

Container with Most Water

11. Container With Most Water

Solved

Medium Topics Companies Hint

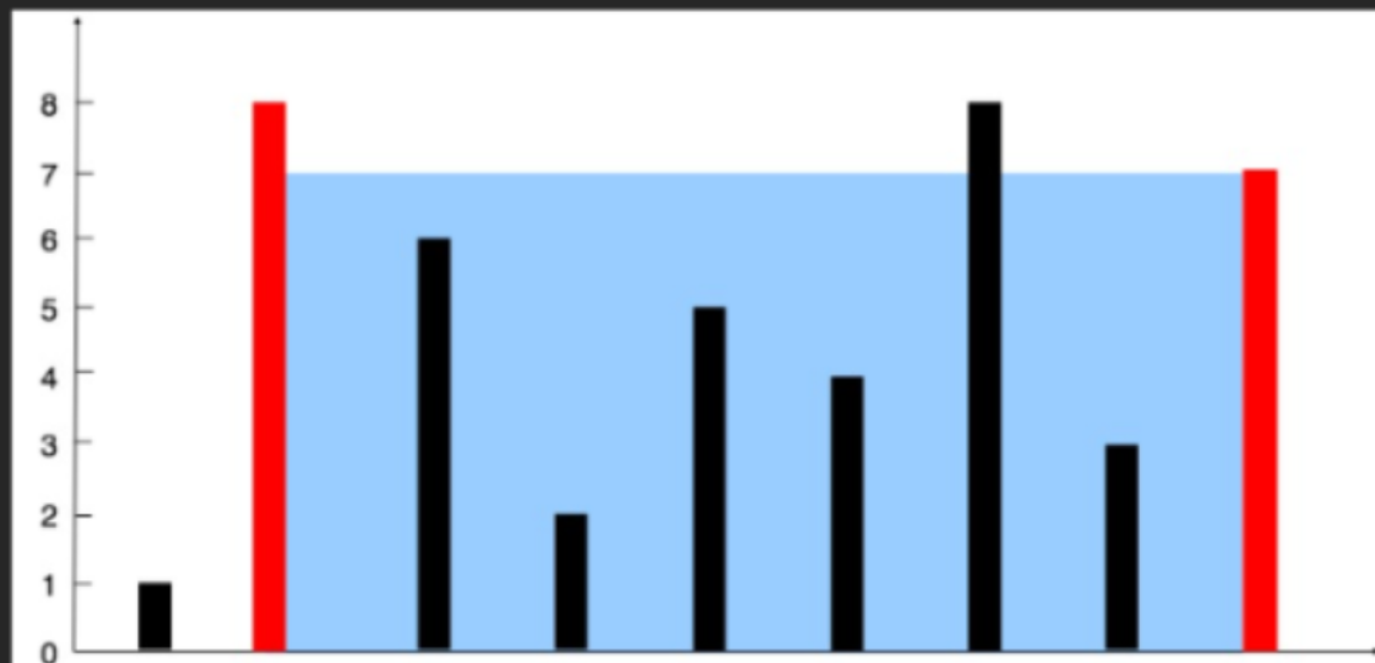
You are given an integer array `height` of length `n`. There are `n` vertical lines drawn such that the two endpoints of the i^{th} line are $(i, 0)$ and $(i, \text{height}[i])$.

Find two lines that together with the x-axis form a container, such that the container contains the most water.

Return the maximum amount of water a container can store.

Notice that you may not slant the container.

Example 1:

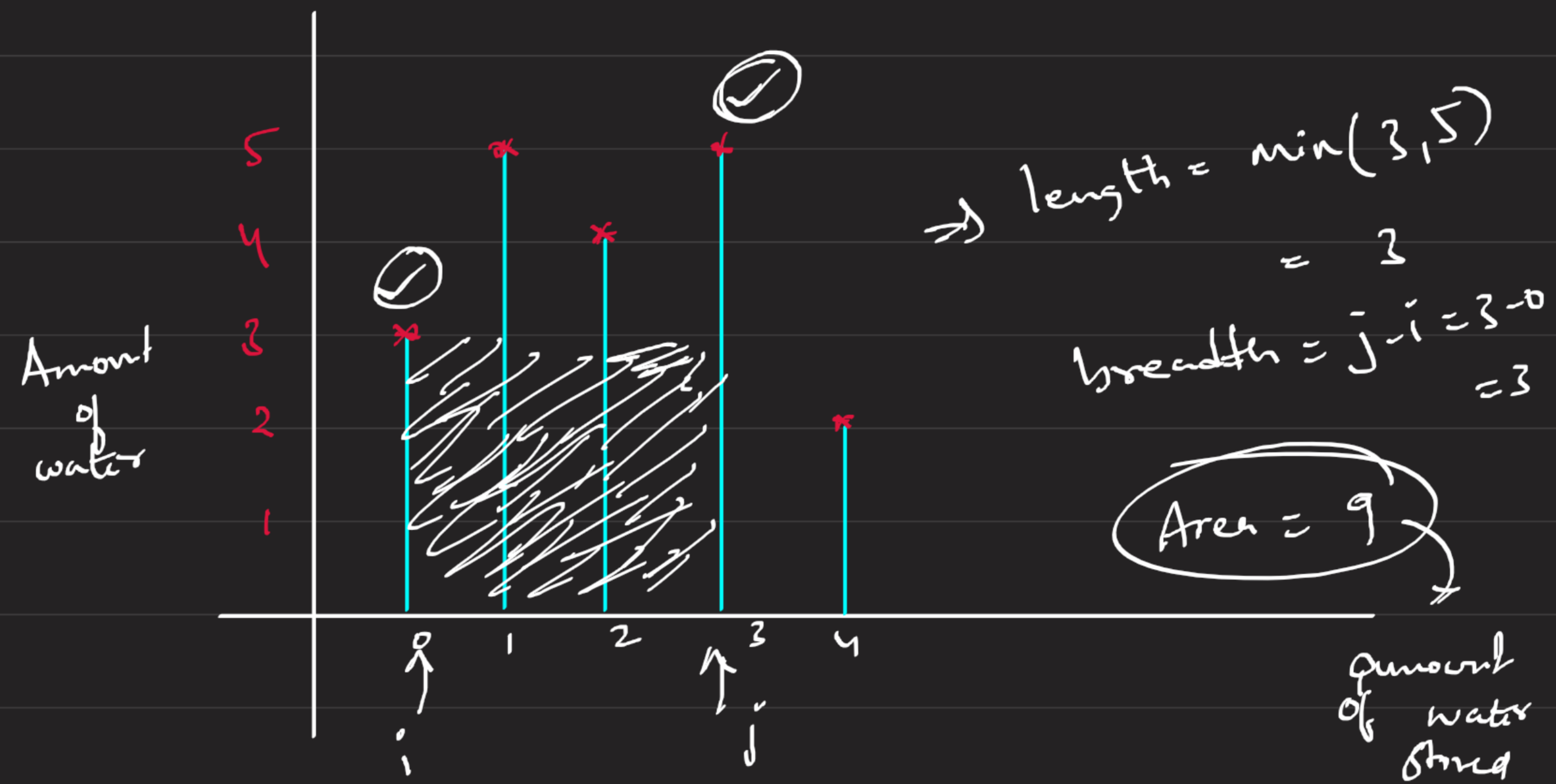


Input: `height = [1,8,6,2,5,4,8,3,7]`

Output: 49

Explanation: The above vertical lines are represented by array `[1,8,6,2,5,4,8,3,7]`. In this case, the max area of water (blue section) the container can contain is 49.

