



Agenda

- ① sliding window maximum
- ② Rotten Oranges
- ③ Asteroid Collision

Sliding Window Maximum

int[] arr = {⁰1, ¹3, ²-1, ³-3, ⁴5, ⁵2, ⁶6, ⁷7} K = 3

value of \max^m of each window = { 3, 3, 5, 5, 6, 7 }

Brute Force

TC: $O(N \times K)$
SC: $O(1)$

```
{
    for (int i = 0; i <= n - K; i++)
    {
        int max = -∞;
        for (int j = i; j < i + K; j++)
            max = max(max, arr[j]);
        ans.add(max);
    }
}
```

int[] arr = { 1, 3, -1, -3, -5, -13, 6, 7 } $K=3$

~~1~~ ~~3~~ ~~-1~~ ~~-3~~ ~~-5~~ ~~-13~~ ~~6~~ ~~7~~

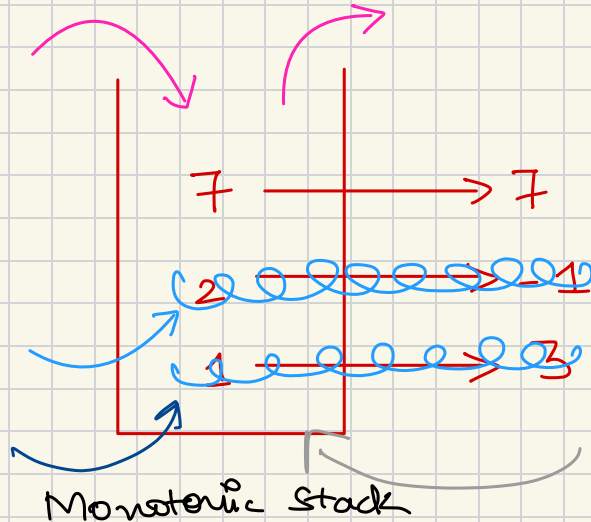
next greater element on right

{ 3, 3, -1, -3, 6, 7 }

$e_i = x$

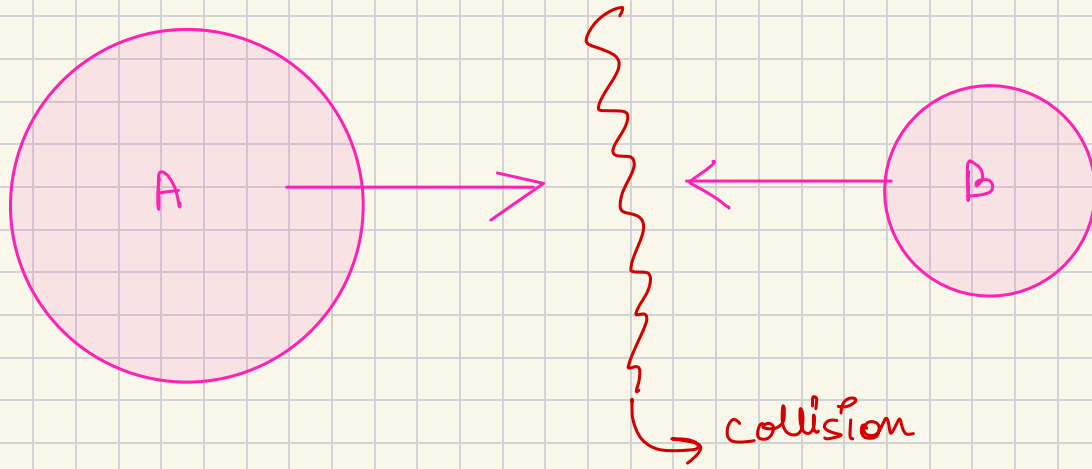
$s_i = x - k + 1$

Range



decreasing

Asteroid Collision



NOTE: at time of collision, smaller one gets destroyed and larger one stays unaffected



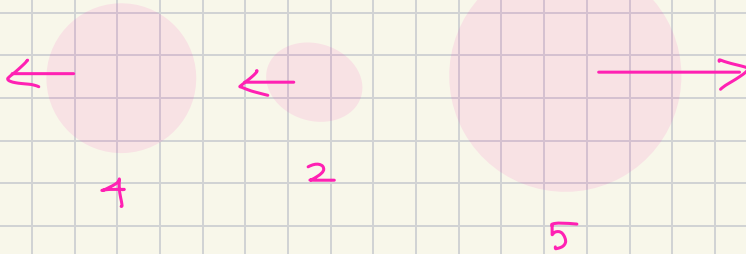
NOTE: If two asteroid of same size collide,
Both will get destroyed.

