A child teaches an adult three things :-
to be happy for no reason, to be always
busy with something, and know how to
demand with all his might what he wants !

Happy Childrens' Day

81) Given an array of 1 and 0. We can replace one of the 0s with a 1. Return the count of max consecutive 1's in the array.

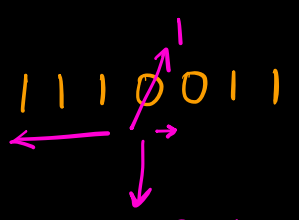
Amazon M.S. Adobe

Ex:- 1 1 0 1 1 0 1 1 1

(indices 0 1 2 3 4 5 6 7 8)

1 1 0 1 1 1 1 1 1 ⇒ 6

Ex:- 0 1 1 0 1 1 0 1 1 0



how many 1's x ← 0 → how many 1's y ⇒ x+1+y

For every 0 in the array :-

→ count number of consecutive 1's to the left l

→ count number of consecutive 1's to the right r

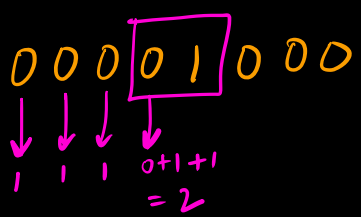
→ if $(l+r+1 > ans)$ {

$ans = l+r+1;$

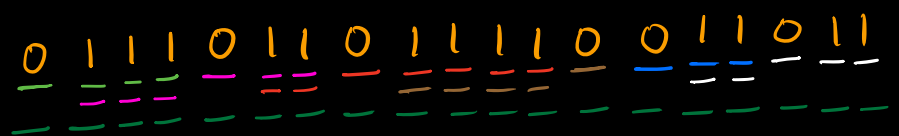
}

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

Edge case :- all elements are 1 ⇒ ans is n.



1 1 1 1 1 1 ... 1 ⇒ n.



each element → visited max 3 times

→ by the 0 on the left

→ by the 0 on the right

→ initial iteration.

Total no. of iterations ⇒ $\leq 3n$

$= O(n)$.

(82) Given an array of 1 and 0. We can swap one of the 0s with a 1. Return the count of max consecutive 1's in the array.

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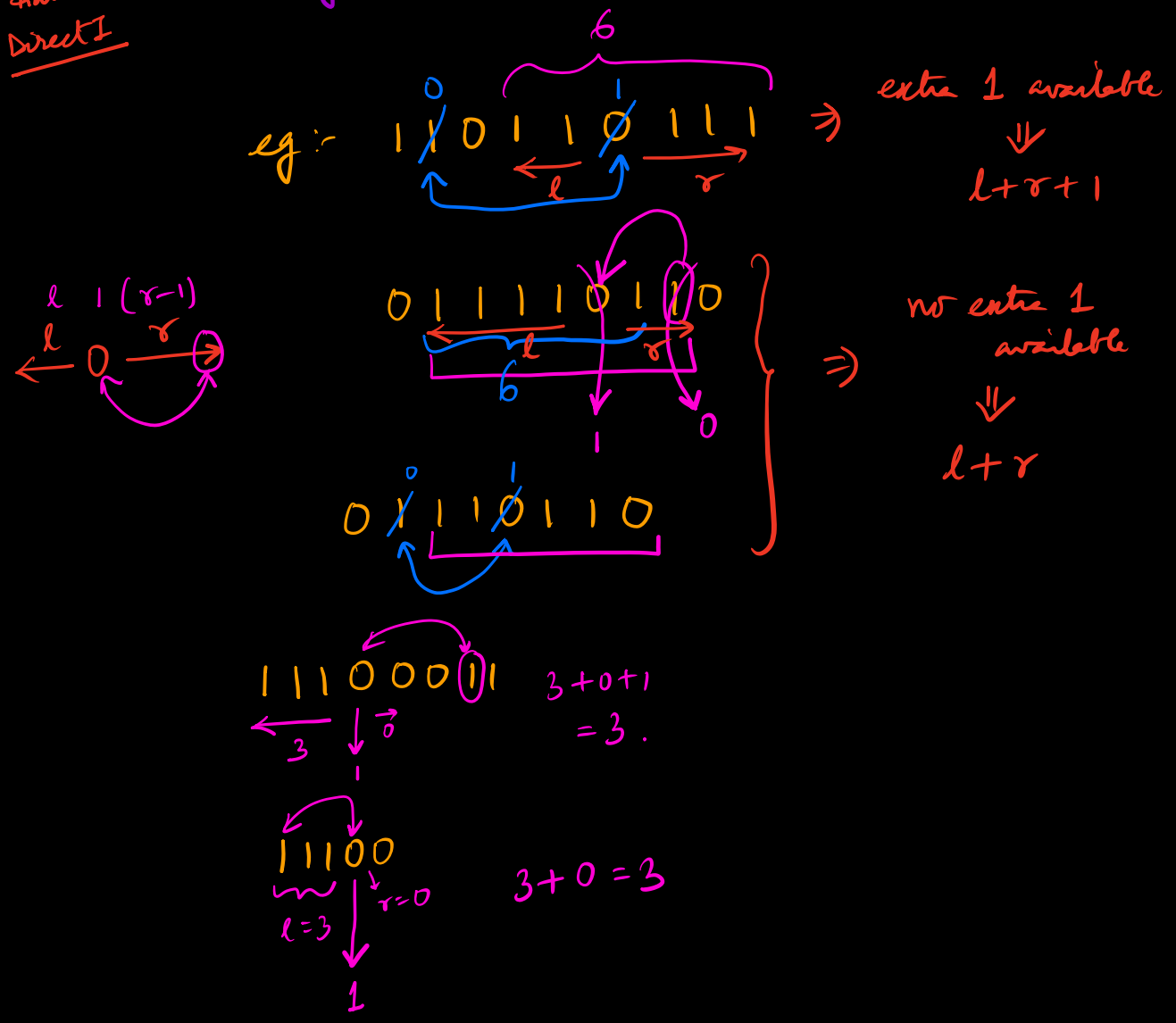