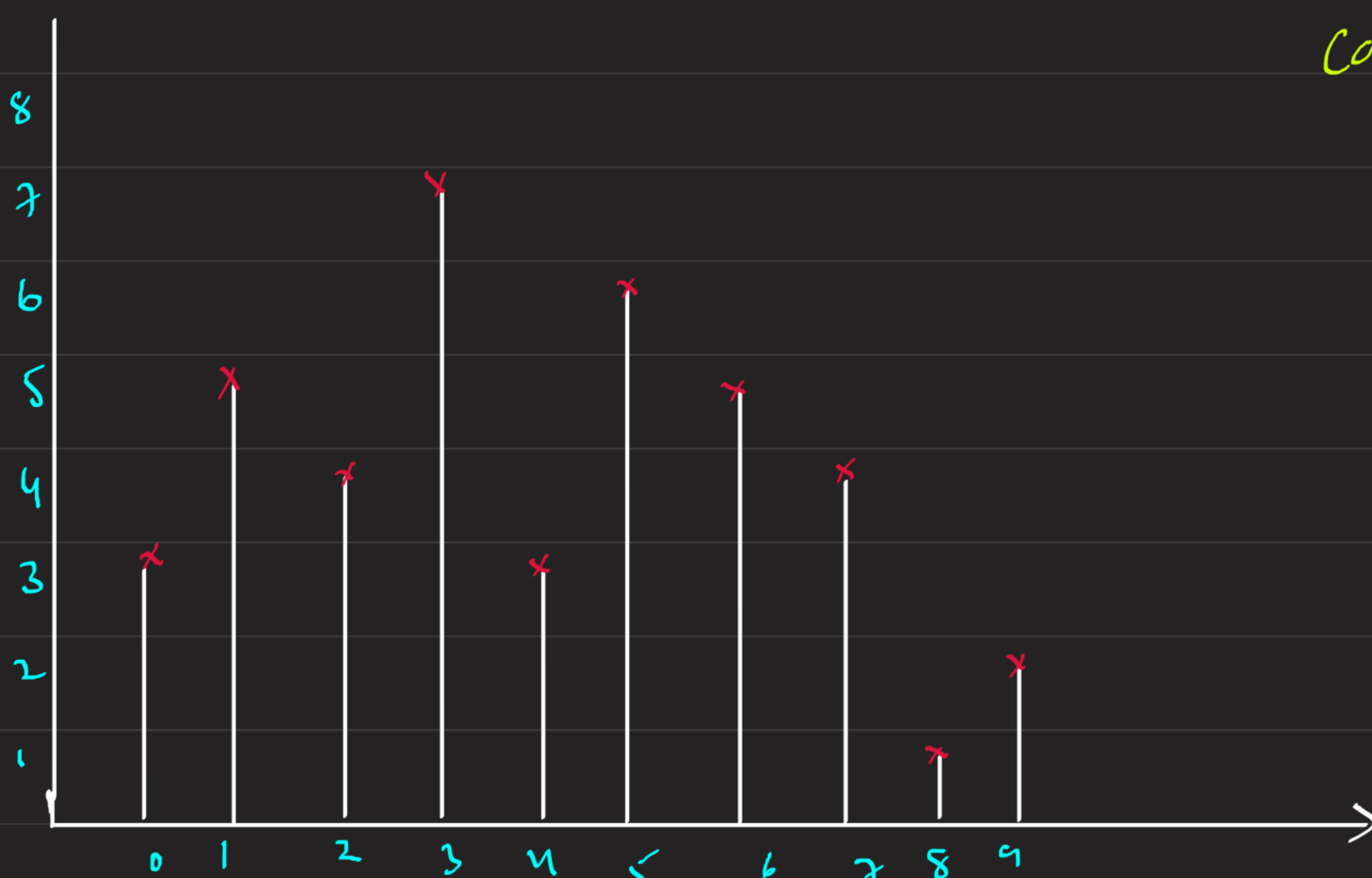
Use a pointer technique



Amount of water = length \times Breadth \rightarrow nothing but area

