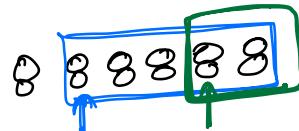
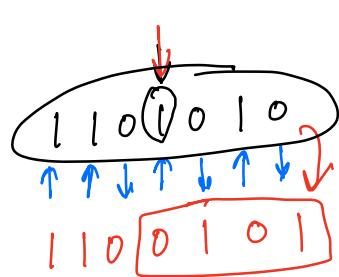
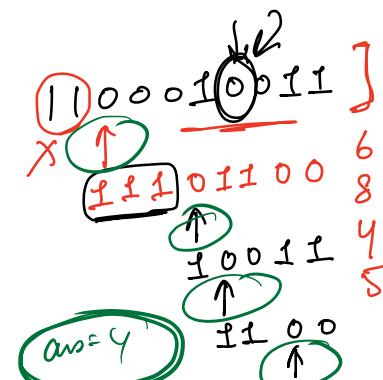
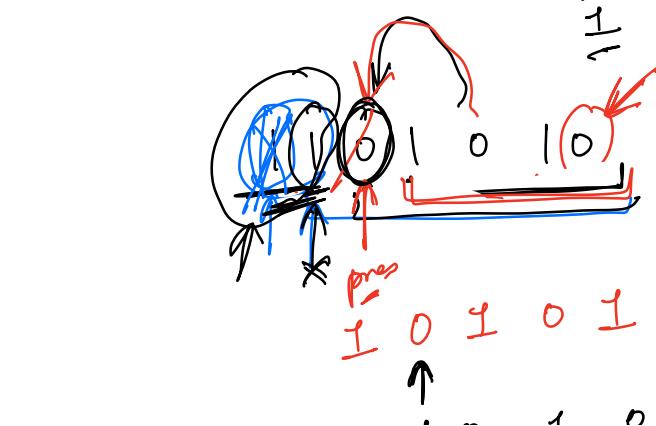
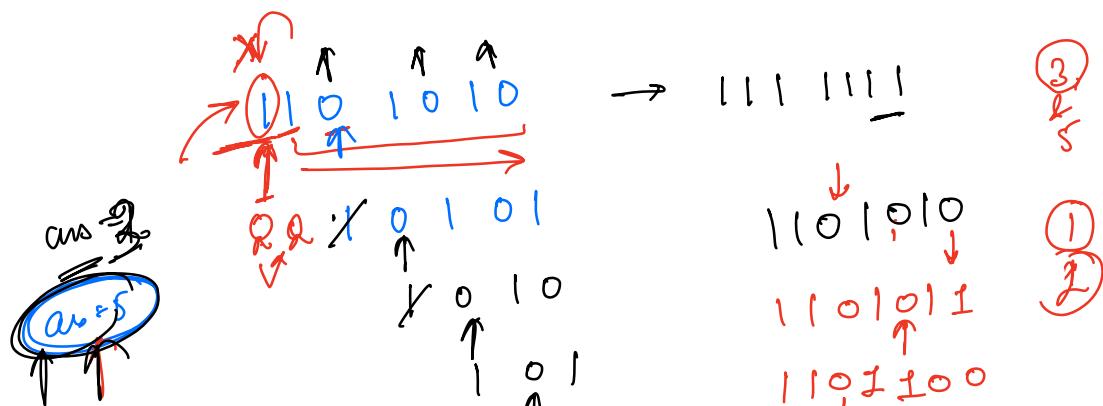


Q There are N light bulbs. Each bulb has a switch.
 All the switches are faulty. If you press a switch, it
 changes the state of current bulb and of all the bulb on either side.
 You are given with initial states of bulb.