- Count no. of 1's in the array ⇒ k.
- For every 0 in the array :-
  - ⟶ count no. of consecutive 1's to the left (l)
  - ⟶ count no. of consecutive 1's to the right (r)
  - ⟶ if l+r == k:
    ans = max(ans, l+r) // no extra 1
    else:
    ans = max(ans, l+r+1) // extra 1.

O(n) T.C.
O(1) S.C.

[Break till 10:33 PM]

(Q3) No. of triplets

Given an array, count the no. of triplets (i, j, k) s.t. $i < j < k$

and

$ar[i] < ar[j] < ar[k]$

	0	1	2	3	4
ar :-	2	6	9	4	10

i j k	ar[i] ar[j] ar[k]
(0, 1, 2)	2 < 6 < 9
(0, 1, 4)	2 < 6 < 10
(0, 2, 4)	2 < 9 < 10
(0, 3, 4)	2 < 4 < 10
(1, 2, 4)	6 < 9 < 10

idea :- Iterate over all possible triplets.

```
for(i=0; i<n; i++){
    for(j=i+1; j<n; j++){
        for(k=j+1; k<n; k++){
            if(ar[i] < ar[j] && ar[j] < ar[k])
                count++;
        }
    }
}
```

$O(n^3)$ TC

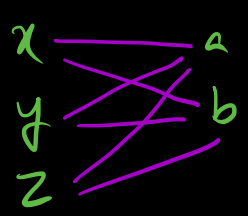
$O(1)$ S.C.

	0	1	2	3	4
ar :-	2	6	9	4	10

x	No. of elements to the left of x that are < x	No. of elements right of x that are > x	No. of triplets with x at centre
9	2 (2,6)	1 (10)	2 * 1 = 2
6	1 (2)	2 (9,10)	1 * 2 = 2
2	0	4	0 * 4 = 0
4	1 (1)	1 (10)	1 * 1 = 1
10	4	0	4 * 0 = 0

