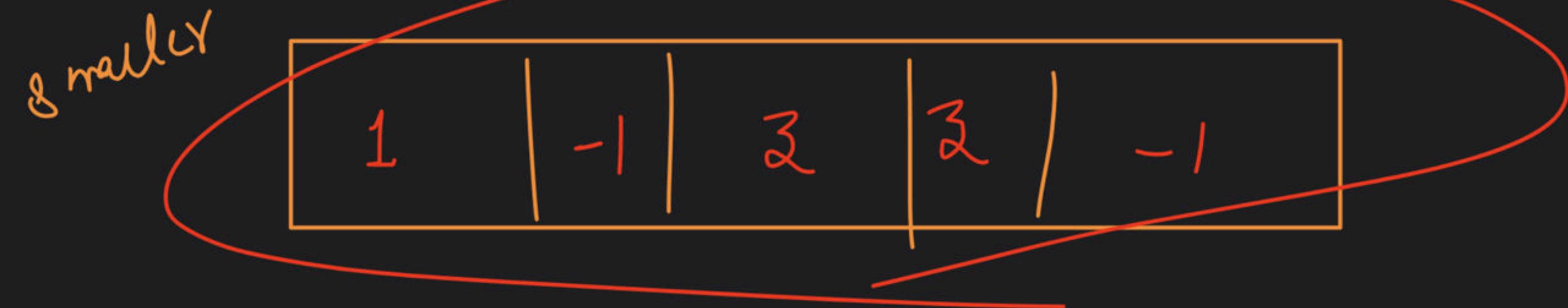
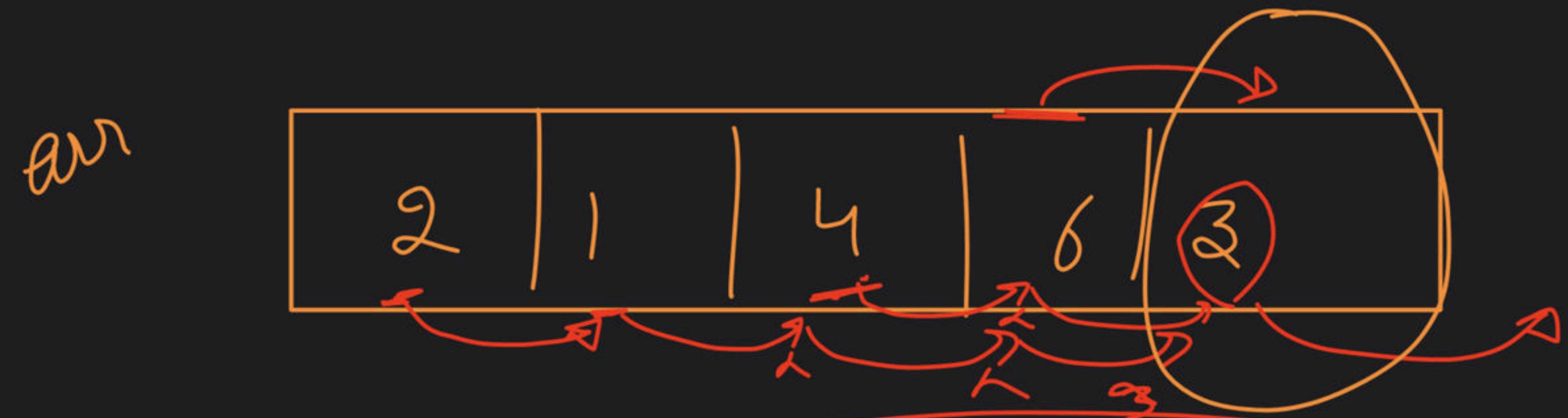
`getMin()`