Q → minimum no of switches you need to press such that every bulb is "on" at least



$\begin{matrix} 1 & 0 \\ \uparrow & \uparrow \\ 1 & 0 \\ \uparrow & \uparrow \\ 1 & 0 \\ \uparrow & \uparrow \end{matrix}$

\rightarrow

$\begin{matrix} 1 & 1 \end{matrix}$

Bulb

S switches \rightarrow on state
 $\rightarrow 1 \rightarrow 0 \rightarrow 1 \rightarrow 0 \rightarrow 1$
 6 switches \rightarrow off state

① \rightarrow for bulb
 even
 odd no gate
 |
 toggle
 the initial
 state

② When will the count increase?

when the current bulb's current state is off

$\text{ans} = 0$
 $i = 0 \rightarrow n$
 $\text{if } (\text{ans} \% 2 == 0)$
 $\text{state}[i] = !\text{state}[i];$

$T_C \rightarrow O(n)$
 $S_C \rightarrow O(1)$

decide
current state

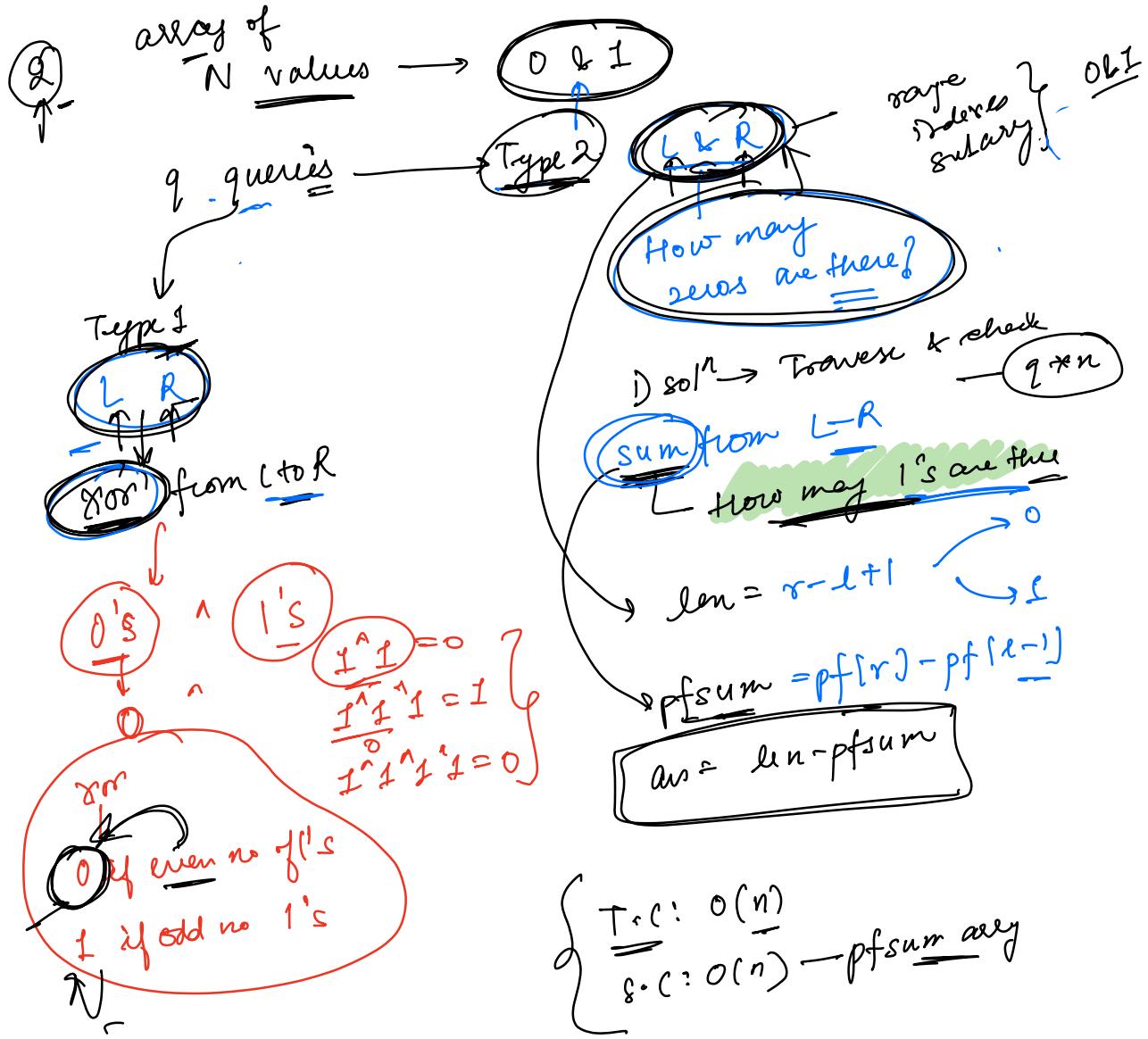
$\text{if } (\text{state}[i] == 0)$

$\text{ans} += 1$ // press switch

$x \rightarrow$ even state same
odd state will change
toggled x times

$\begin{matrix} 1 & 1 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 1 & 0 \end{matrix}$

