① gravity flip

→ box / container

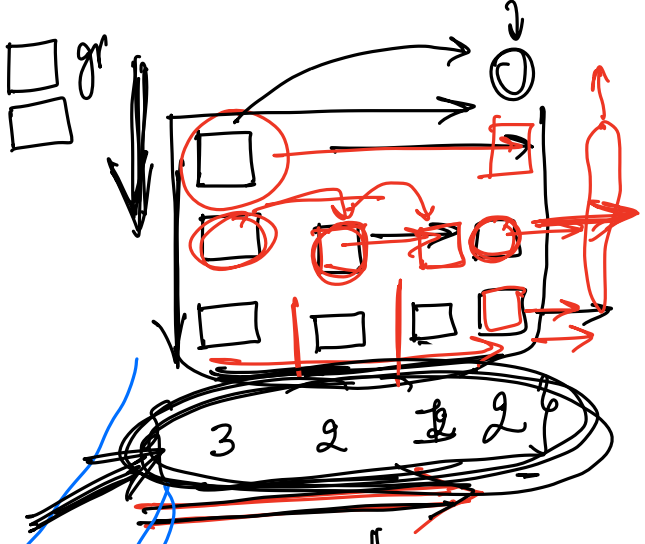
→ cubes

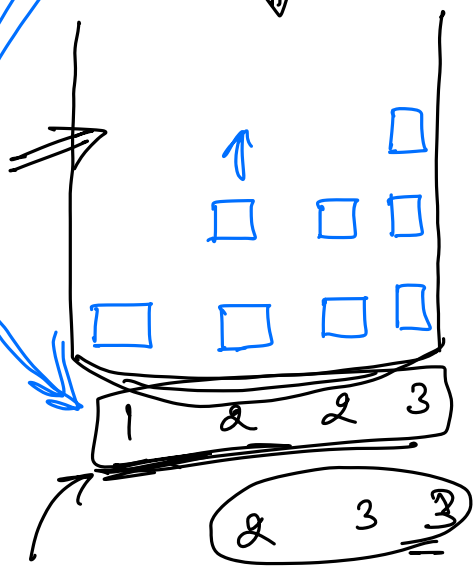
→ no of cubes in every column

gravity → left to right

↓

no of cubes in every column



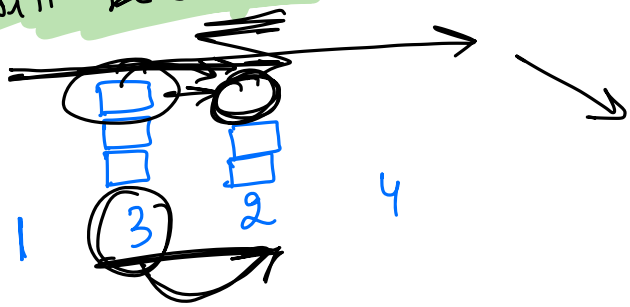



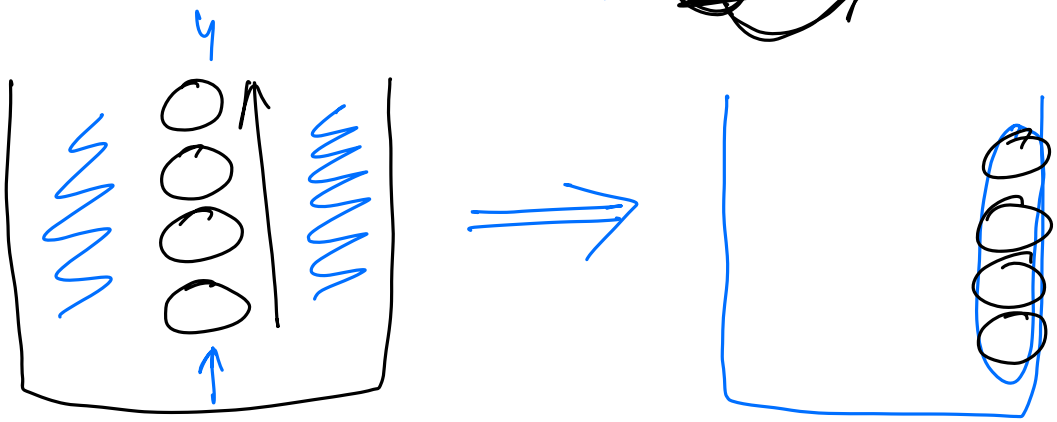

Naive

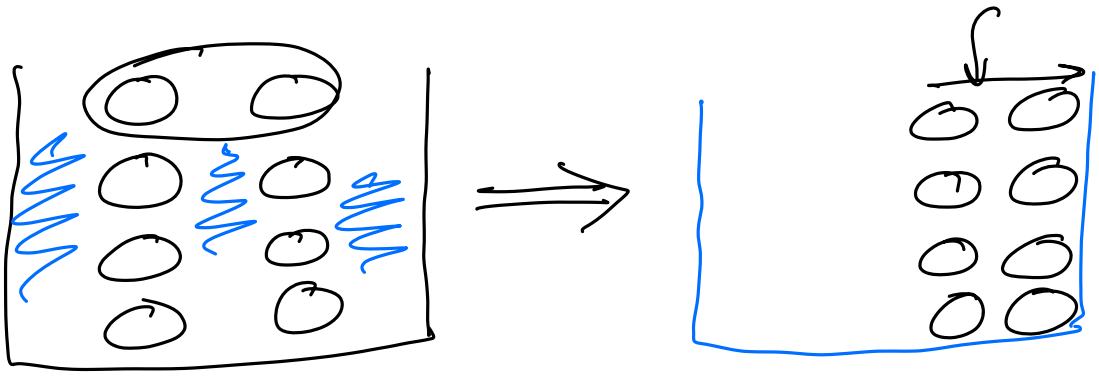
BF

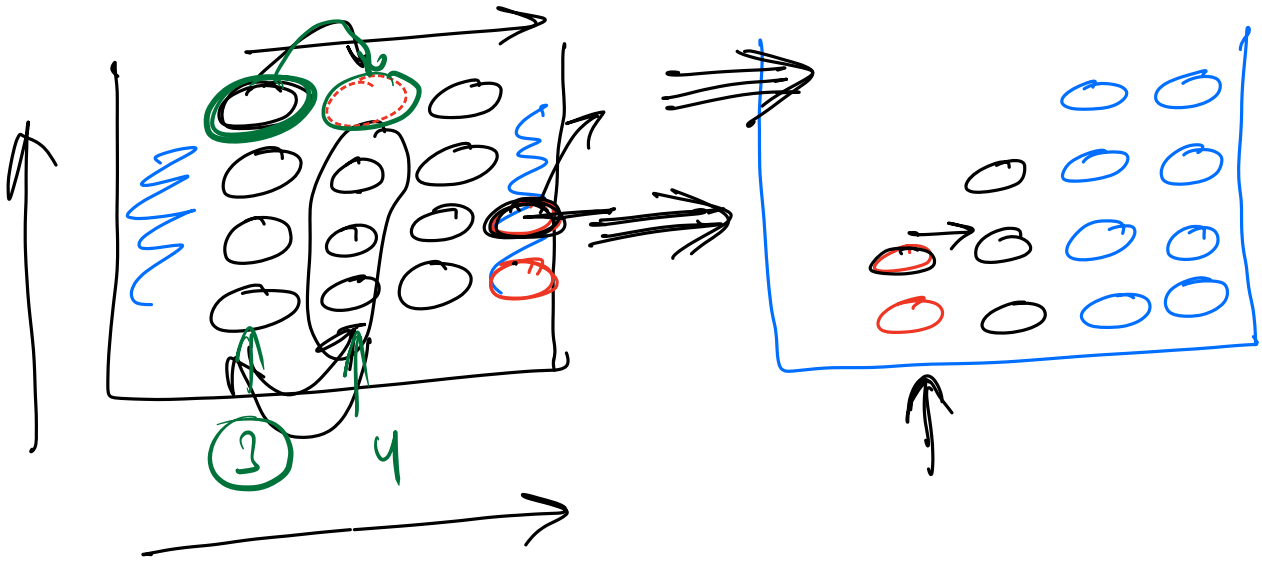
| | | | |
|---|---|---|---|
