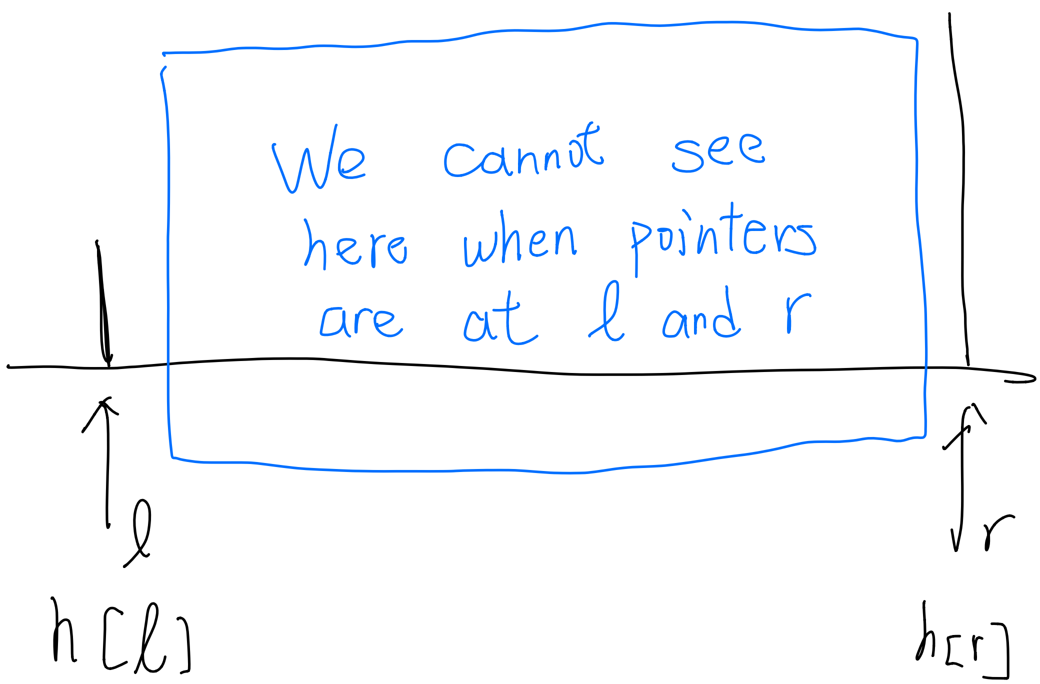
# Two pointers thinking process:




$\boxed{\text{if } h[r] > h[l]}$:

$$A = h[l] \cdot (r - l)$$

$\Rightarrow$ If a $h[i]$, $i \in (l, r)$

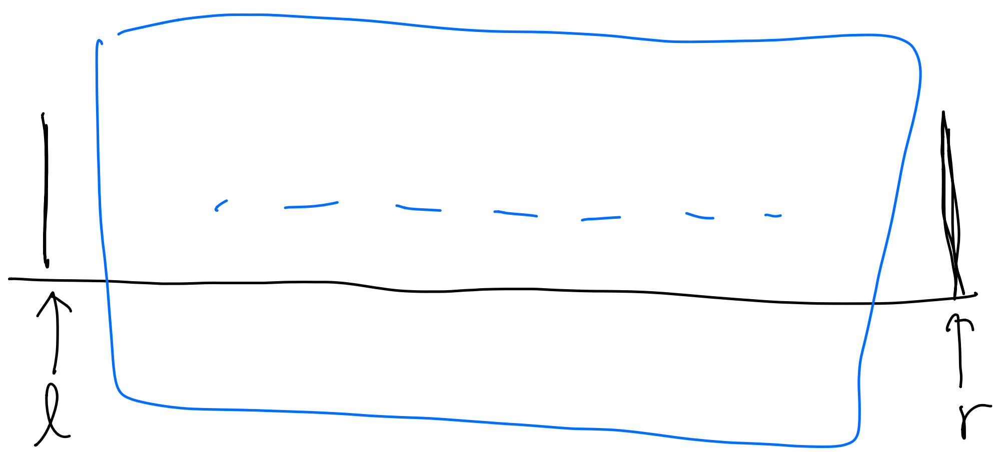
if $h[i] > h[l]$, $\min(h[l], h[i]) \cdot (i - l) < h[l] \cdot (r - l)$

if $h[i] \le h[l]$, $\min(h[l], h[i]) \cdot (i - l) < h[l] \cdot (r - l)$

$\Rightarrow$ we can move $l$ to the right else if $\boxed{h[r] < h[l]}$:

$\Rightarrow$ we can move $r$ to the left

else if $\boxed{h[l] == h[r]}$:



$$A = h[l] \cdot (l - r)$$

Question: Can we build a container using either $h[l]$ or $h[r]$ with an index $\boxed{i \in (l, r)}$ with $h[i]$ that

$$\boxed{\min(h[l \text{ (or } r)], h[i]) \cdot |i - l \text{ (or } r)| > A}$$

If $h[i] \geq h[l] (= h[r])$

$$A_1' = \min(h[i], h[l]) \cdot (i - l)$$

$$= h[l] \cdot (i - l) < h[l] \cdot (r - l)$$

$(\because i < r)$ $= A$

$$A_2' = \min(h[i], h[r]) \cdot (r - i)$$

$$= h[r] \cdot (r - i) < h[r] \cdot (r - l)$$

$(\because i > l)$ $= A$

else if $h[i] < h[l] (= h[r])$

$\Rightarrow$ same proof as above

$\Rightarrow$ We cannot find an index $i \in (l, r)$ s.t. using either $h[l]$ or $h[r]$ with $h[i]$ to form a larger rectangle. $\Rightarrow$ $\boxed{l{+}{+},\ r{-}{-}}$