`st.back().second`

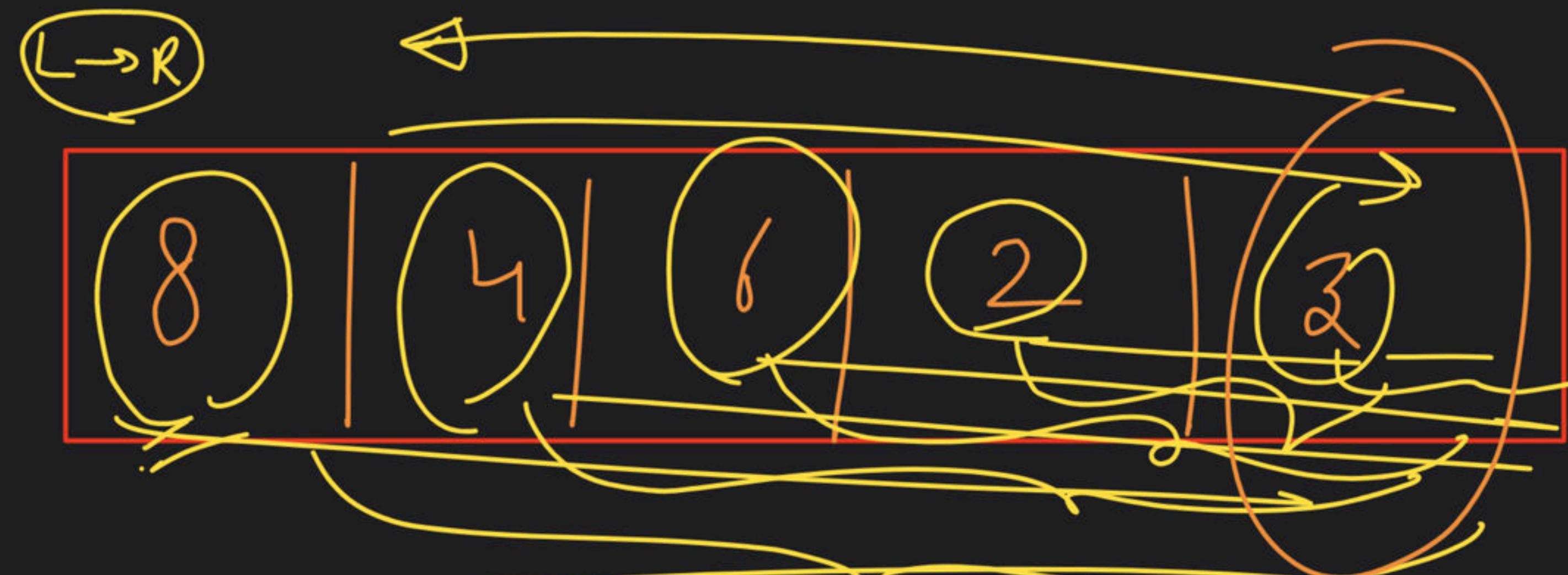
Next Smaller Element

arr[] =



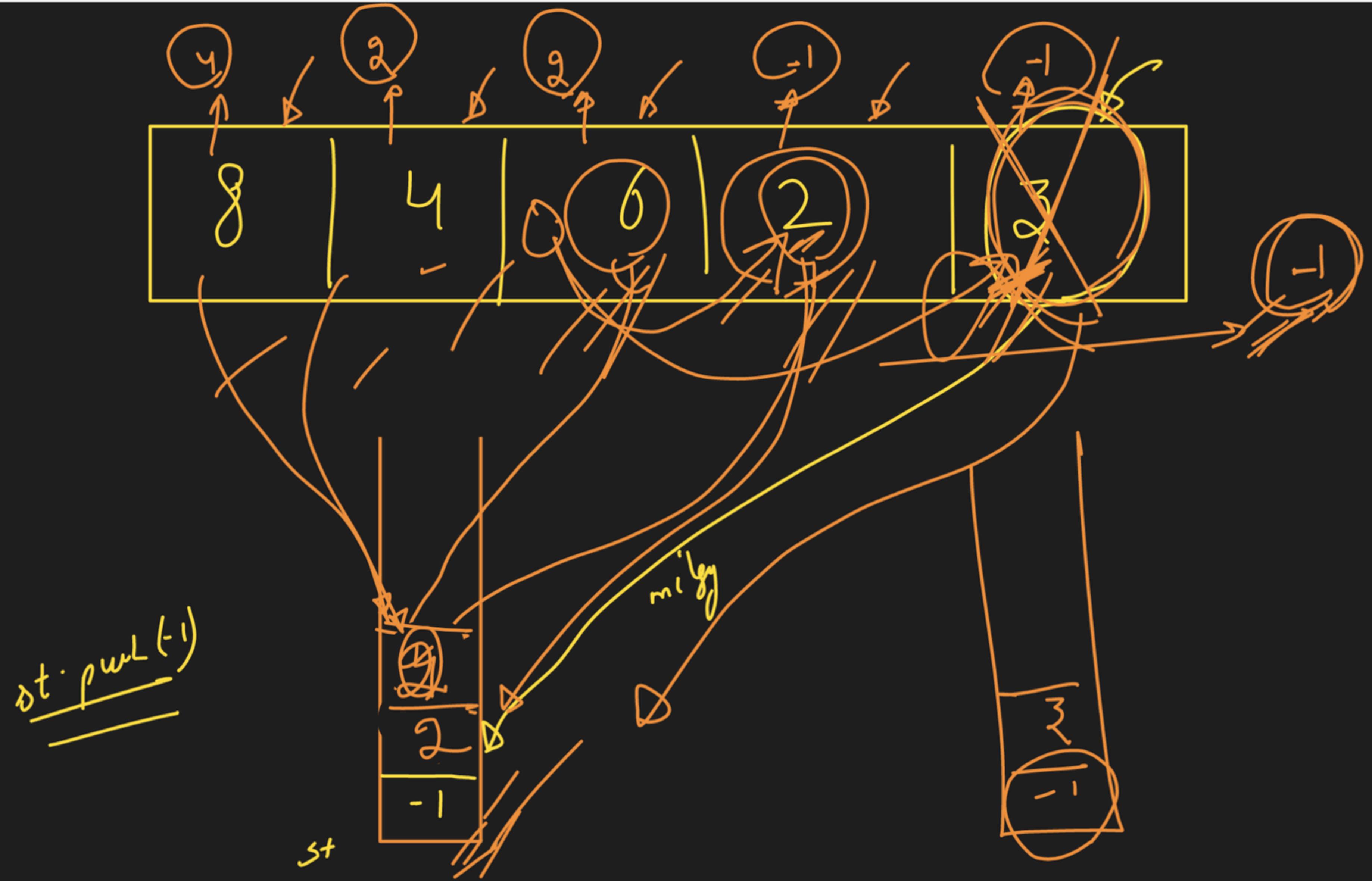


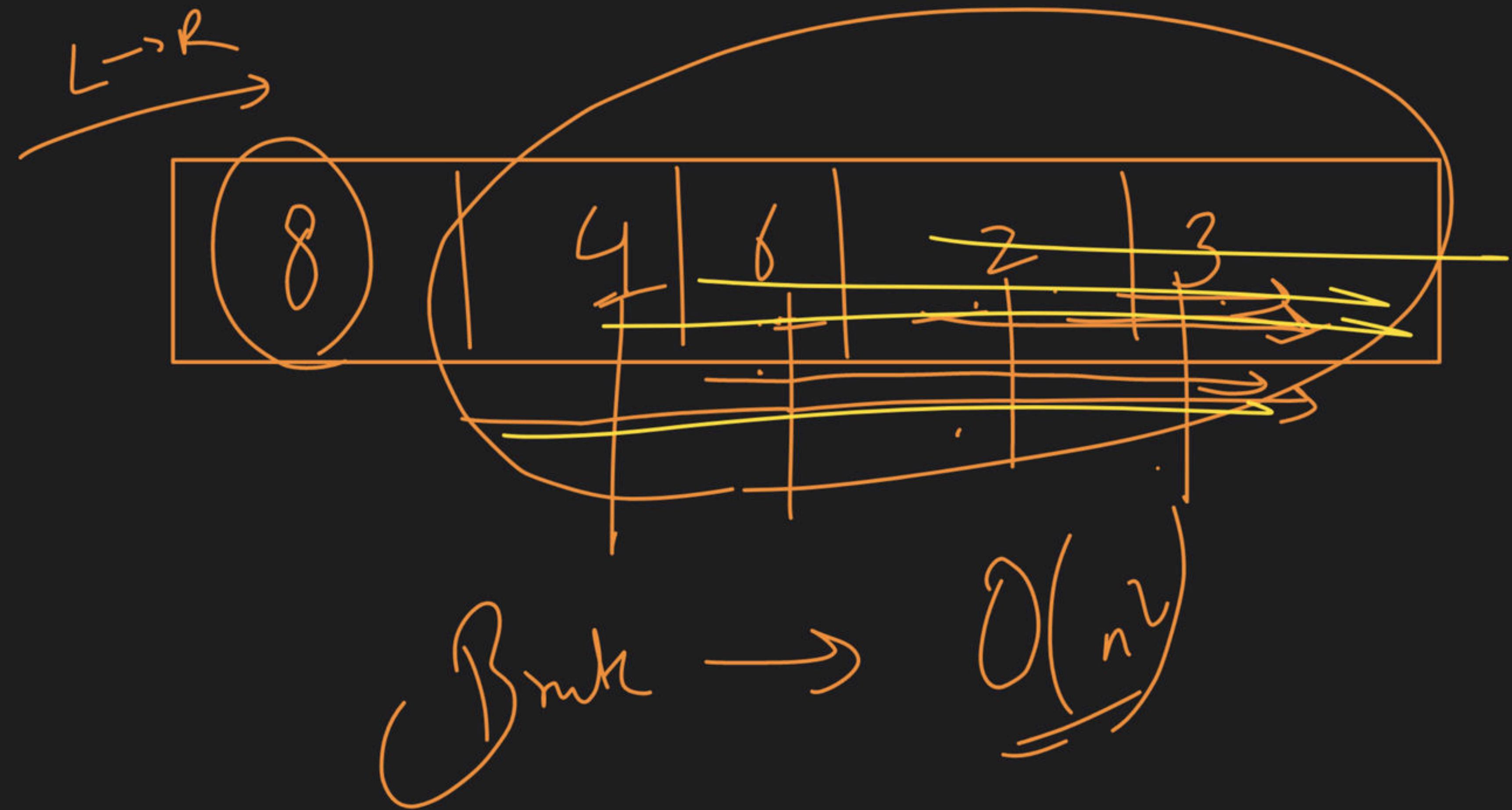
#Bank

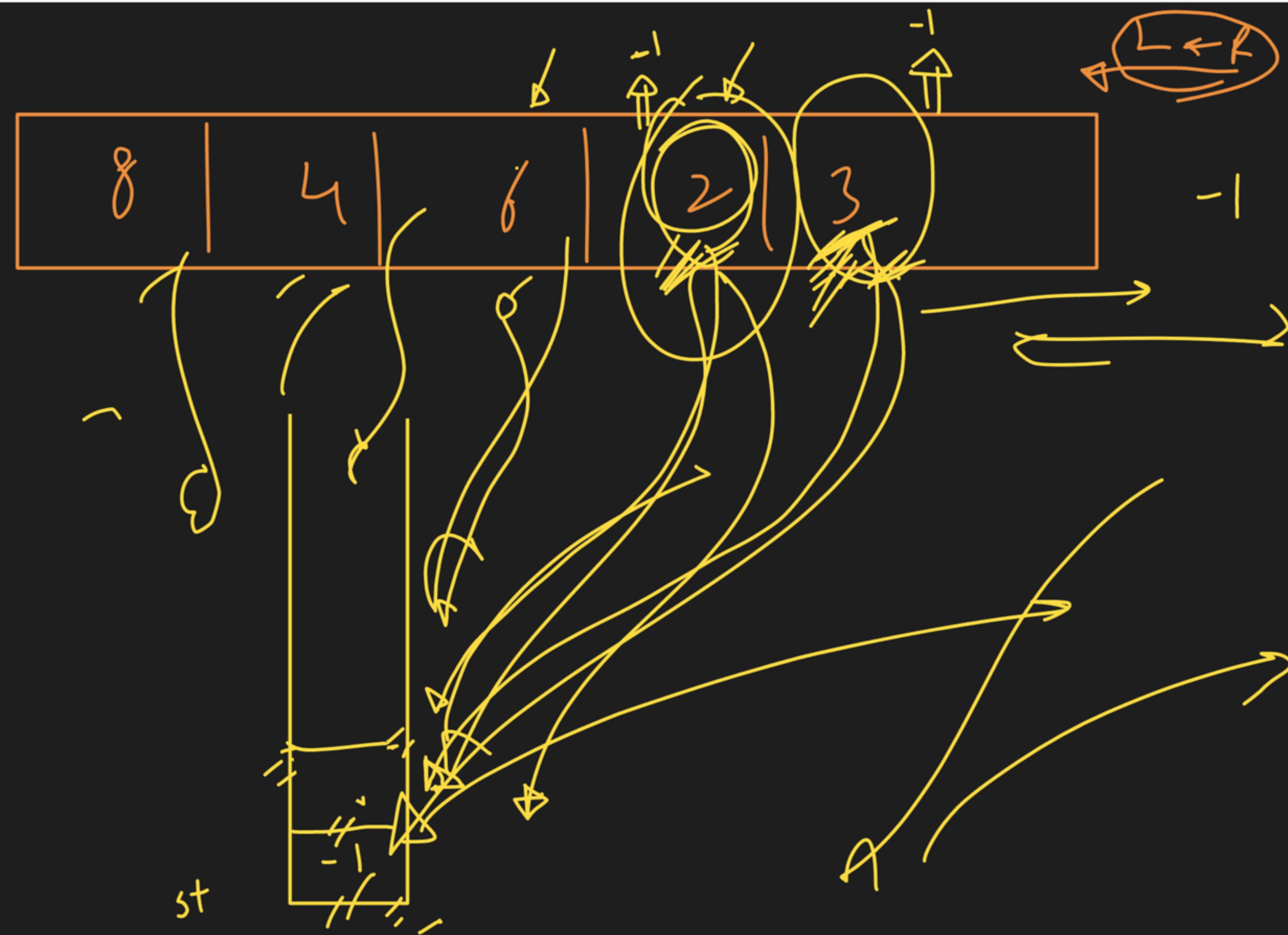