$\begin{matrix} 1 & 1 & 1 & 0 & 1 & 1 & 0 & 1 & 0 & 1 & 0 & 0 \end{matrix}$

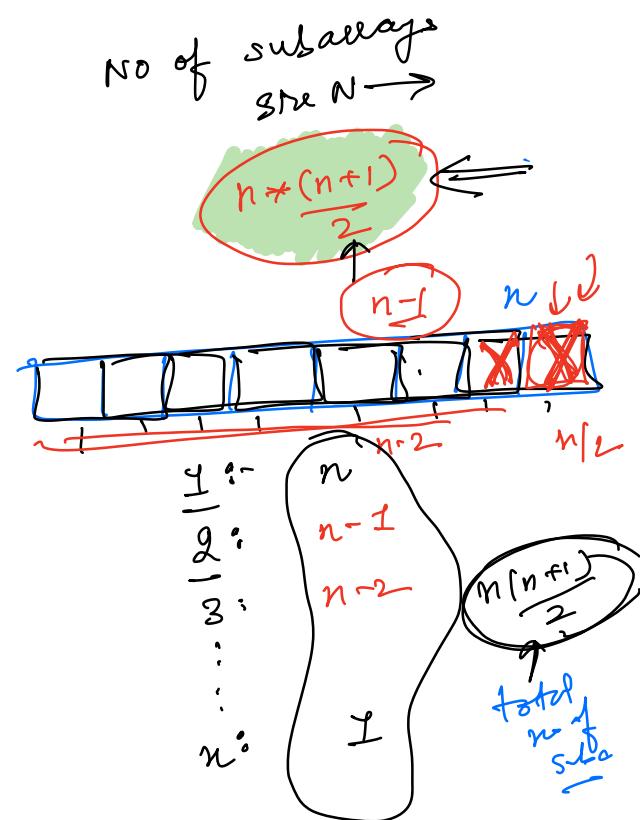
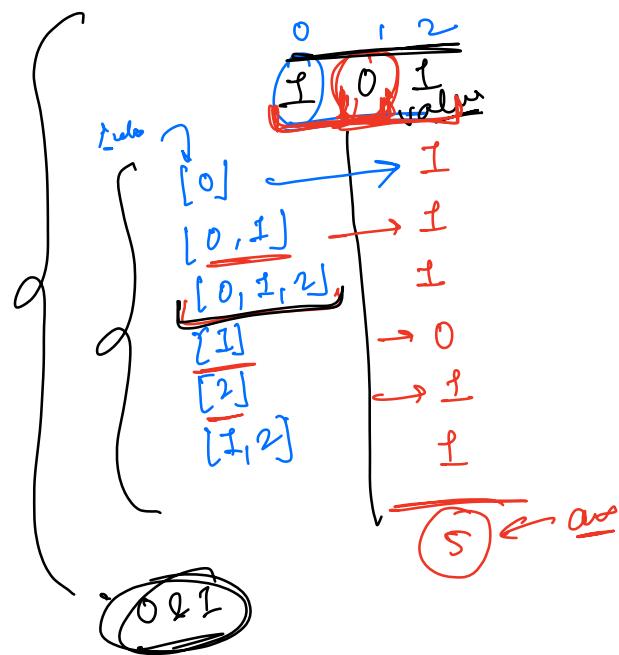