| 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 1 | 1 | 1 |
| 1 | 2 | 2 | 3 |

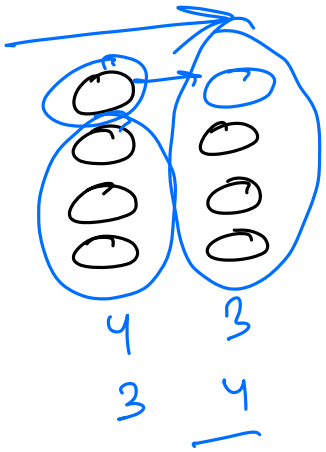
1st obs → final result will be sorted








T.C: $n \log n$

*

② circle of Monsters

→ n monsters → circle

→ array - A → represents the health of every monster

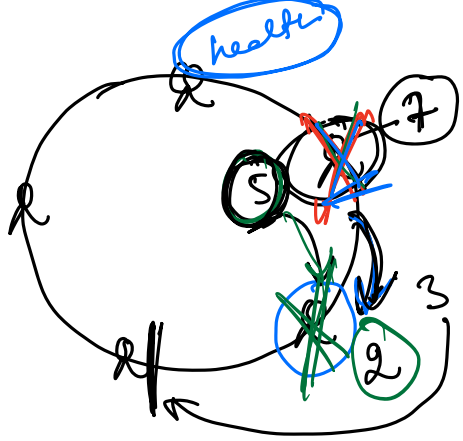
$a_i$ → healt of $i^{th}$ monster

1 unit of health - 1 bullet

→ damage → array

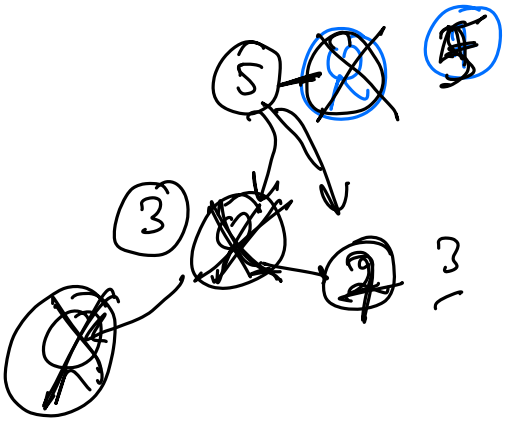
guess the ques?