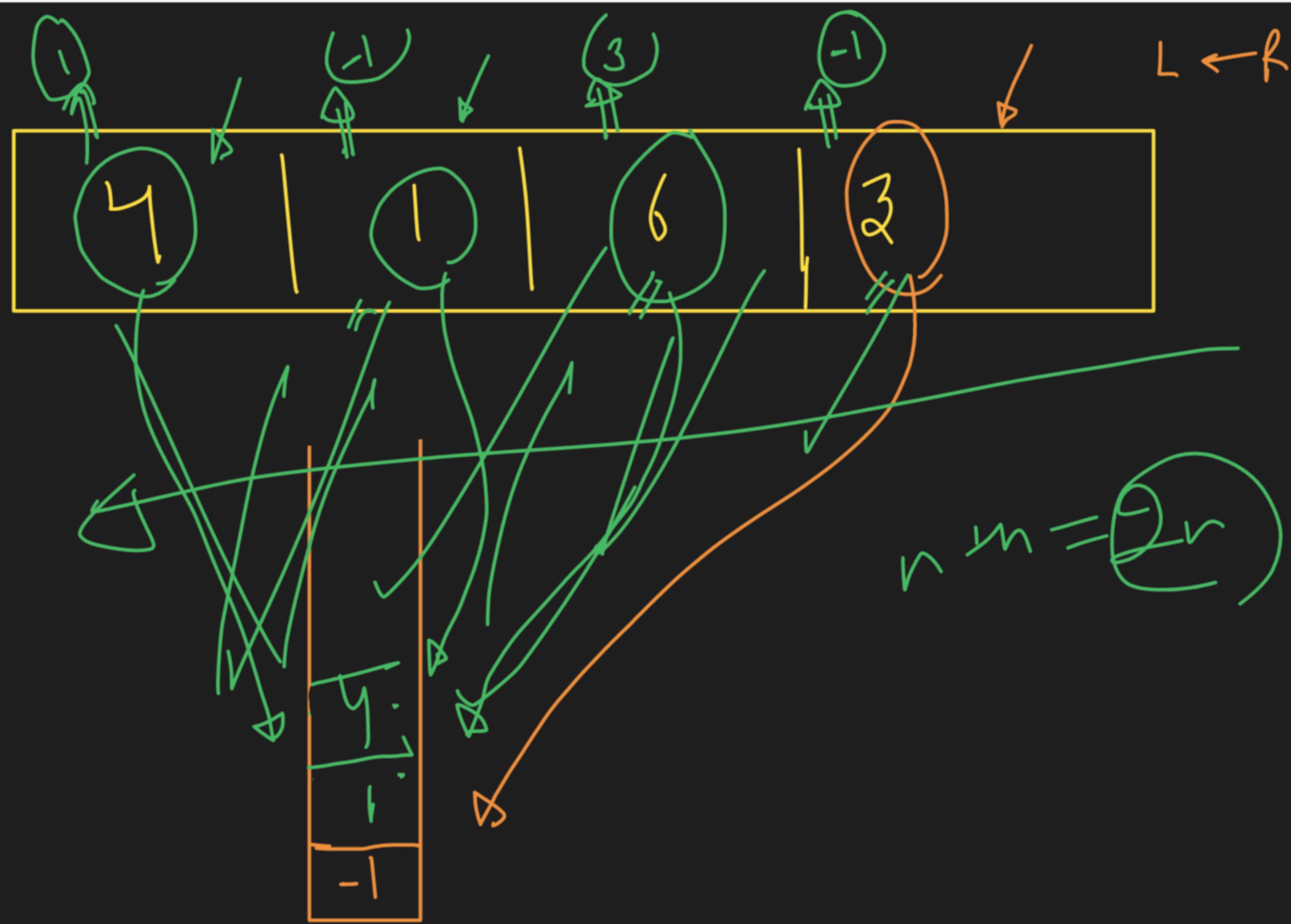
A hand-drawn diagram showing a sequence of numbers enclosed in an oval. The numbers are $n-1$, $n-2$, $n-3$, followed by three dashed ellipses, then $+1+0$. A horizontal arrow points to the right below the oval.

