



Stacks

o Next greater Element on right

int[] = { 3, 6, 1, 2, 7, 4, 3, 2, 5 }

↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑

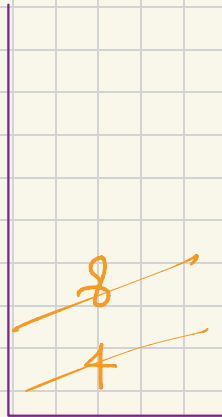
{ 6, 7, 2, 7, -1, 5, 5, 5, -1 } ✓

clear!

~~var[st:peek()]~~

↓

{value at that position}



stack { Ele. looking for uger }

int[] arr = { 2, 3, 1, 4, 3, 5 }

0	1	2	3	4	5
2	3	1	4	3	5
↑	↑	↑	↑	↑	↑
3	4	4	5	5	-1

↑

Monotonic Stack!

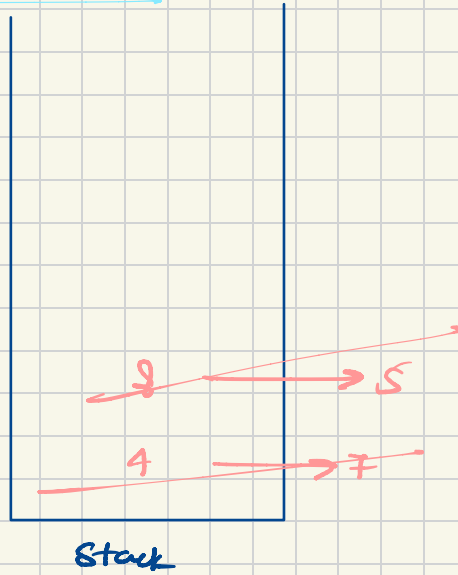


stack { Ele looking for user }

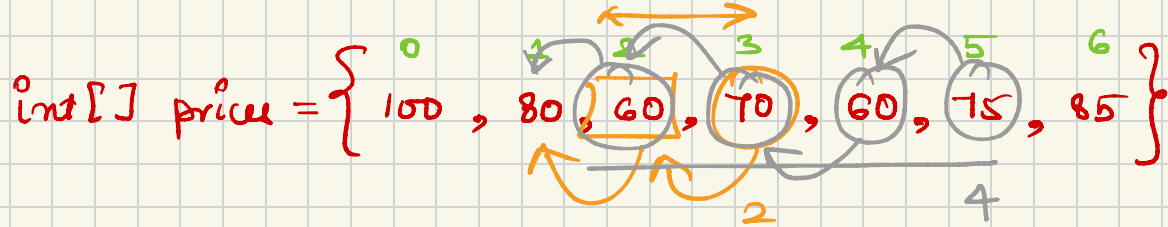
TC: $O(N)$
SC: $O(N)$

0	1	2	3	4	5	6	7	8
3	6	1	2	7	4	3	2	5
↑	↑	↑	↑	↑	↑	↑	↑	↑
6	7	2	7	-1	5	5	5	-1
-1	-1	6	6	-1	7	4	3	7

next greater
Element on
left



Stock Span Problem

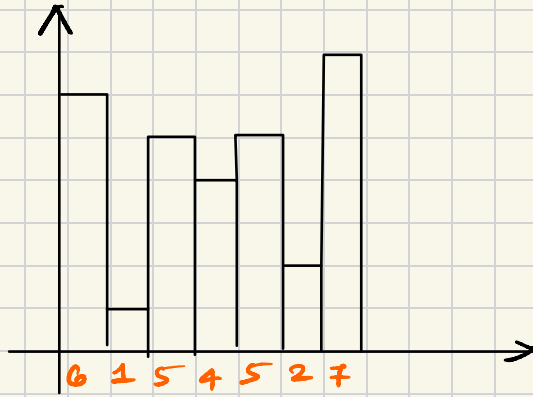


Span: no. of consecutive prev. days inc. current day, where stock price is less than equal to current day

{ 100, 80, 60, 70, 60, 75, 85 }

{ 1, 1, 1, 2, 1, 4, 6 } ✓

Largest Area Histogram.



$\text{int[] list} = \{6, 1, 5, 4, 5, 2, 7\}$

Brute Force

$h \times w$

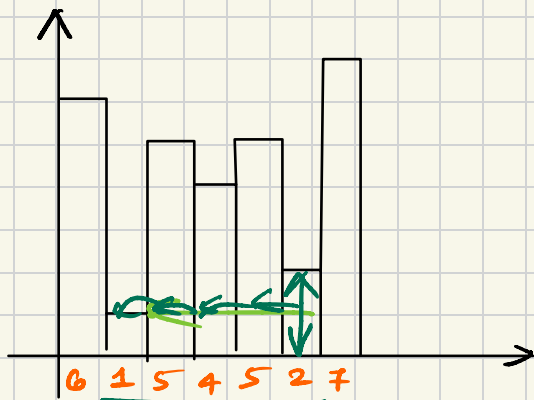
$TC: O(n^2)$
 $SC: O(1)$

```
for (int i = 0; i < n; i++)  
{  
    int mh = 0;  
    for (int j = i; j < n; j++)  
    {  
        w = j - i + 1;  
        mh = max(arr[j], mh);  
        area = w * mh;  
    }  
}
```

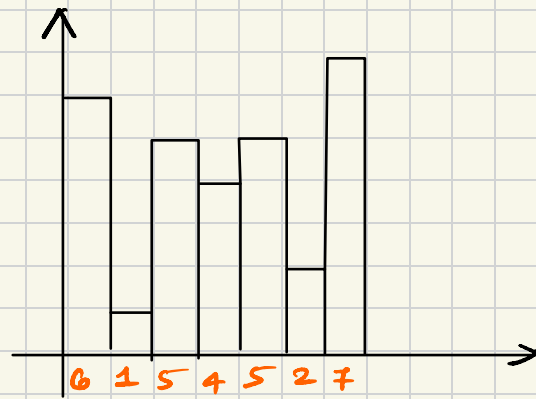


fixed

мониторинг



next smaller on left



$$\begin{matrix} - & 0 & 1 & 2 & 3 & 4 & 5 & 6 \\ & \{ & 6, & 1, & 5, & 4, & 5, & 2, & 7 \} \end{matrix}$$

$$\begin{matrix} \text{next} & -1 & -1 & 1 & 1 & 3 & 1 & 5 \\ \text{next} & 1 & 7 & 3 & 5 & 5 & 7 & 7 \end{matrix}$$

$$\left[\begin{matrix} 1 - (-1) - 1 & 7 - (-1) - 1 \\ = 1 & = 7 & 3 - 1 - 1 \\ & & = 1 \end{matrix} \right]$$