minimum bullets you need

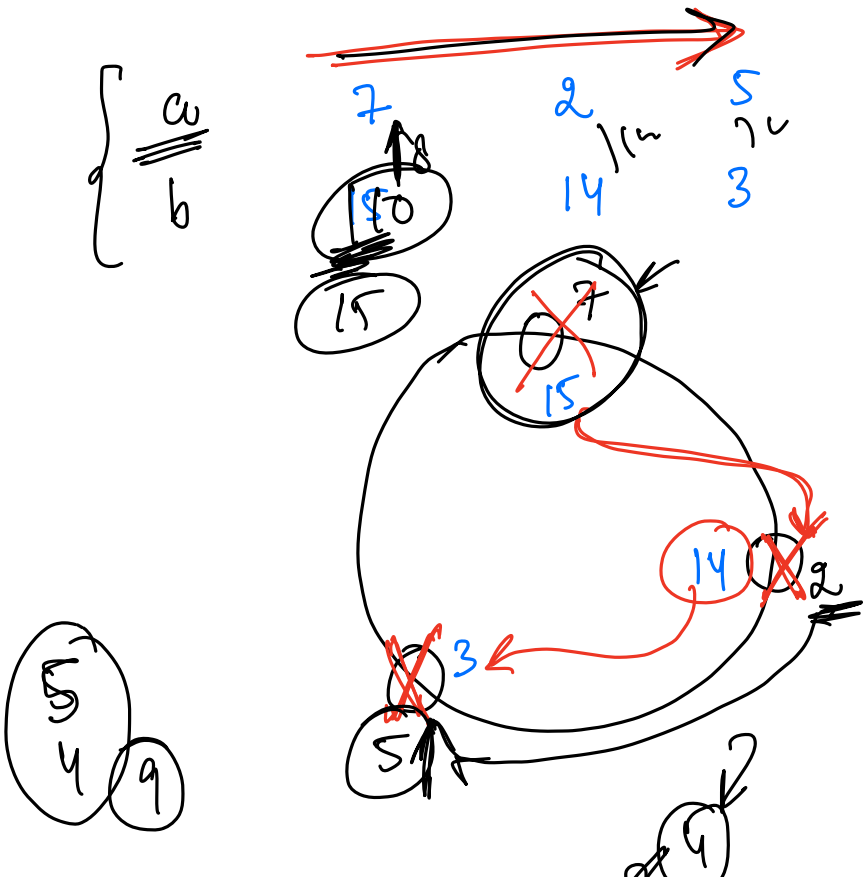


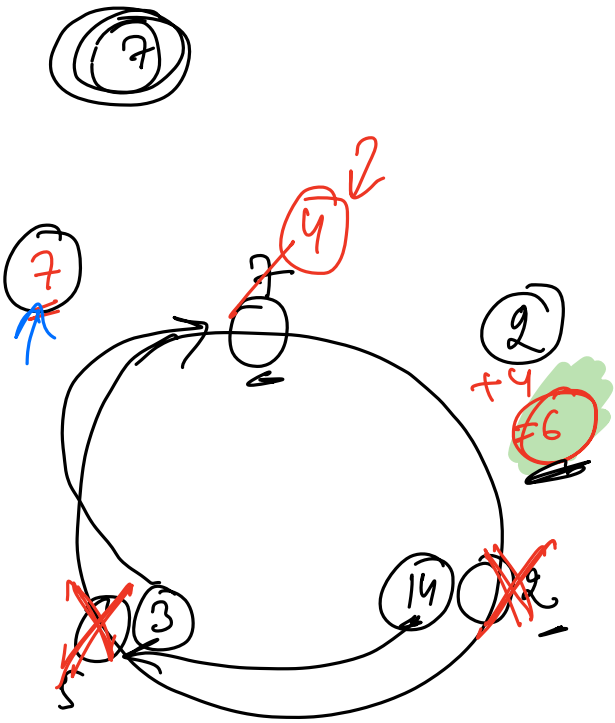

health - $a_i$

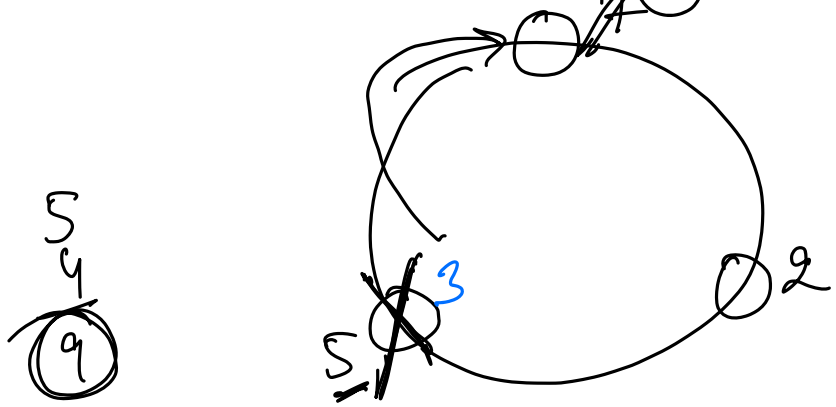
damage - $b_i$

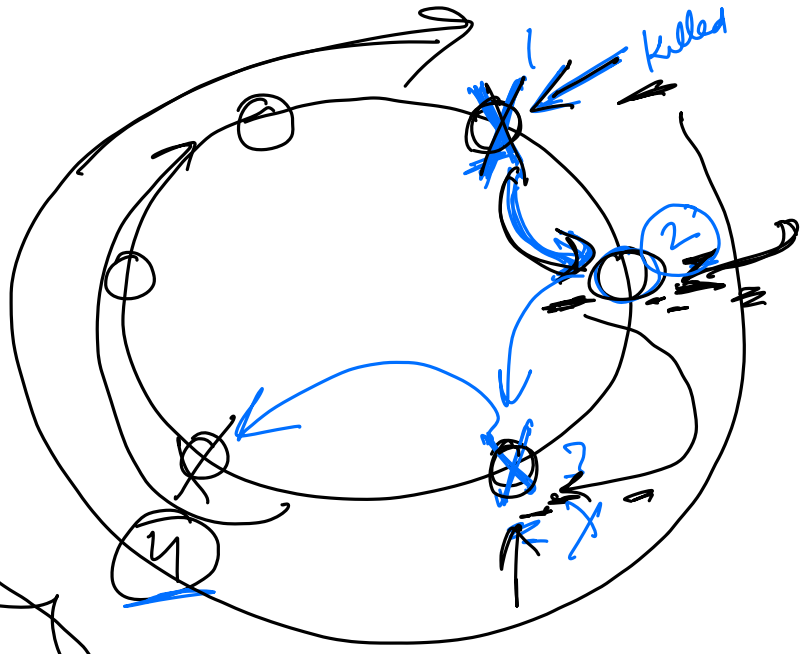



a
b





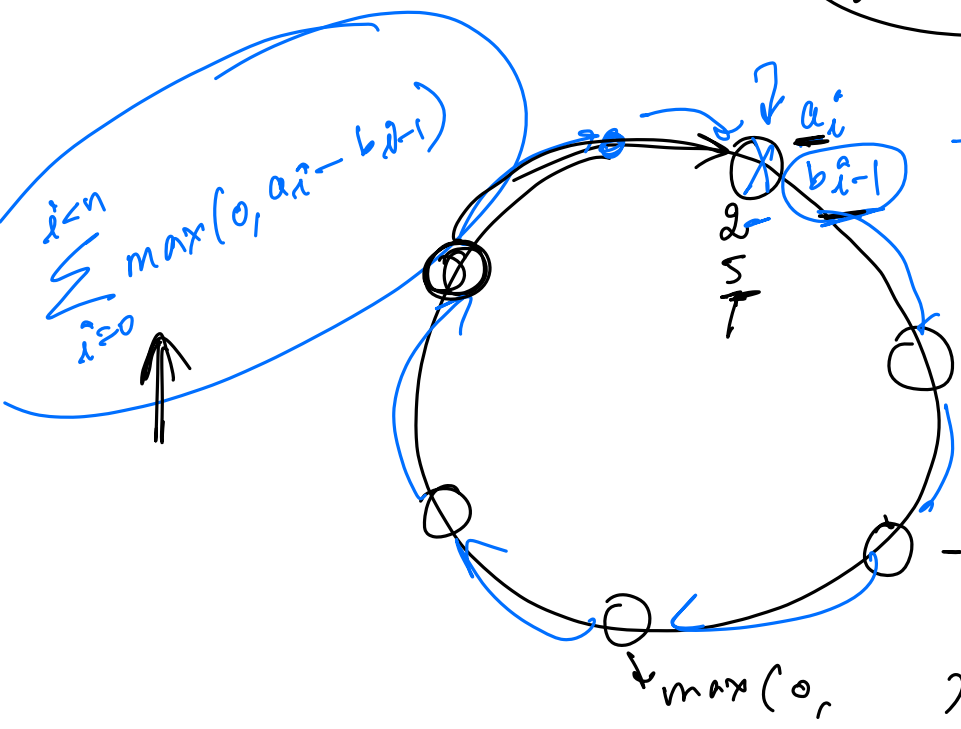



