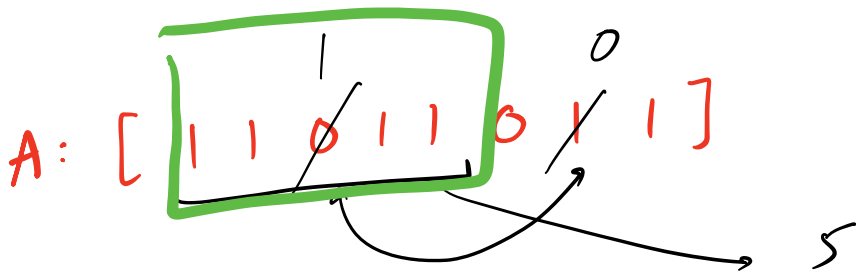
Q Given a binary Array! → {0, 1}

We can ATMOST replace a 0 with a 1 from the Array!
Find the MAX consecutive 1's we can get in the array!



A: [1 1 0 0 1 1 1 0 1 1 0]

BF → ∀ SA → Vx Ps

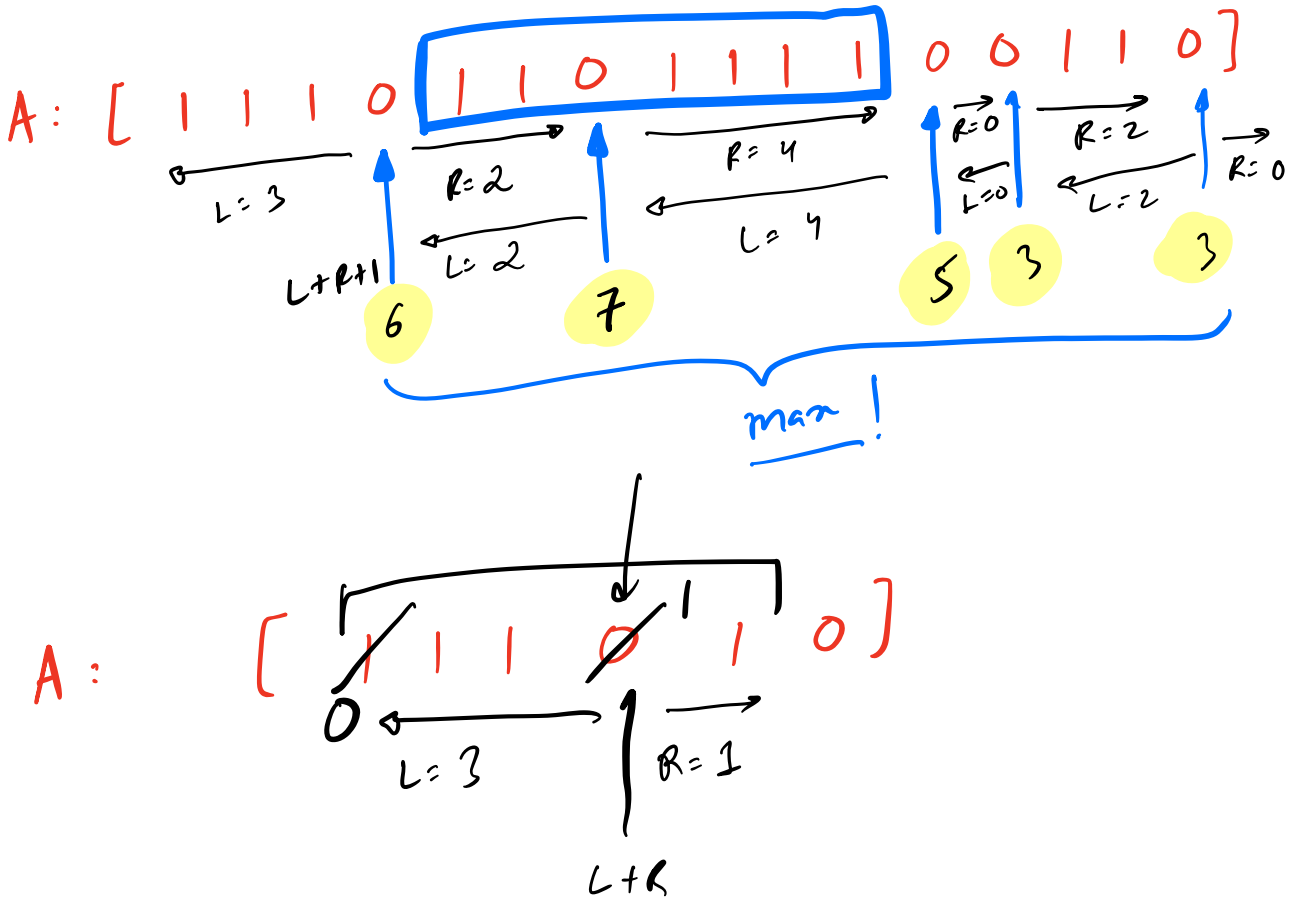
TC: O(N²)