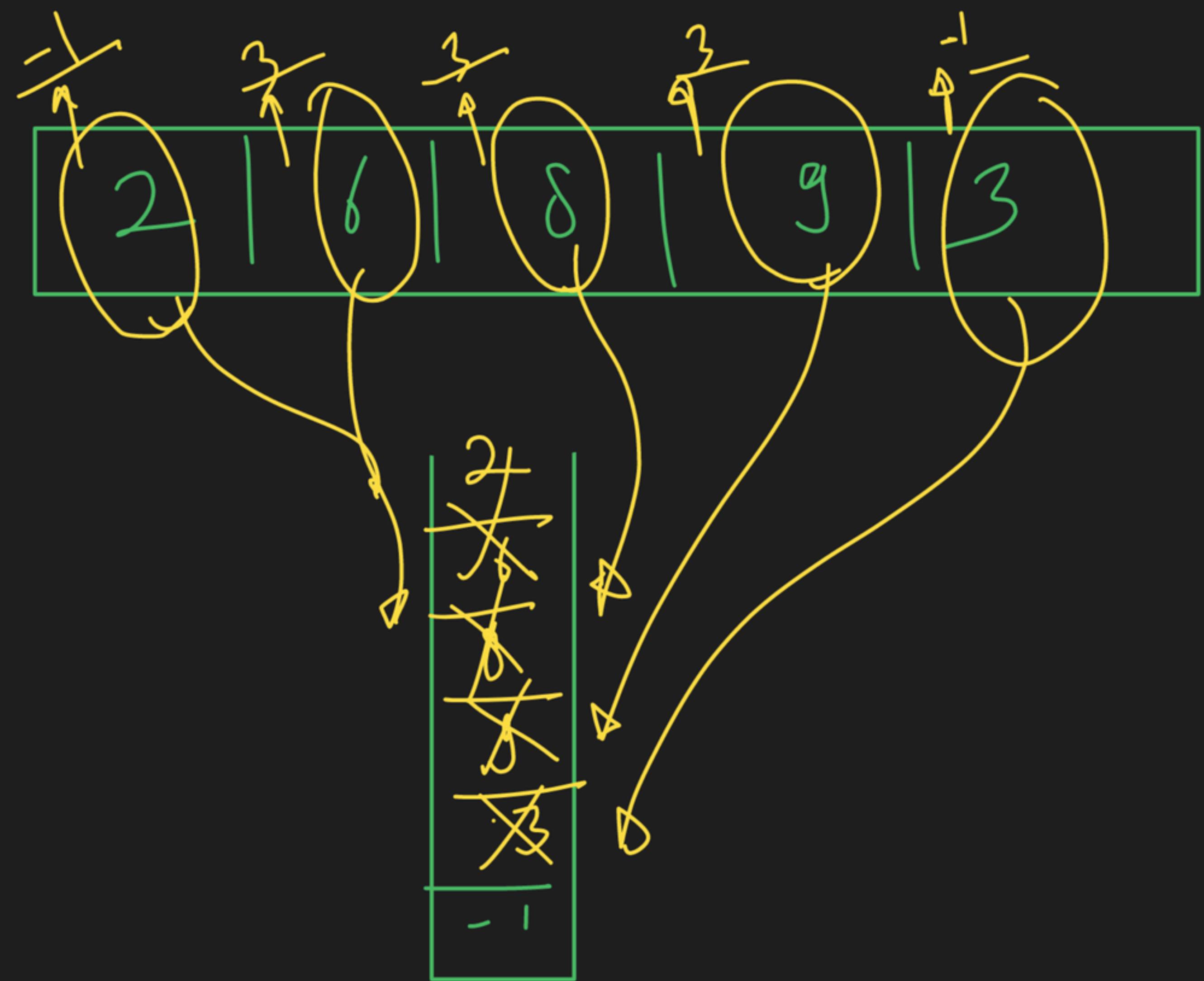
$O(n^L) \times$

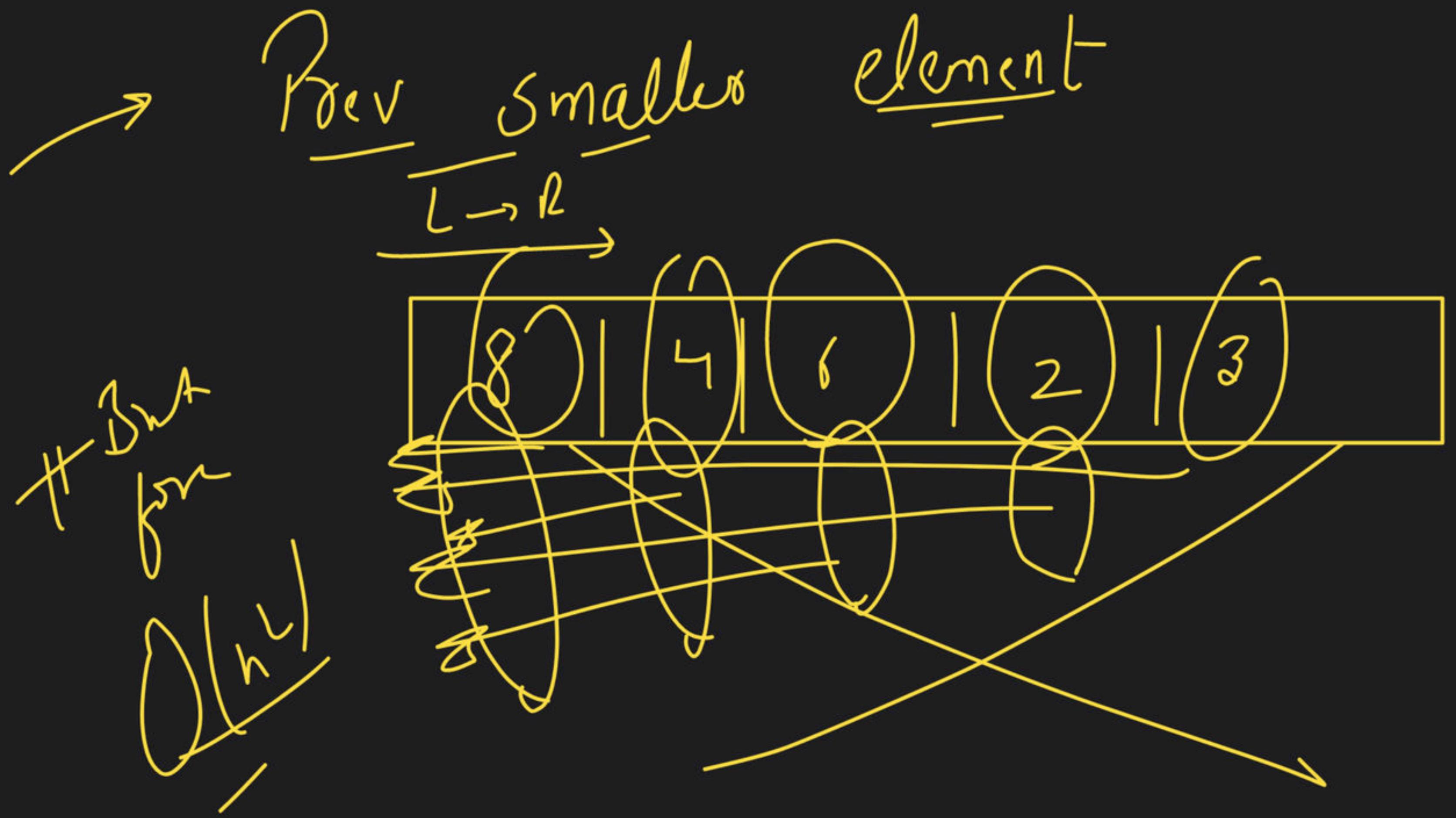


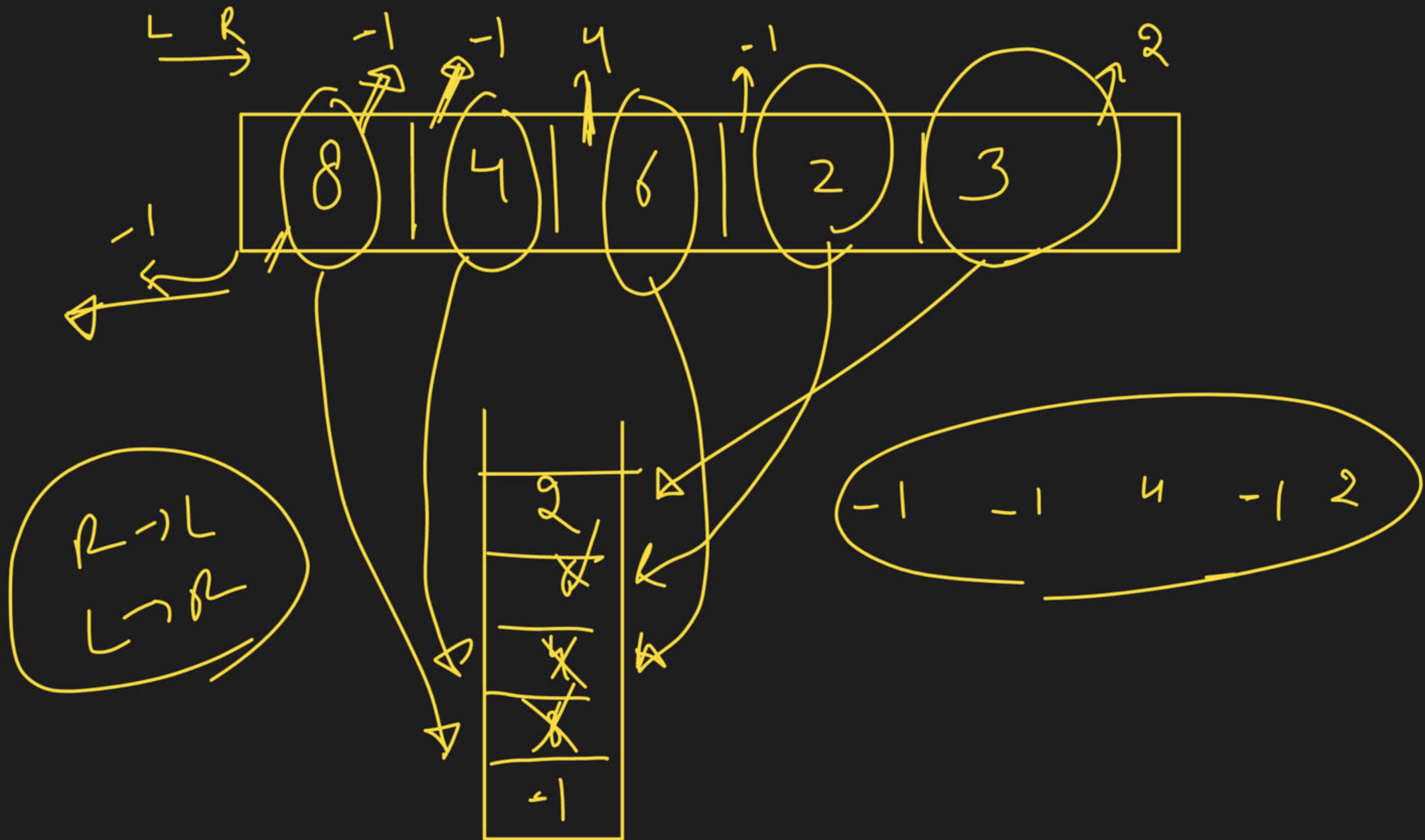