$$= (j - i) \times (\min(\text{arr}[i], \text{arr}[j]))$$

$$\text{arr}[] : (3, 5, 4, 7, 3, 6, 5, 4, 1, 2)$$



Case - I

if $\text{arr}[i] > \text{arr}[j]$

\downarrow
j is not useful in making max area

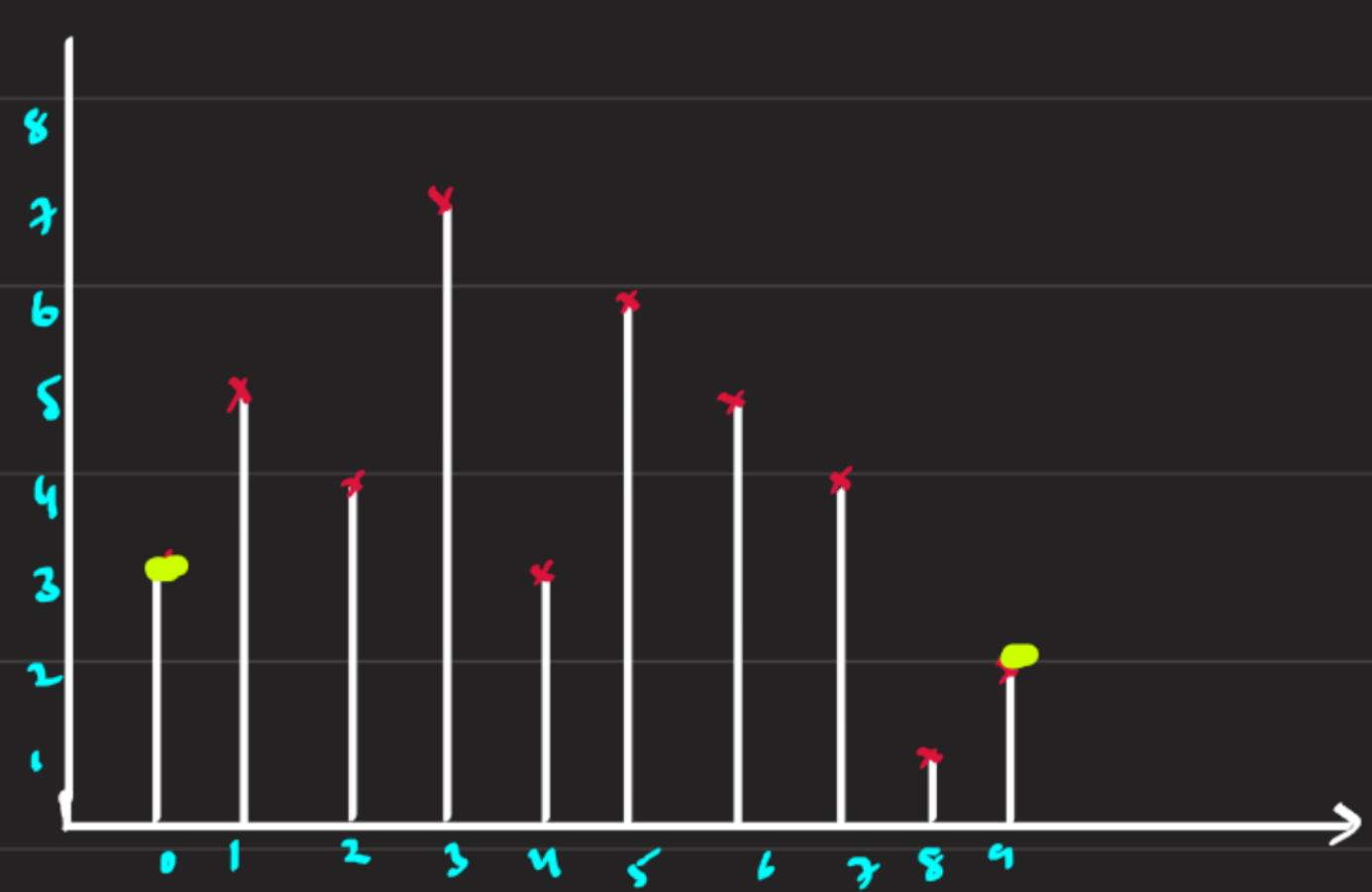
so $\rightarrow j--$

Case - II