SL: O(N)

for (L: 0 → N-1)

for (R: L → N-1)

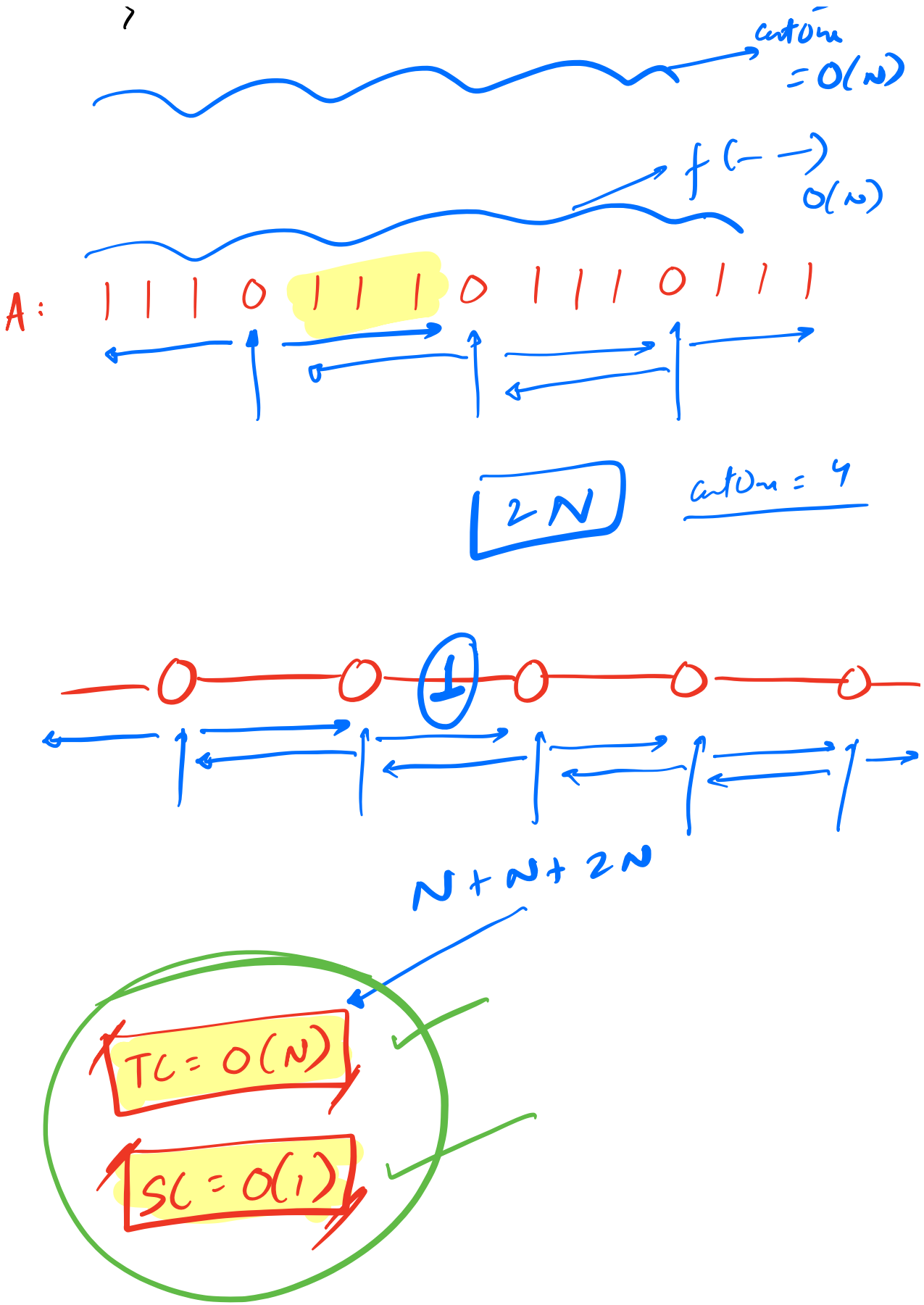
// [L, R]