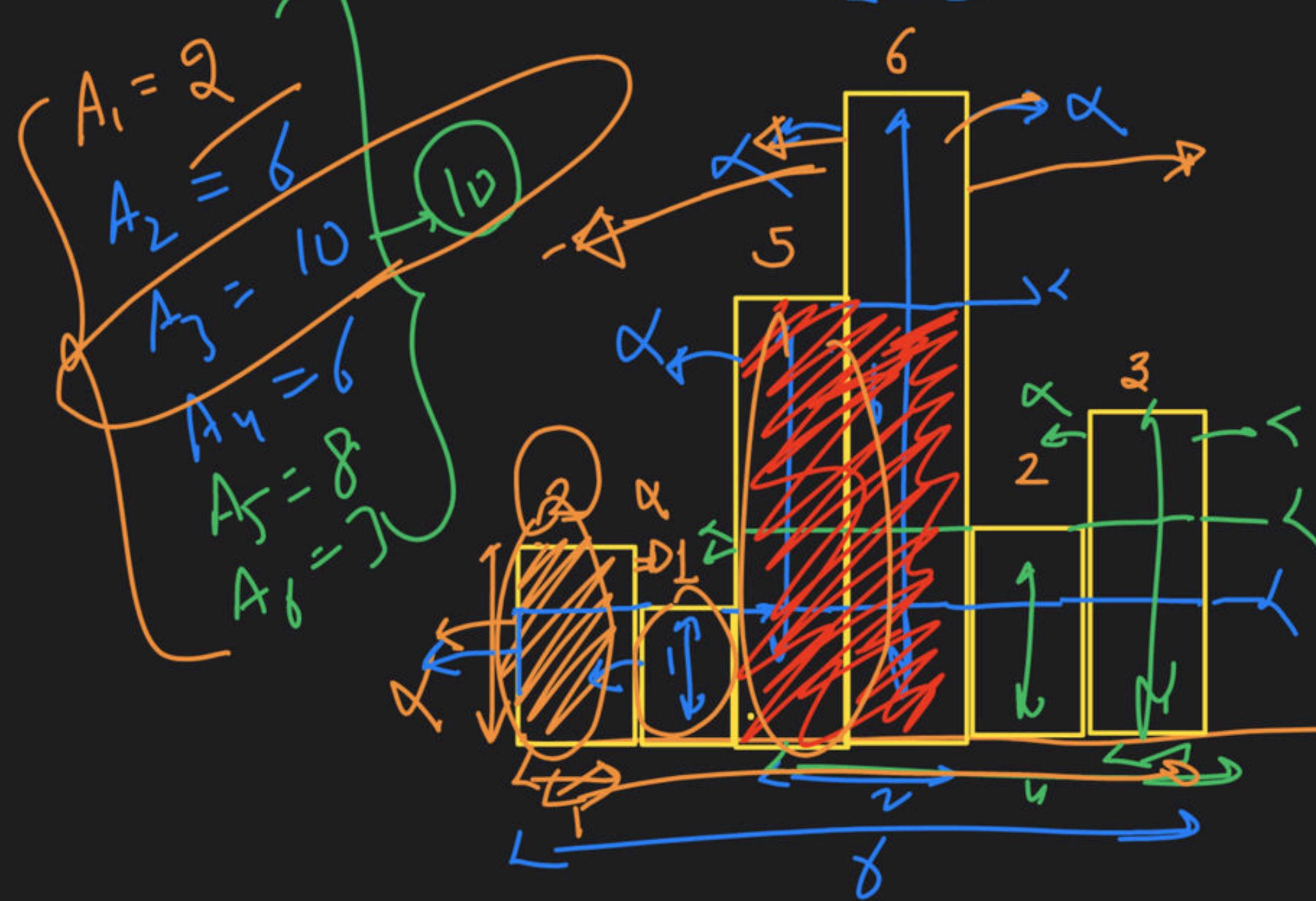








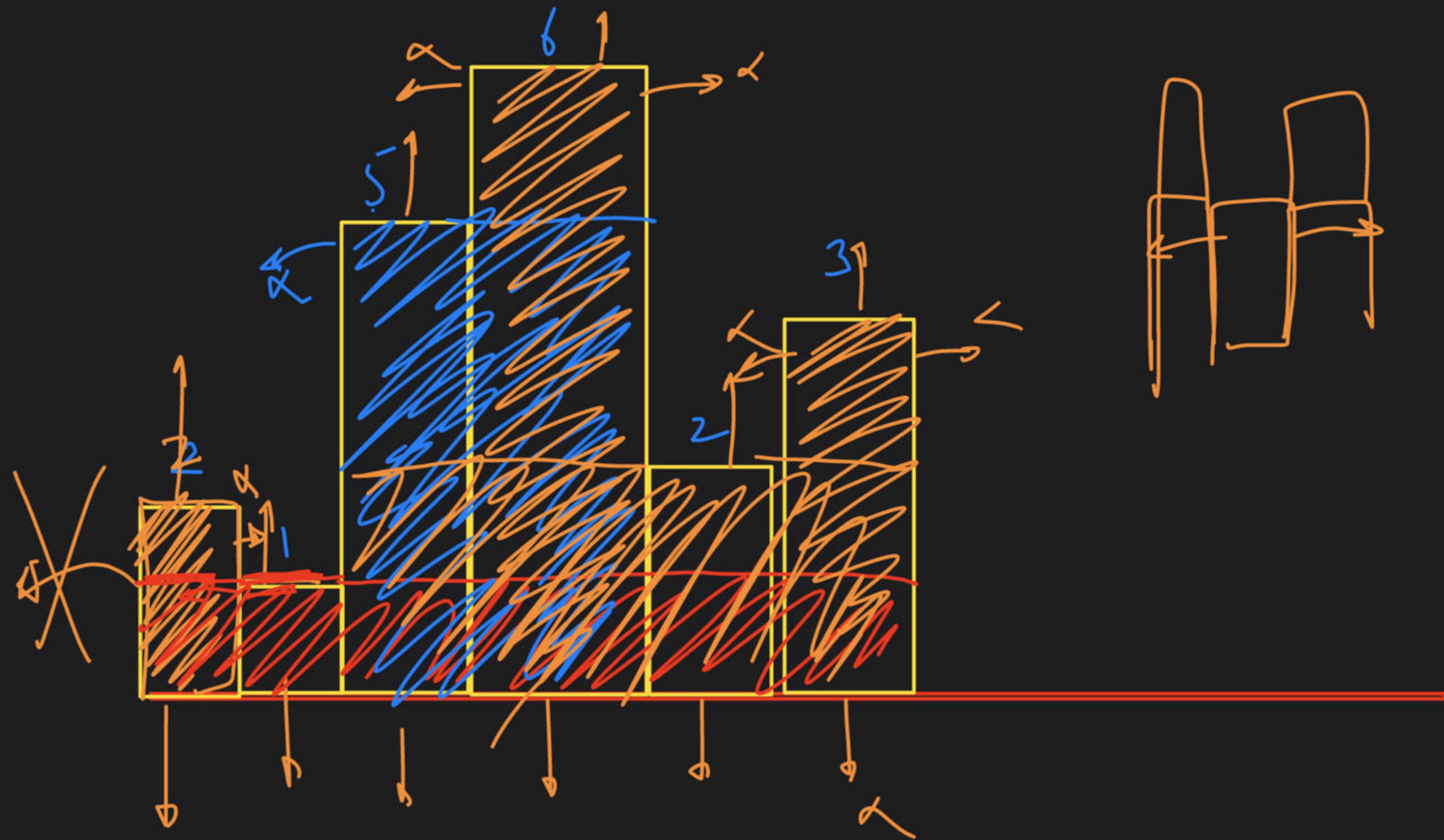
1 Largest Area in a Histogram