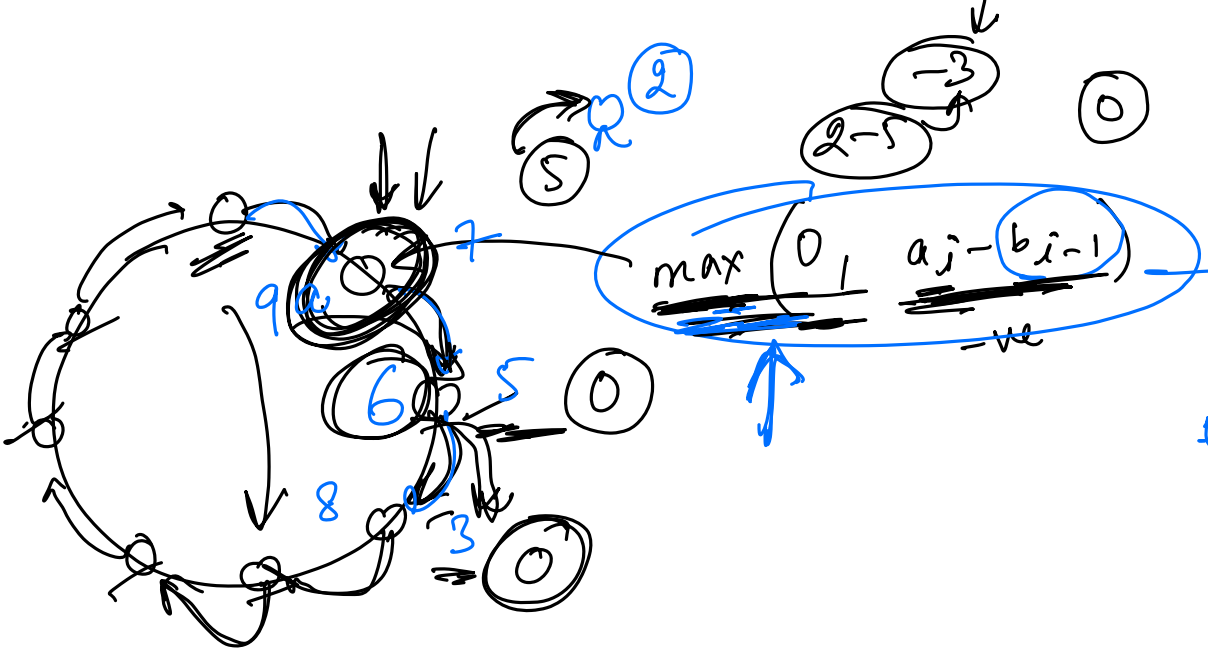

1st obs

If you decide on which one to kill first, then you just need to go sequentially

BF

Treat every monster as a starting point

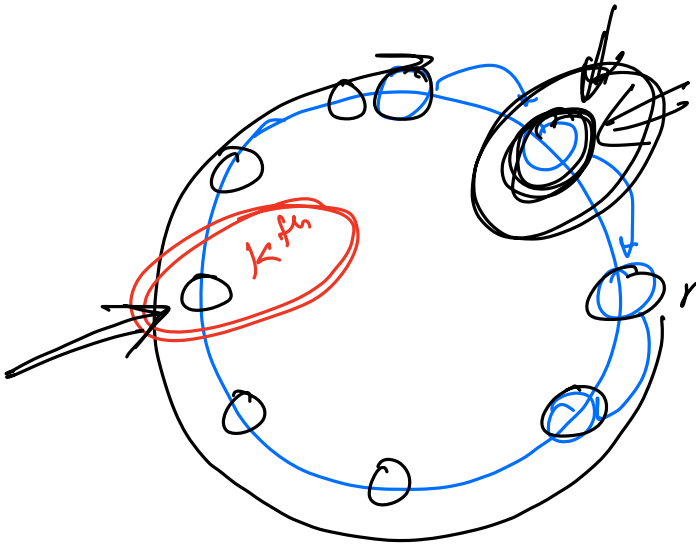





$$\max(0,\ a_i - b_{i-1})$$

-ve

→ no of bullet to be used to kill $i^{th}$ man

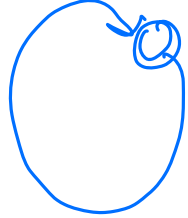


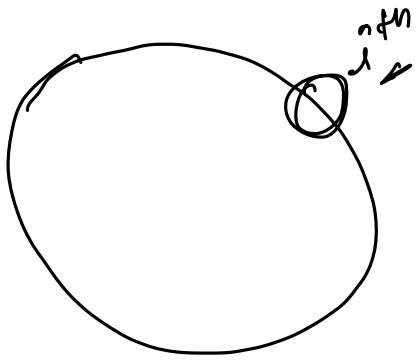

$$\sum \max(0,\ a_i - b_{i-1})$$

$$\max(0,\ a_i - b_{i-1})$$

$$\min_{\substack{k=1 \\ \forall \\ k \geq 0}} \left\{ a_k + \underbrace{\sum \max(0,\ a_i - b_{i-1})}_{\text{only } n} - \max(0,\ a_k - b_{k-1}) \right\}$$