\rightarrow \leftarrow - interval

③ any N elements \rightarrow  

sum of value of all subarrays

bitwise OR of all elements in the subarray



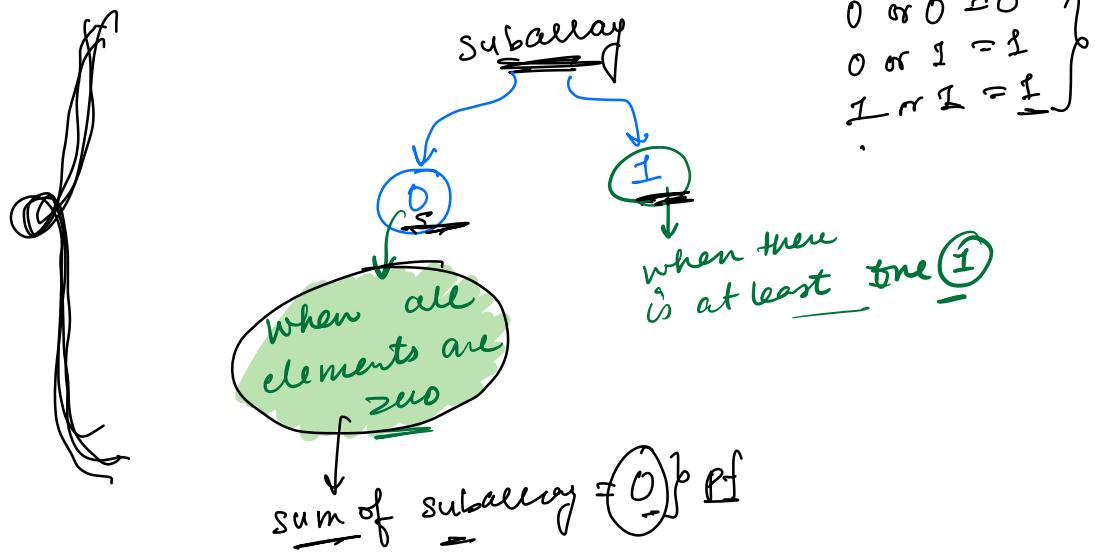
B.F. \Rightarrow consider all subarrays one by one

for $i=0 \rightarrow n$
 for $j=i \rightarrow n$

$[i:j]$
 for $k=i \rightarrow j$ or

$O(n^3)$

$O(1)$ per



$$\text{sum of subarray} = 0 \quad \text{pf}$$

$\text{pf}[l \infty] - \text{pf}[l-1]$

ans++;