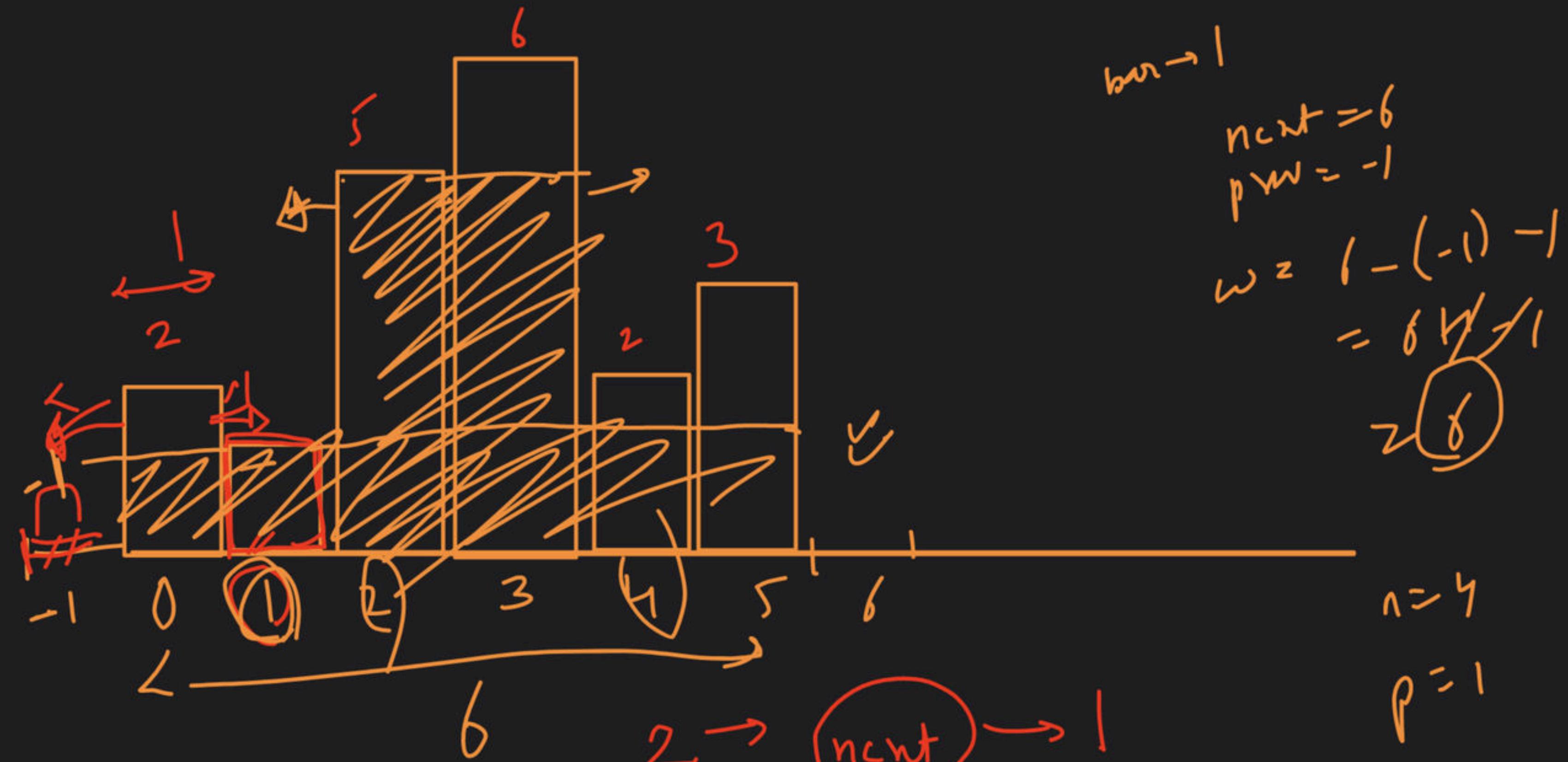


Largest rectangular area in a histogram

$$w =$$

$$A = l \times w$$





$arr \rightarrow 1$

$$\begin{aligned} ncnt &= 6 \\ prev &= -1 \end{aligned}$$

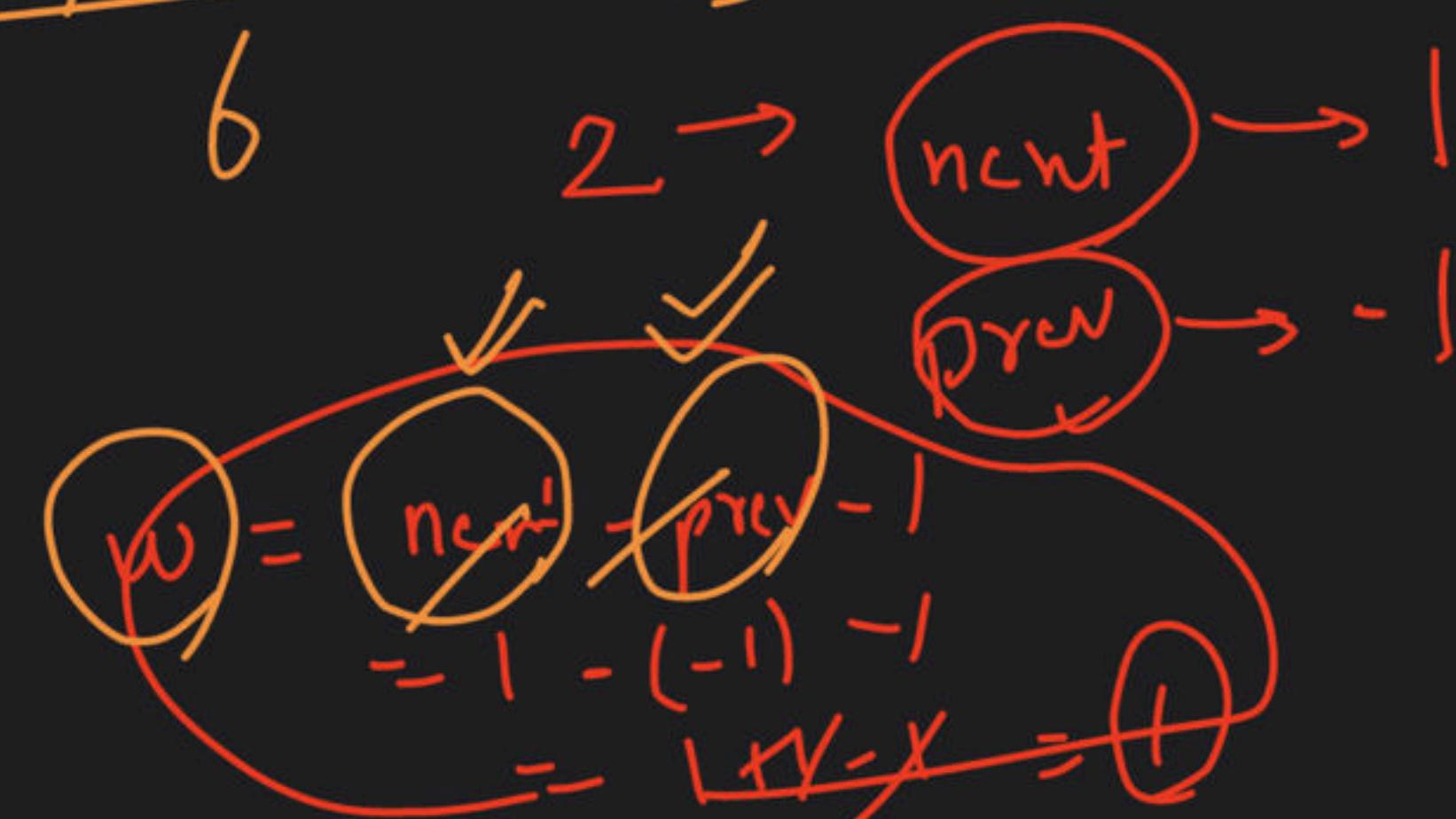
$$\begin{aligned} w &= 1 - (-1) - 1 \\ &= 6 / 1 \end{aligned}$$