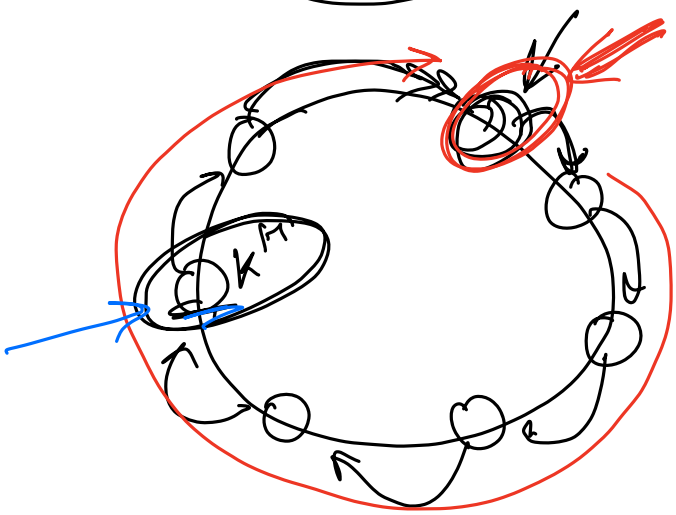
① you need to kill sequentially



② 


no of bullets

$= \max(0, a_i - b_{i-1})$

③ 


$\sum \max(0, a_i - b_{i-1})$

$O(n)$

$O(1)$

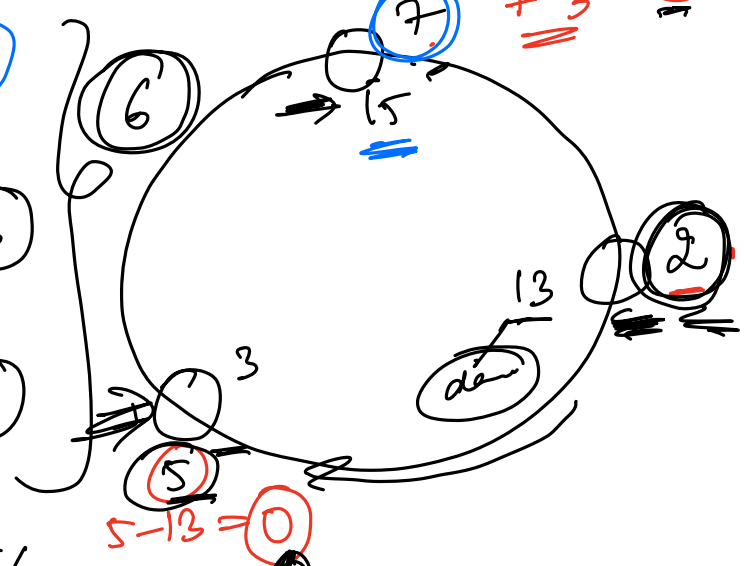
$$a_k + \left(\sum_{i=0}^{n} \max(0, a_i - b_{i-1})\right) - \max(0, a_k - b_{k-1})$$

$k^{th}$ monster

$7 + 4 - 4 = 7$

$2 + 4 - 0 = 6$

$5 + 4 - 0 = 9$




$7 - 3 = 4$

$2 - 15 = 0$

$5 - 13 = 0$

4

ans = 0 ~~16~~

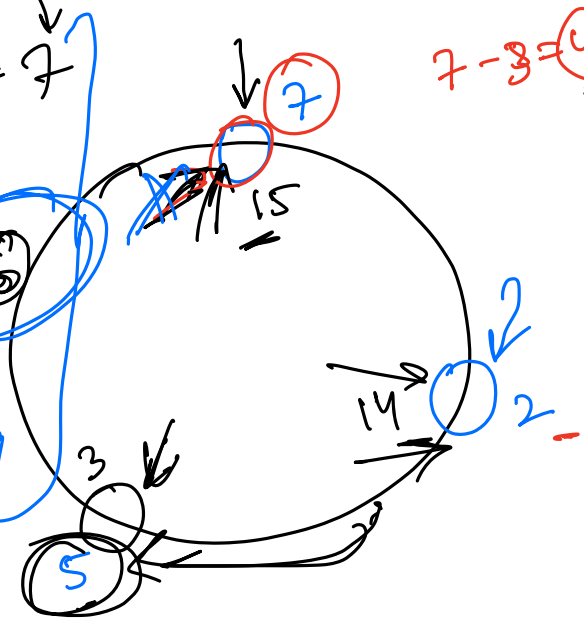
$7 + \cancel{14} - \cancel{14} = 7$

$7 - 3 = 4$

4

$2 + 4 - 0 = 6$

$5 + 4 - 0 = 9$




$2 - 15 = 0.$

$5 - 14 = 0$

(3) given an array of N integers.

q queries → L R → subarray

"Yes" ⇒ if the give range is non-decreasing

"No" ⇒

[ 1 7 3 4 9 ]

0 1 2 3 4

non-dec! increasing

1 → 7

[0 1]

1 7 → Yes

[1 3] → "No"