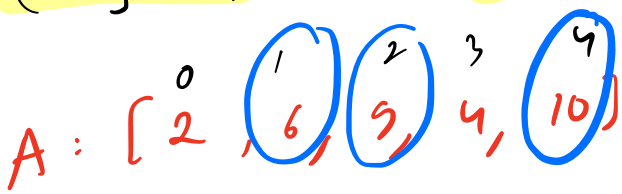
STEPS :

1. Count the total # 1's in A[]. → cntOne
2. Consider every 0 & find
   L = consecutive 1's on left
   R = ——————— right
   if (cntOne > L+R)
   → L+R+1
   else
   → L+R

```
cntOne = 0;
for( i=0; i<N; i++) {
    if( A[i] == 1) cntOne++;
}
if( cntOne == N) {
    ret N;
}
ANS = 0;
for( i=0; i<N; i++){
    if( A[i] == 0) {
        L=0;
        for( K= i-1; K>=0; K--) {
            if( A[K] == 1) L++;
            else break;
        }
        R=0;
        for( K= i+1; K<N; K++) {
            if( A[K] == 1) R++;
            else break;
        }
        if( cntOne > L+R)
            ANS = max( ANS, L+R+1);
        else
            ANS = max( ANS, L+R);
    }
}
```


custom
= O(N)
f(- -)
O(N)
A: 1 1 1 0 1 1 1 0 1 1 1 0 1 1 1
2N
custom = 4
0 0 1 0 0 0
N + N + 2N
TC = O(N)
SC = O(1)

Q. Given an array. Cal. the no. of triplets (i, j, k) $(i < j < k)$ s.t. $A[i] < A[j] < A[k]$



$i < j < k$	$A[i] < A[j] < A[k]$
0 1 2	2 6 9
0 1 4	2 6 10
0 3 4	2 4 10
0 2 4	2 9 10
1 2 4	6 9 10