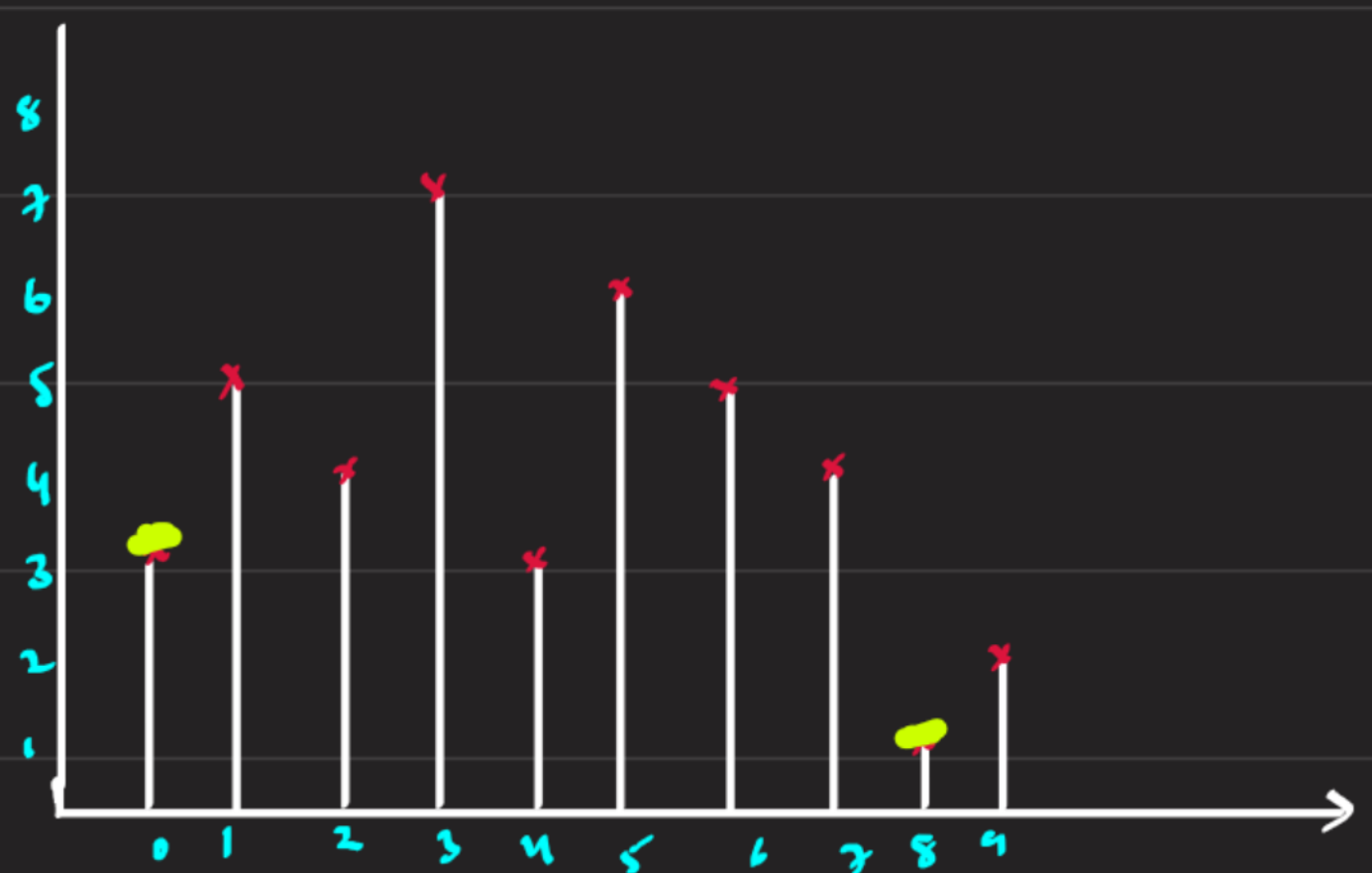
if $\text{arr}[i] < \text{arr}[j]$

\downarrow
i is not useful in making max area

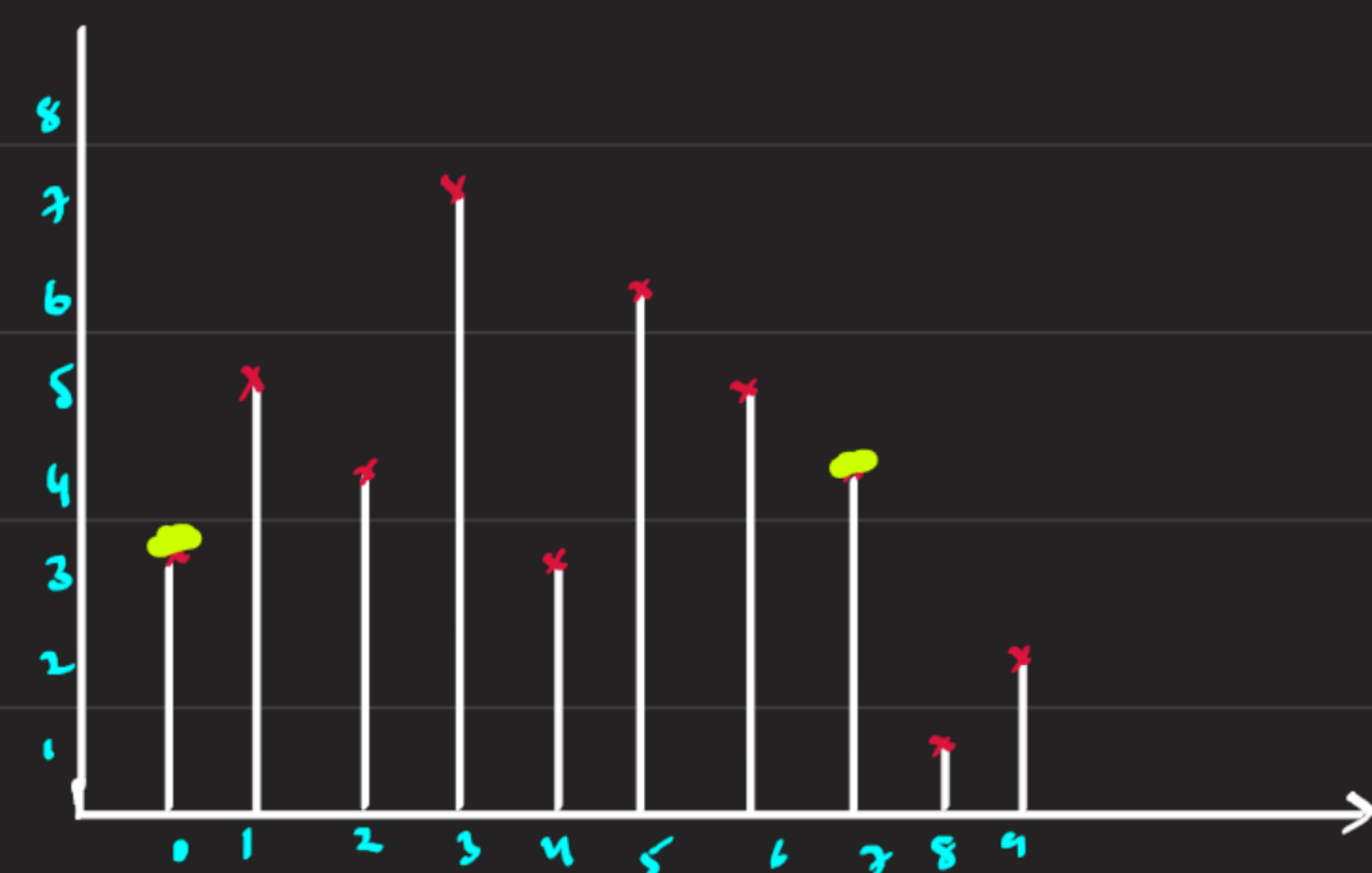