7 3 4

7 → 3 → 8, 9

LS → 1 → 10 R

B-F ⟹ just traverse the range & find out

T.C: $O(n * q)$

if( a[i] >= a[i-1])

if( a[i] < a[i-1])

1

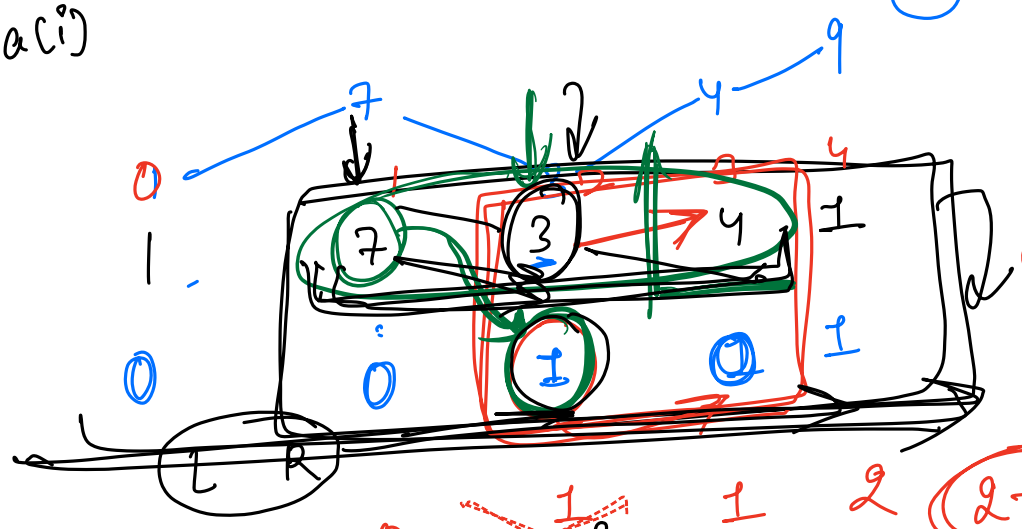
a[i]

a[i-1]

subarray

st hint

7 — 3 — 4




3 → 4

2-3

sum

L+1 R

pf

pf[R] - pf[L+1-1]

pf[y] - pf[x-1]

O(1)