5

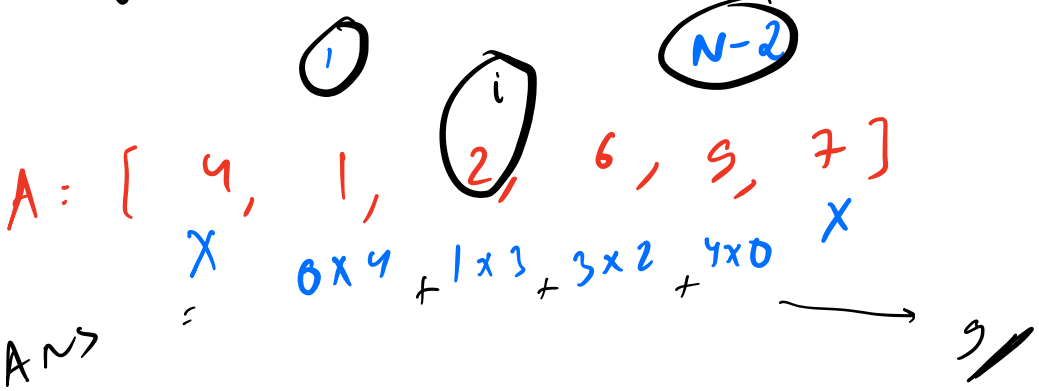
I) BF

```
ANS=0
for(i=0; i<N; i++){
    for(j=i+1; j<N; j++){
        for(k=j+1; k<N; k++){
            if( A[i] < A[j] && A[j] < A[k])
                ANS++;
        }
    }
}
cout ANS;
```

TC = O(N^3)

SC : O(1)

II)



```
ANS = 0
for (i = 1; i < N-1; i++) {
    L = 0;
    for (k = i-1; k >= 0; k--) {
        if (A[k] < A[i]) L++;
    }
    if (L == 0) continue;
    R = 0
    for (k = i+1; k < N; k++) {
        if (A[i] < A[k]) R++;
    }
    ANS += (L x R);
}
ret ANS;
```

TC = O(N²)

SC = O(1)

Josephus problem

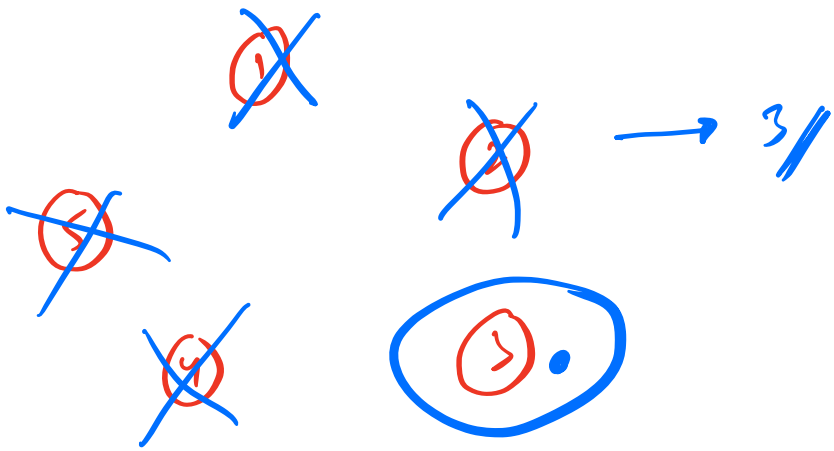
N people standing in a circle [1 - N]