$int[] = \{ \underset{\checkmark}{1}, \underset{\checkmark}{2}, \underset{\checkmark}{3}, \underset{\checkmark}{-4}, \underset{\checkmark}{-2}, \underset{\checkmark}{5}, \underset{\checkmark}{-3} \}$

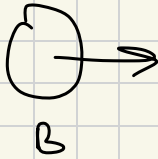
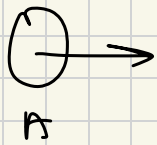
(+) we \rightarrow moving towards right
(-) we \rightarrow moving towards left

$abs(val) \rightarrow$ size of the asteroid

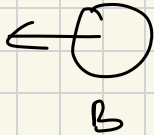
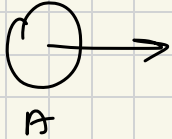
$\{-4, -2, 5\}$



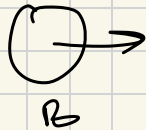
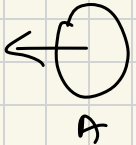
Cases



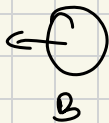
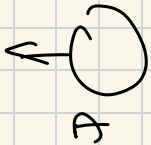
No collision



Collision



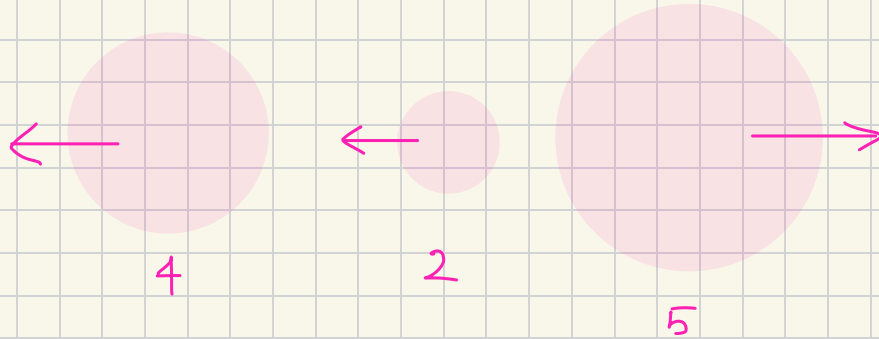
No collision



No collision

$$\text{int}[] = \{ \underset{\nearrow}{1}, \underset{\nearrow}{2}, \underset{\nearrow}{3}, \underset{\nearrow}{-4}, \underset{\nearrow}{-2}, \underset{\nearrow}{5}, \underset{\uparrow}{-3} \}$$

stable universe



$$\text{cns} = \{ -4, -2, 5 \}$$

$$\text{int}[] = \{ \overset{\checkmark}{1}, \overset{\checkmark}{2}, \overset{\checkmark}{4}, \overset{\checkmark}{-4}, \overset{\checkmark}{-6}, \overset{\checkmark}{5}, \overset{\checkmark}{-3} \}$$