x y z	ar[j]	a b
3	h	2

x h a
x h b
y h a
y h b
z h a
z h b



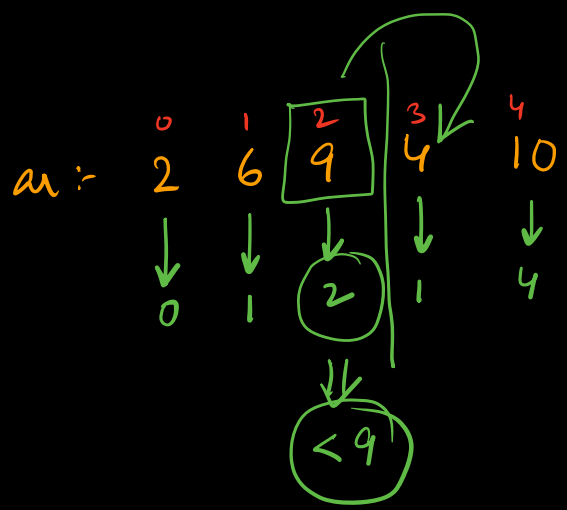
3 * 2 = 6

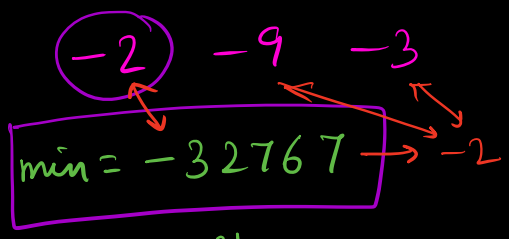
ans = 0

for every element A[i] :- // iterating over the center elements

- iterate from 0 to i-1, and count the nr. of elements less than A[i] $\Rightarrow l$
- iterate from i+1 to n-1, and count the nr. of elements more than A[i] $\Rightarrow r$
- add $(l * r)$ to the ans

$O(n^2)$ T.C.
$O(1)$ S.C.

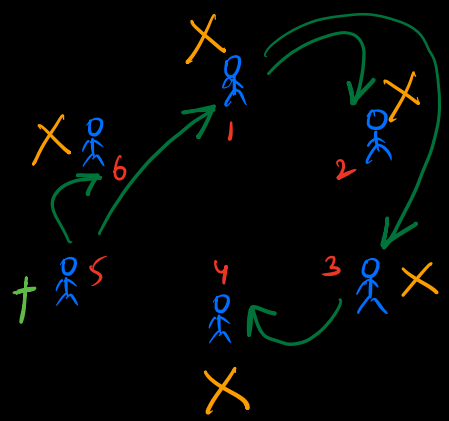




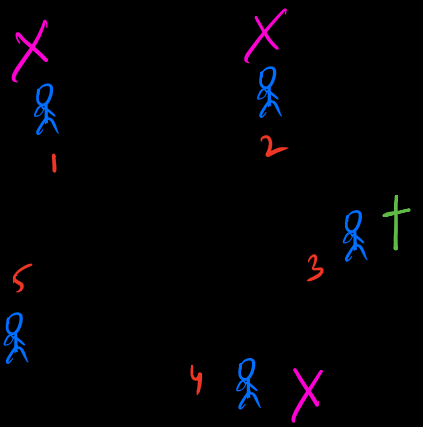
-2^{31} :- integer Integer.MIN_VALUE

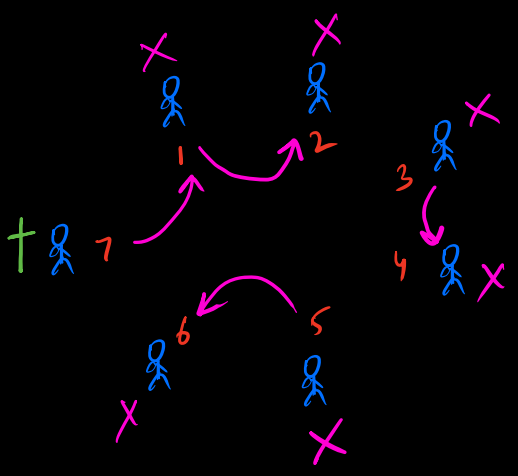
-2^{63} :- long. Long.MIN_VALUE .