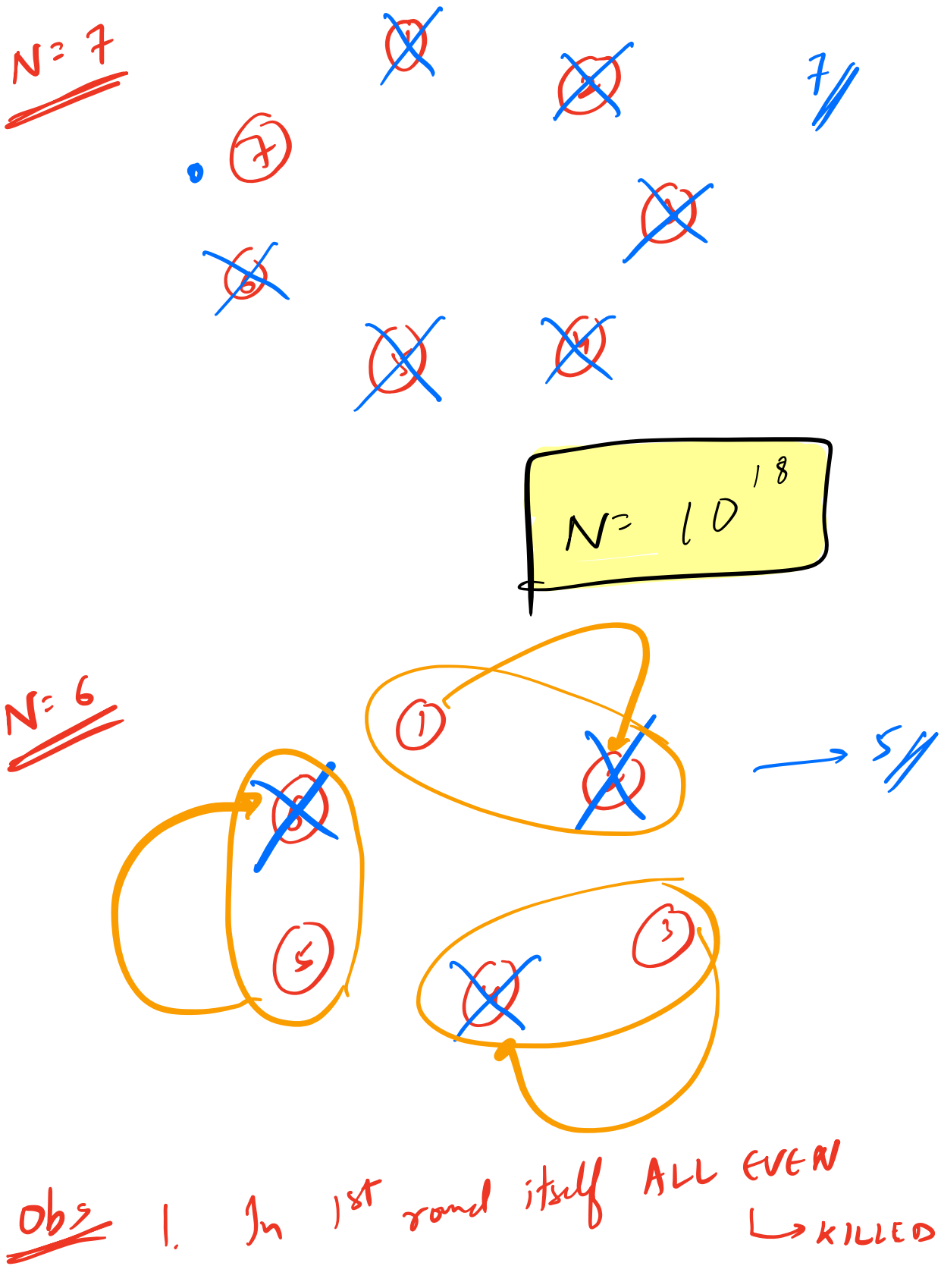
1st person would start. He has a knife.

→ Kill the next alive person in clockwise direction & pass the knife to the next alive person!

Find the last ALIVE person!