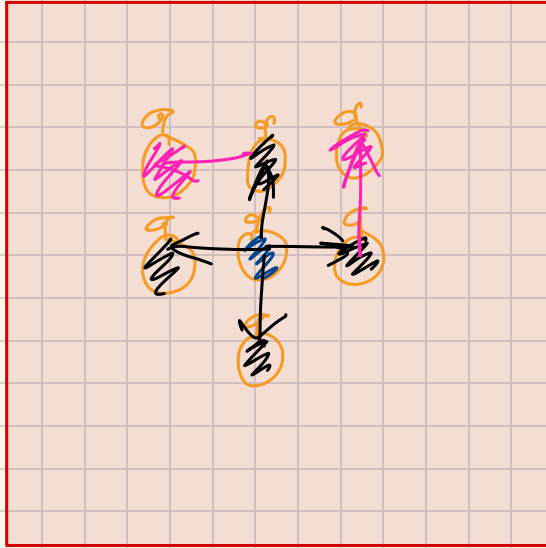
-6, 5

stable universe

$\{-6, 5\}$

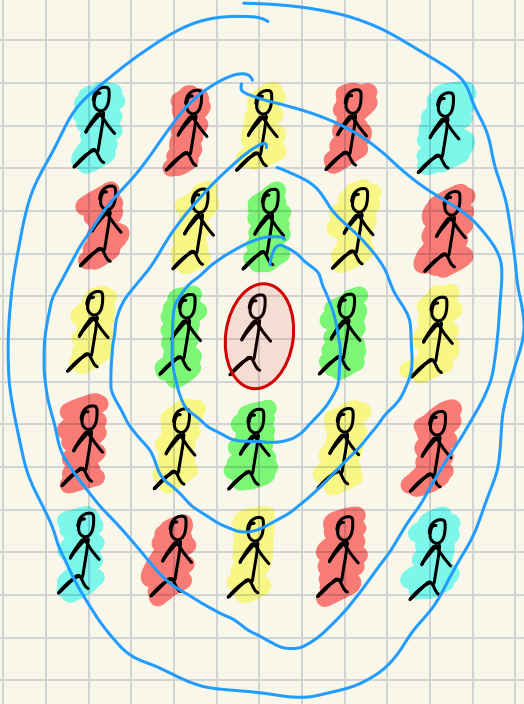
Ans 1

Rotten Oranges (BFS)



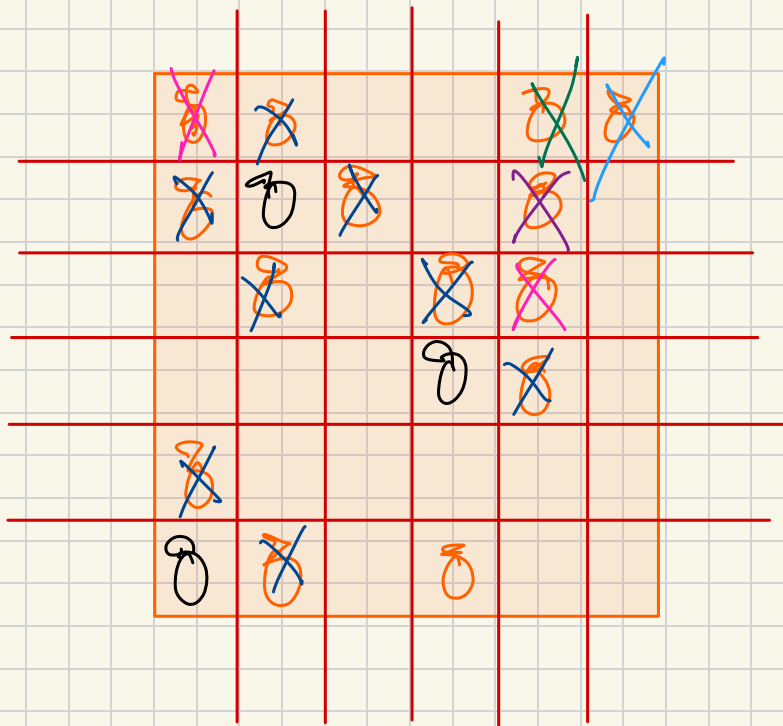
it took 2 units of time to
rotten all the oranges

Covid



min time = 4 units

move radially
↳ BFS



time = ~~1 unit~~
~~2 unit~~
~~3 units~~
~~4 units~~
5 units

\checkmark (Time = level - 1)

	0	1	2	3	4	5
0	0 ✓	0 ✓			0 ✓	0 ✓
1		0	0 ✓		0 ✓	
2		0 ✓		0 ✓	0 ✓	
3			0		0 ✓	
4	0 ✓					
5	0	0 ✓		0		

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$(1/4)$ $(0/4)$ $(0/5)$

H.W → ① Height problem