T.C: $O(n^2)$

S.C: $O(n)$

complete array - 1's

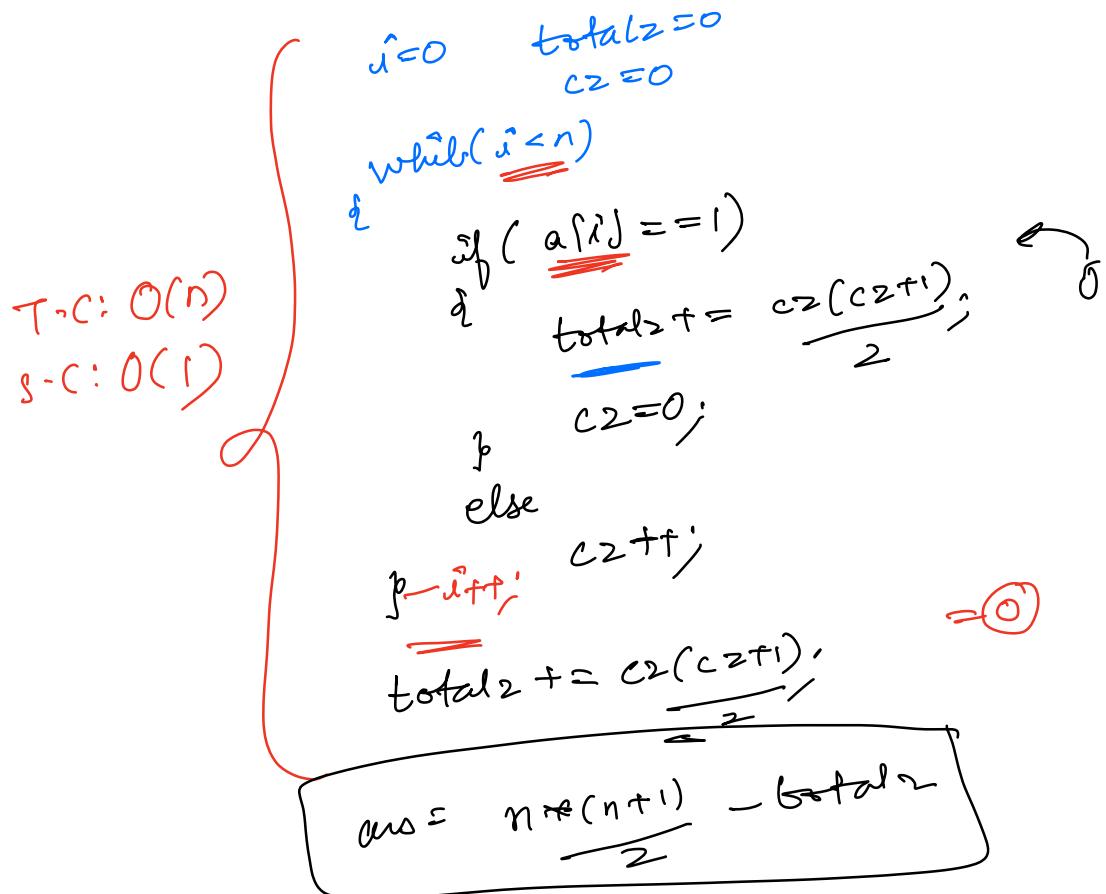
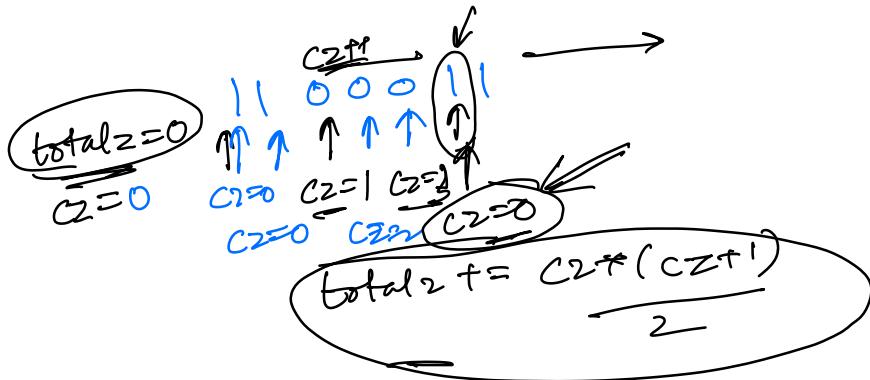
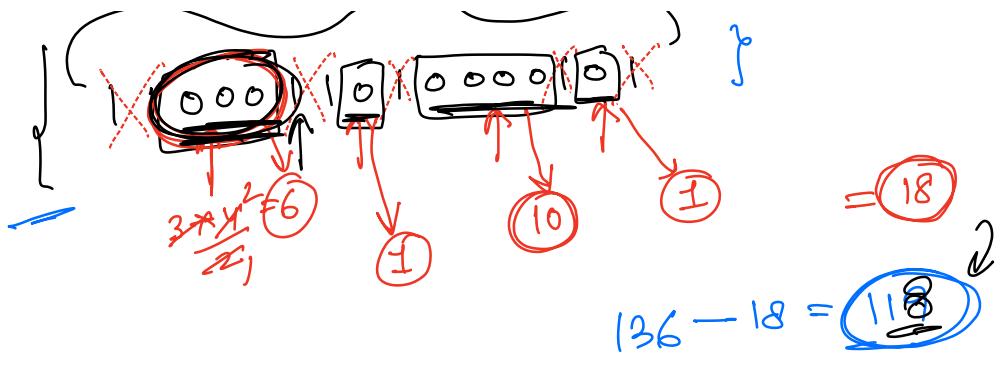
ans? $= \frac{n(n+1)}{2}$