so $\rightarrow i++$



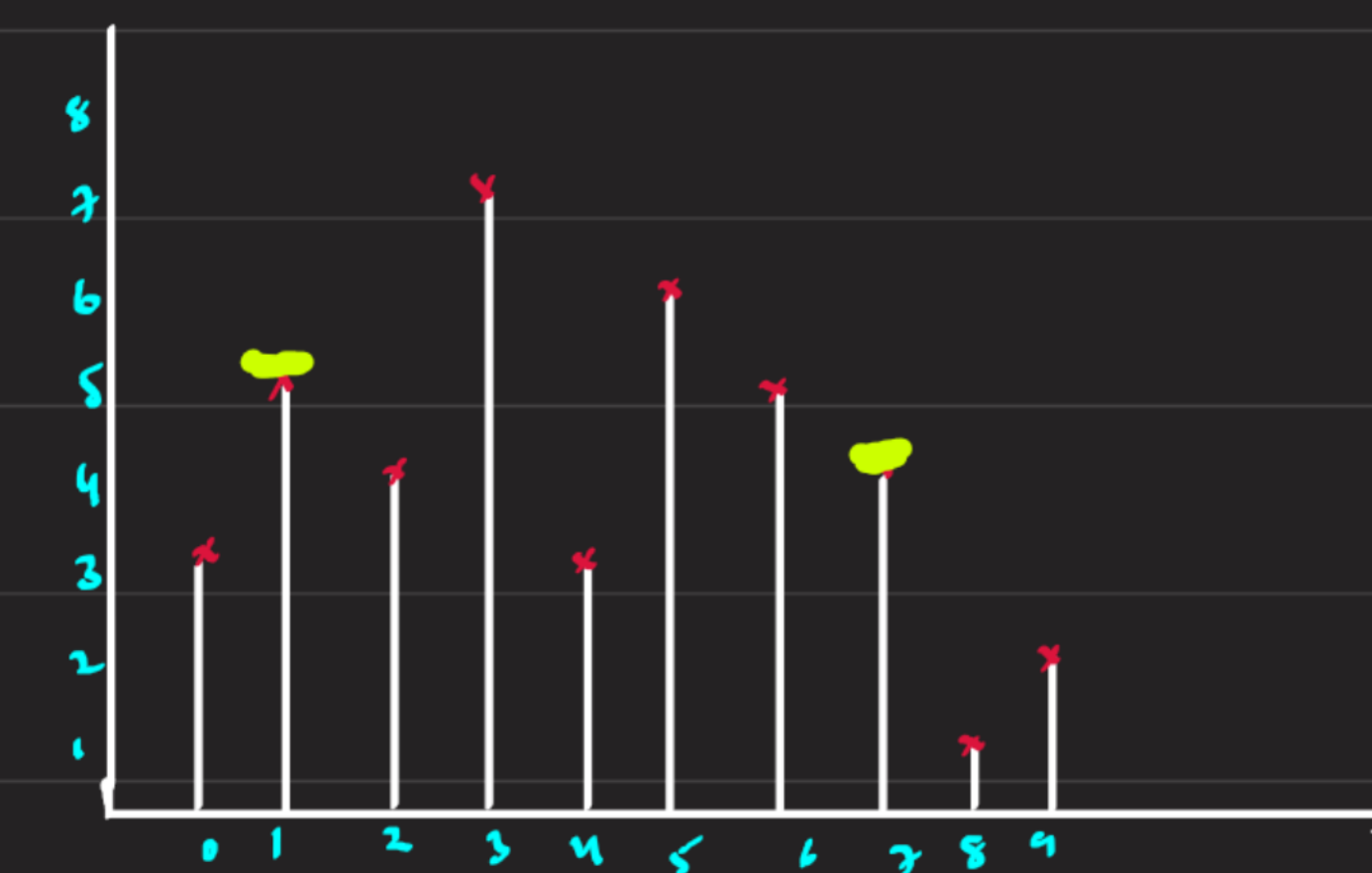
$a(i)$	$a(j)$	height	width	amount	max ans	operation
3	2	2	9	18	7 18	j--