$$n = 4$$

$$p = 1$$

$$\begin{aligned} w &= 1 - 1 - 1 \\ &= 2 - 1 - 1 \\ &= 0 \end{aligned}$$

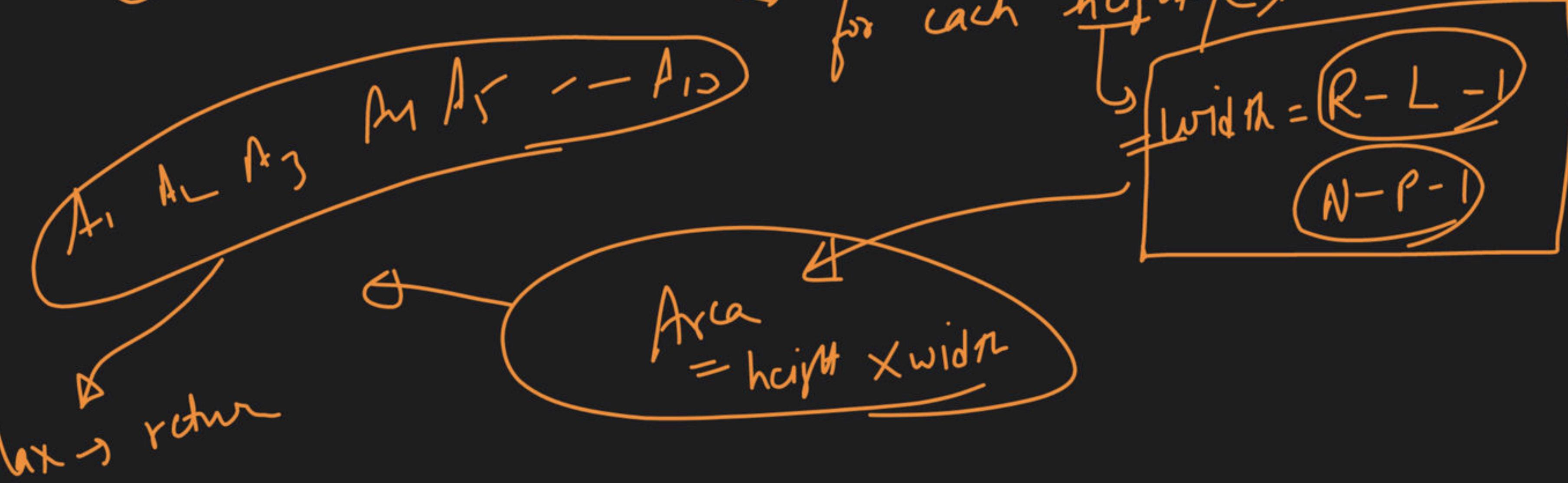
done



(A) $\text{left}[] \rightarrow$ prev smaller Elmt
index

(B) $\text{right}[] \rightarrow$ next smaller Elmt
index

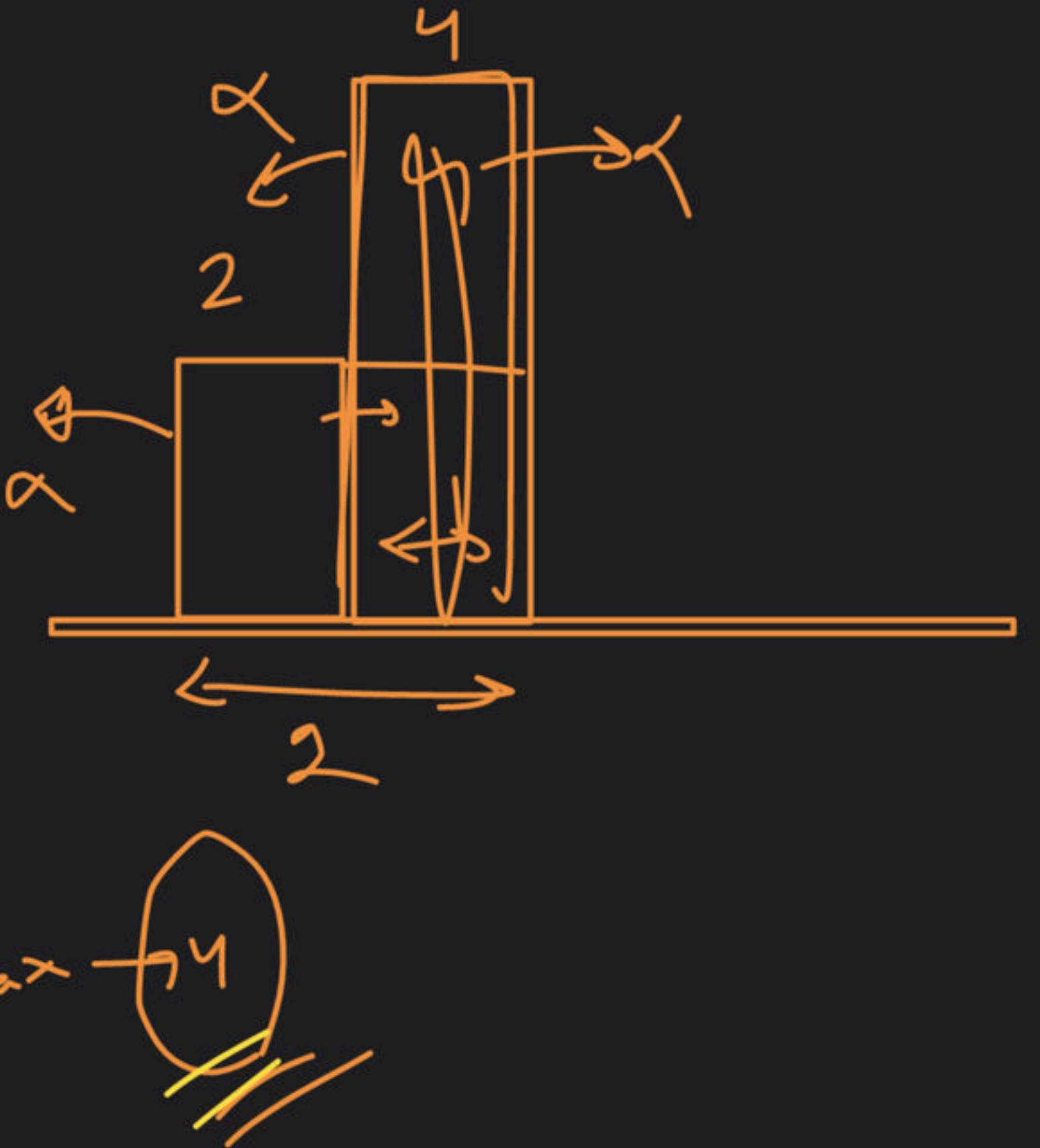
(C) traces $\rightarrow \text{height}(i)$



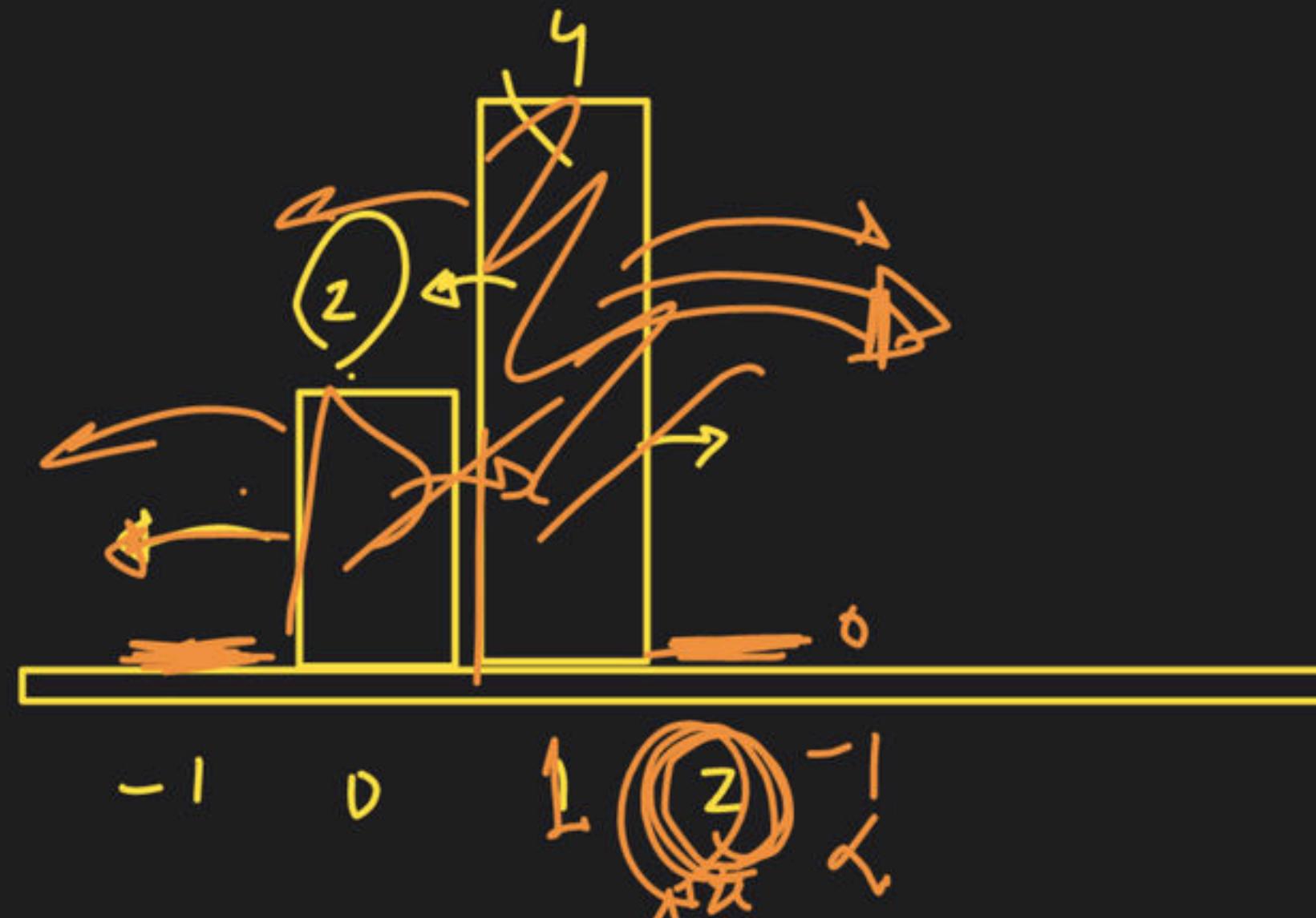


$$A_1 = 2 \times 2$$

$$A_2 = 1 \times 1$$



if ($n[i] == -1$)
 $n[i]$ es null



$$A_2 \cdot (-1 \times 2) = -2$$

$$A_2 \cdot n > 1 = -16$$

$n_{int} \rightarrow$

-1	-1
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$pw \rightarrow$

-1	2
----	---

$w \rightarrow$

-1	-4
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$$\begin{array}{r} -1 - (-1) - 1 \\ -1 - 1 - 1 \end{array}$$

$$\begin{array}{r} -1 - 2 - 1 \\ = -4 \end{array}$$