subarry with only 0's + # subarry with atleast one 1 = $n(n+1)$

$\frac{n(n+1)}{2}$

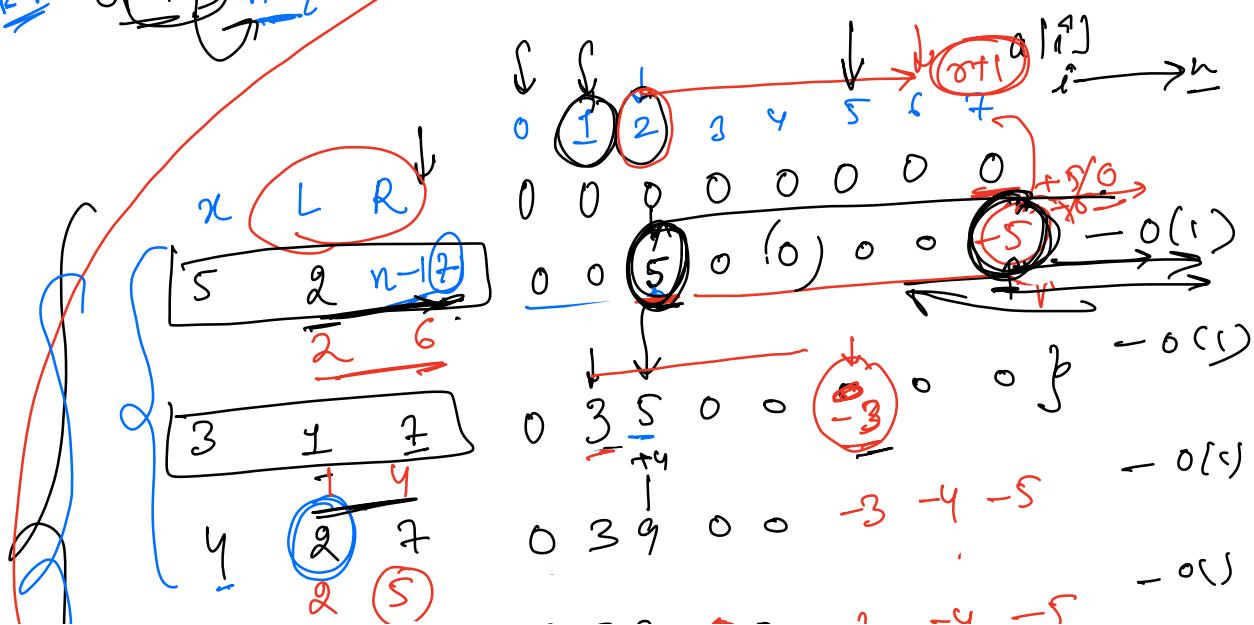
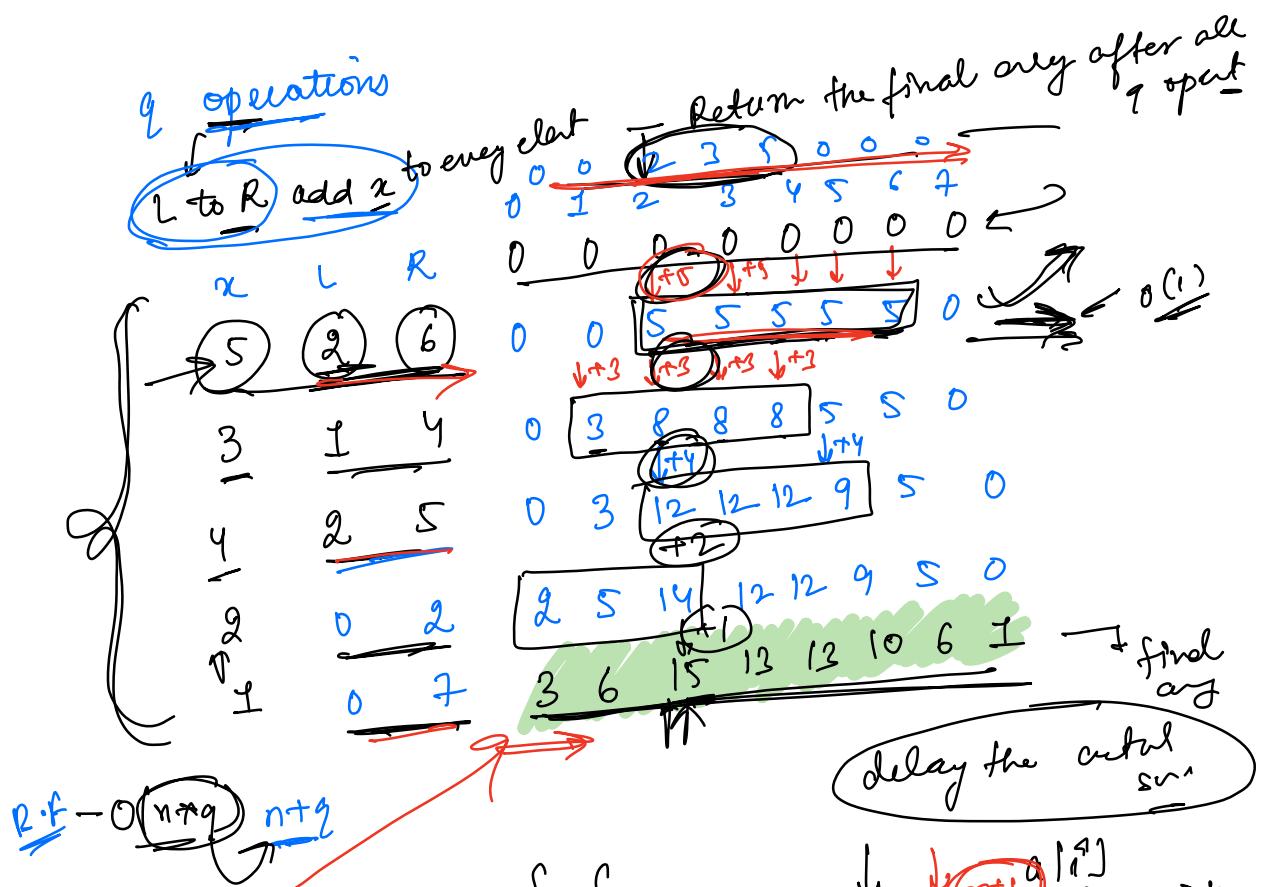
ans = $\frac{n(n+1)}{2}$