Q4) Josephus Problem



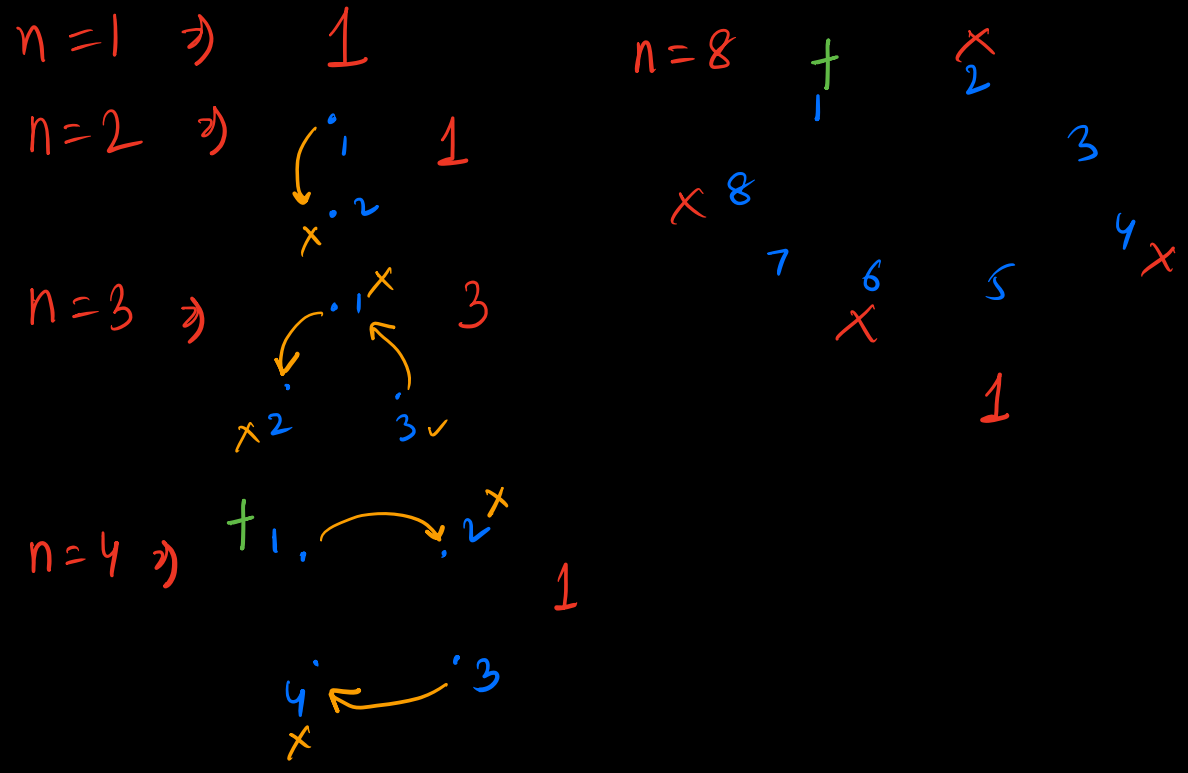
5 survives !





3 survives .

7 survives .

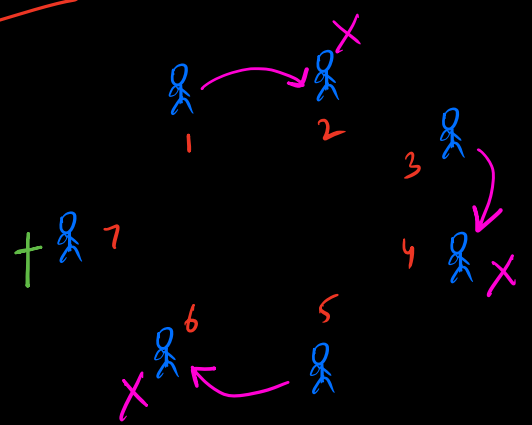


$$2^n \longrightarrow 2^{n-1} \longrightarrow \cdots 2^1$$

$1^s \qquad 1^s \qquad 1^s$

Any power of 2 ⇒ Soldier who starts will survive.

n = 7



4 people left

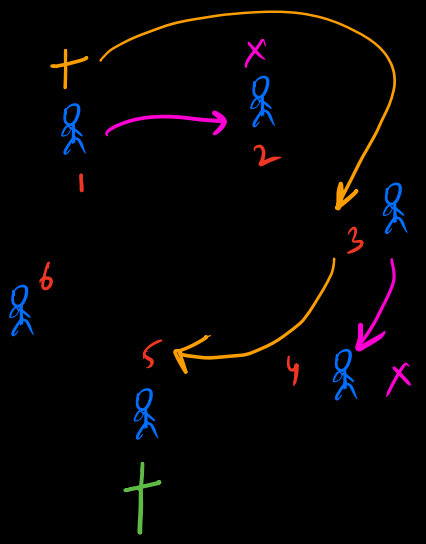
7 has the sword.

Ans → 7.

$7 \xrightarrow{-3} 4$

$1 + 3 * 2 = 7$

n=6



4 people left

5 has the sword

5 wins.

No. of sword = $1 + 2*2 = 5$

n = 100 $\xrightarrow{-36}$ 64

36 hits ⇒ $1 + 2*36$

$= 1 + 72 = 73$

person who gets sword	$= 1 + 2*(\text{no. of hits})$