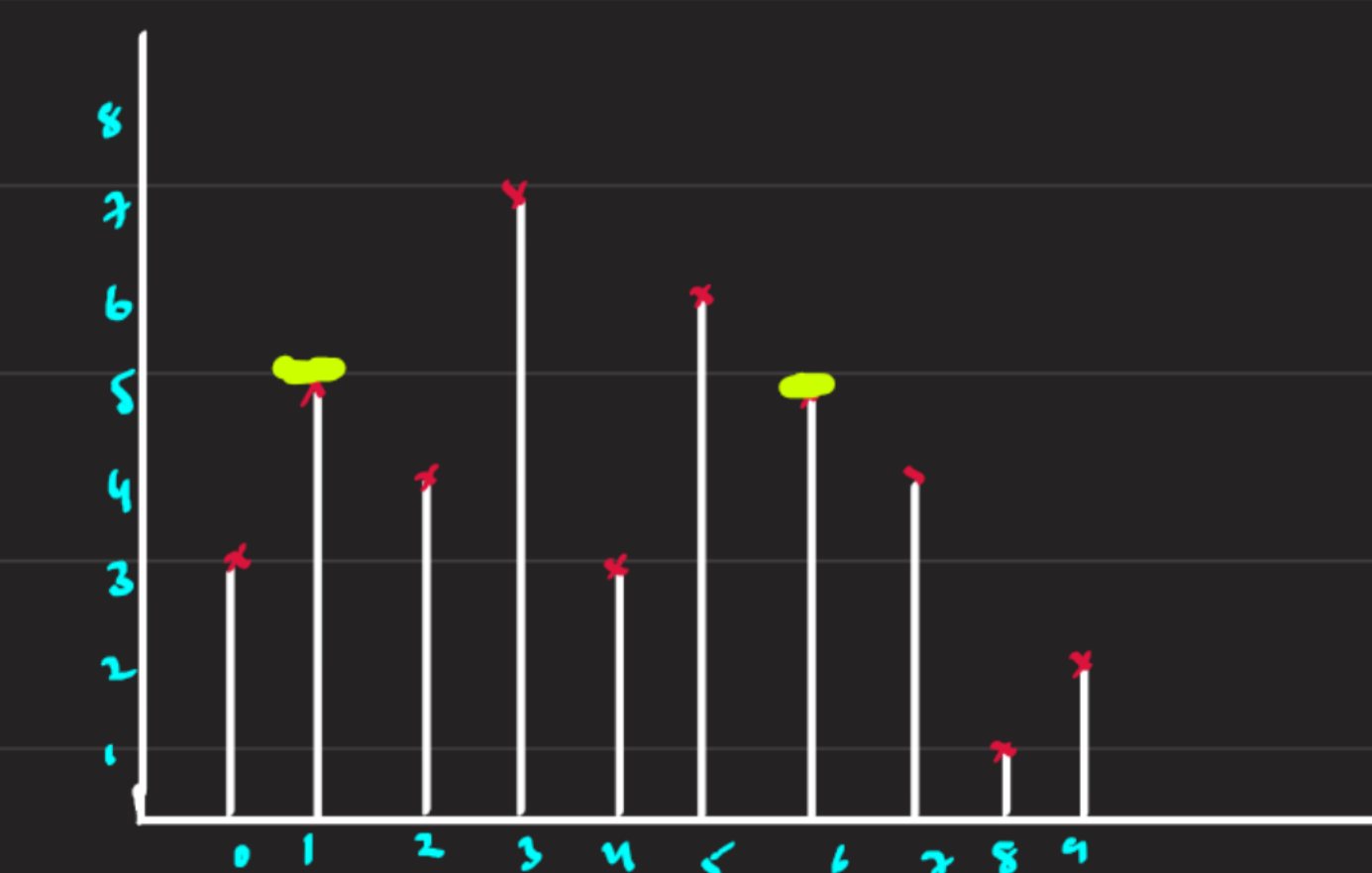
3	1	1	8	8	18	j--
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3	4	3	7	21	18 \rightarrow 21	i++
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5	4	4	6	24	21 \rightarrow 24	j--
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5	5	5	5	25	24 \rightarrow 25	j--
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⋮
↓

likewise update (i, j) and store max potential area of ans

* After (i, j) crosses which area is lastly updated, that will be our answer

↘ most water contained

$T.C : O(n)$, $SC : O(1)$