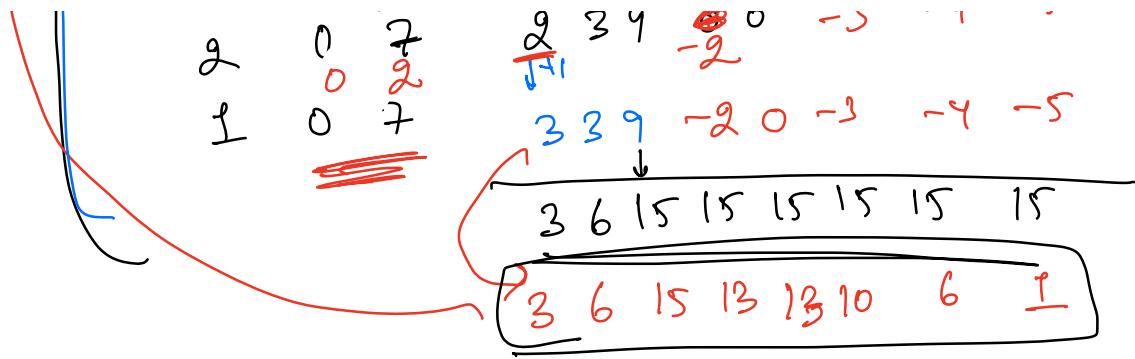
subarry with all element as 0's



④ Beggars outside temple →

you are given with array of N numbers
All are zero initially.





for every $\text{array}[l] += x;$
 if $r < n$ $\text{array}[r+1] -= x;$ for one
 } $O(1)$
 prefix sum — generate final ans

for $i = 0$ to l
 { $u \leq x \geq l \geq r$
 $\text{array}[i] += x;$
 if $(r+1) \leq n$ $\text{array}[r+1] -= x;$
 }
 }
 pfsum $\underline{\underline{\text{loop}}}$

T.C: $O(n + 1)$
 S.C: $O(1)$
 $O(n)$