T.C: q+n

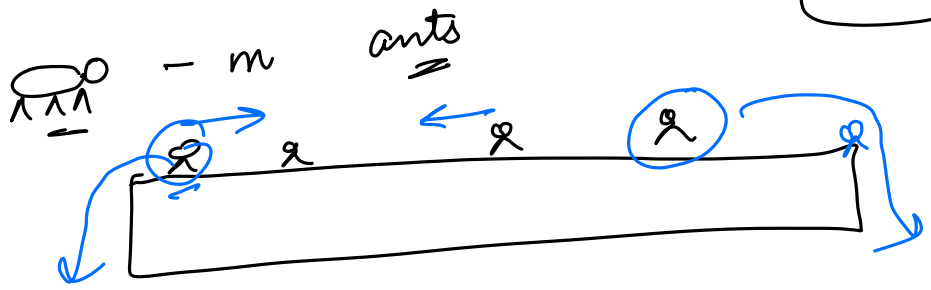
L → R

S.T

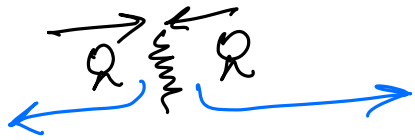
Prefsum

Q4 wooden plank → n

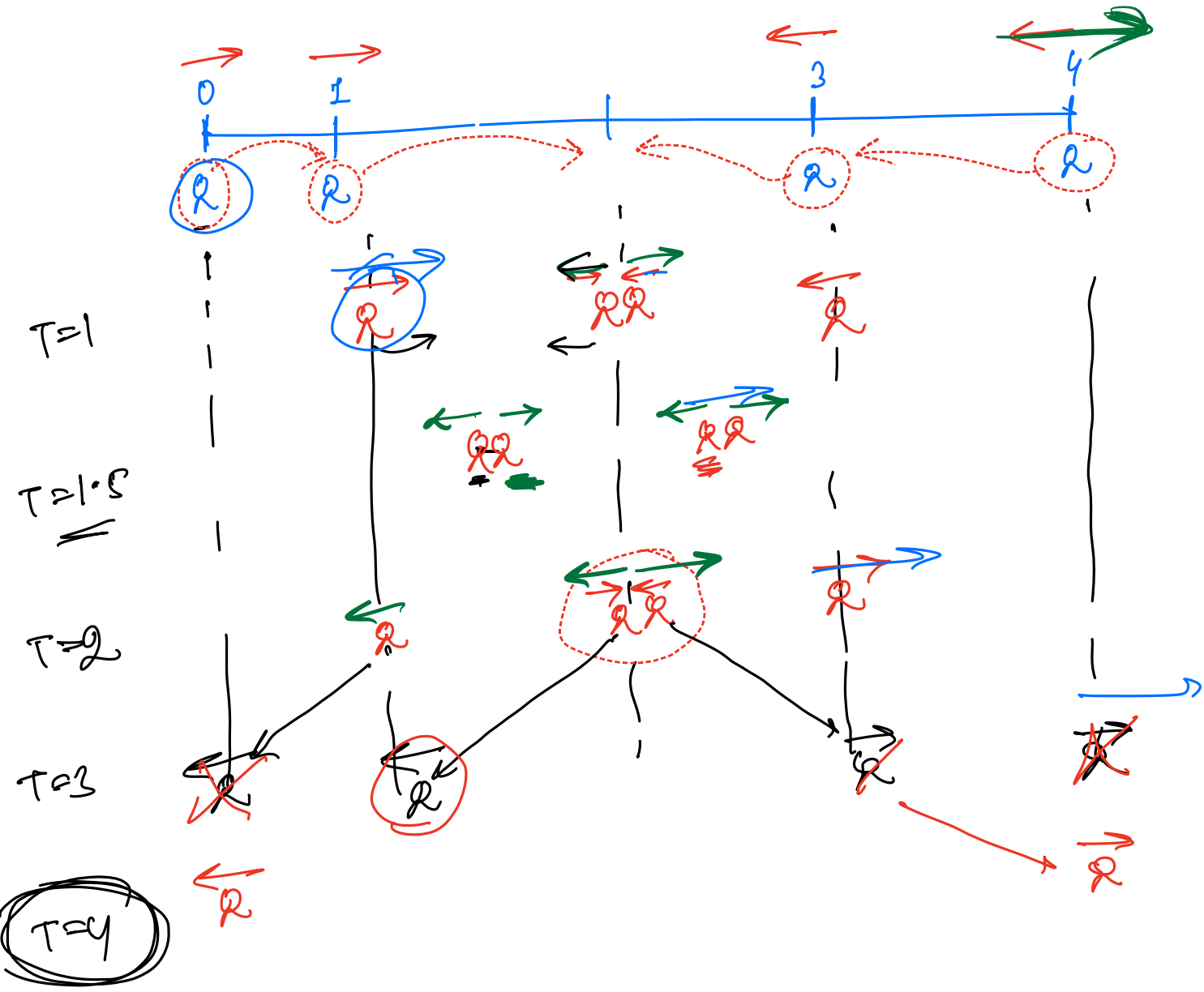
m<n

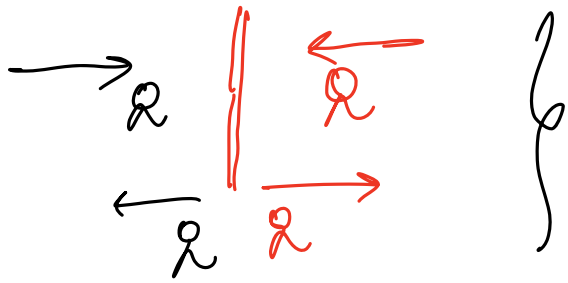


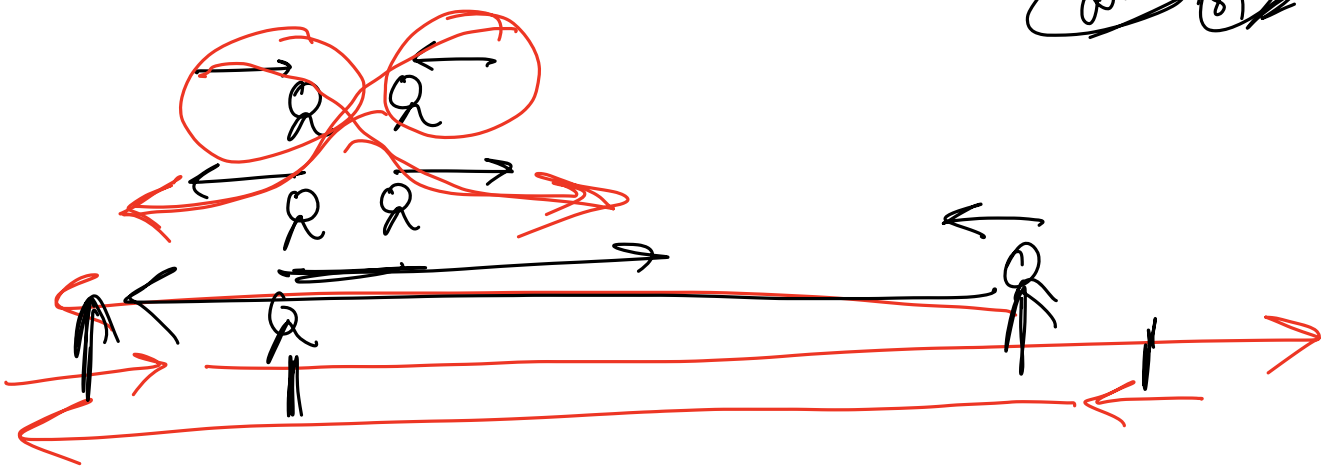

ant → 1 unit/sec



Time → when the last ant would just fall down







Impulse

distr/8/1