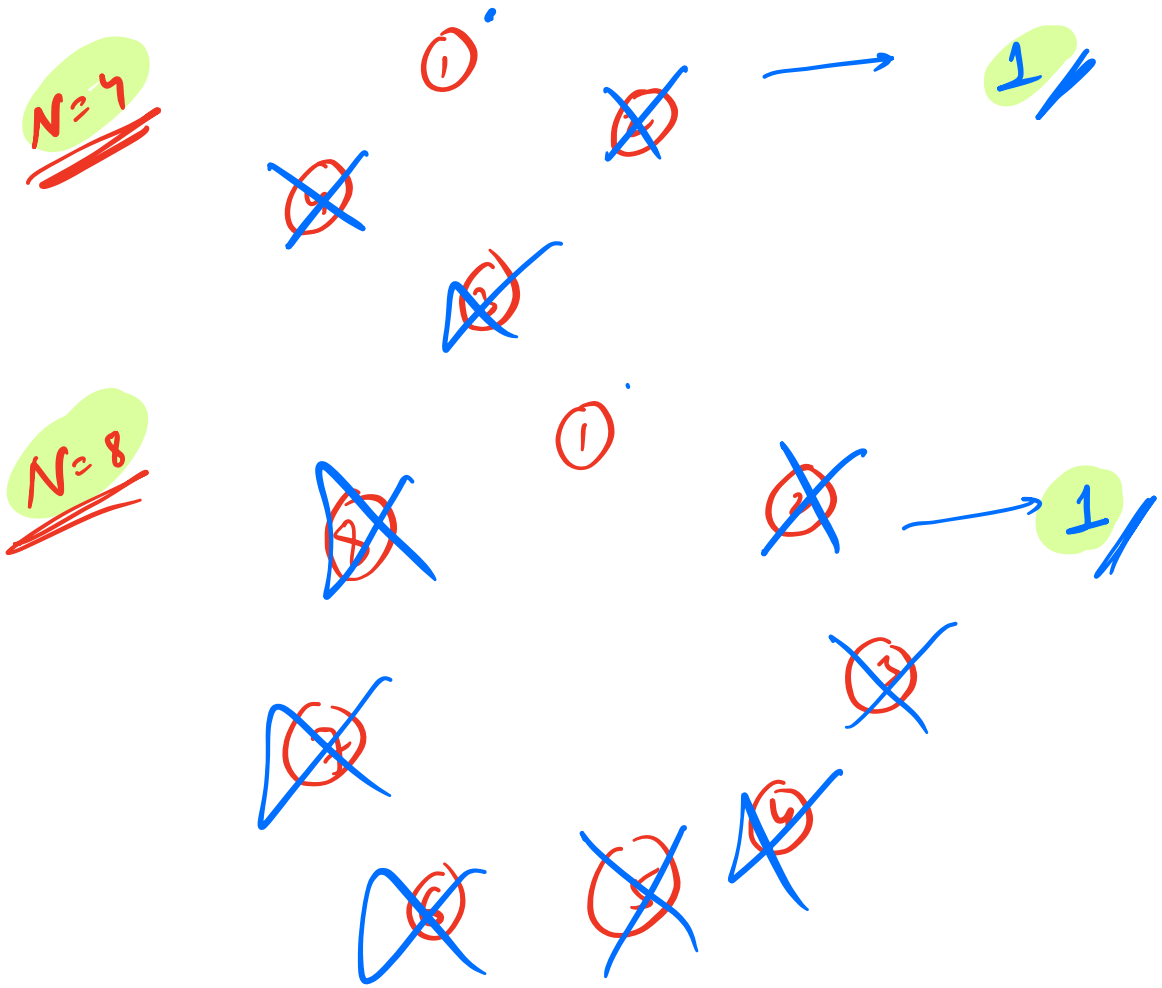
N = 5




N = 7
7
N = 10^18
N = 6
5
Obs 1. In 1st round itself ALL EVEN
↳ KILLED

2. If EVEN # of people

→ the person starting will get the sword back after 1 round!



CASE: $N = 2^x$

#purple → sword

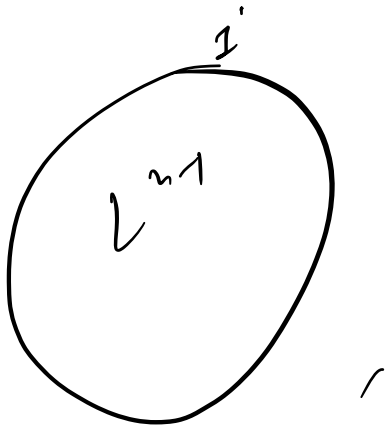
$N = 2^x \rightarrow 1$

$2^{x-1} \rightarrow 1$

$2^{x-2} \rightarrow 1$

$\vdots \quad \vdots$

$1 \rightarrow 1$



$N = 16 \rightarrow 1$

$8 \rightarrow 1$

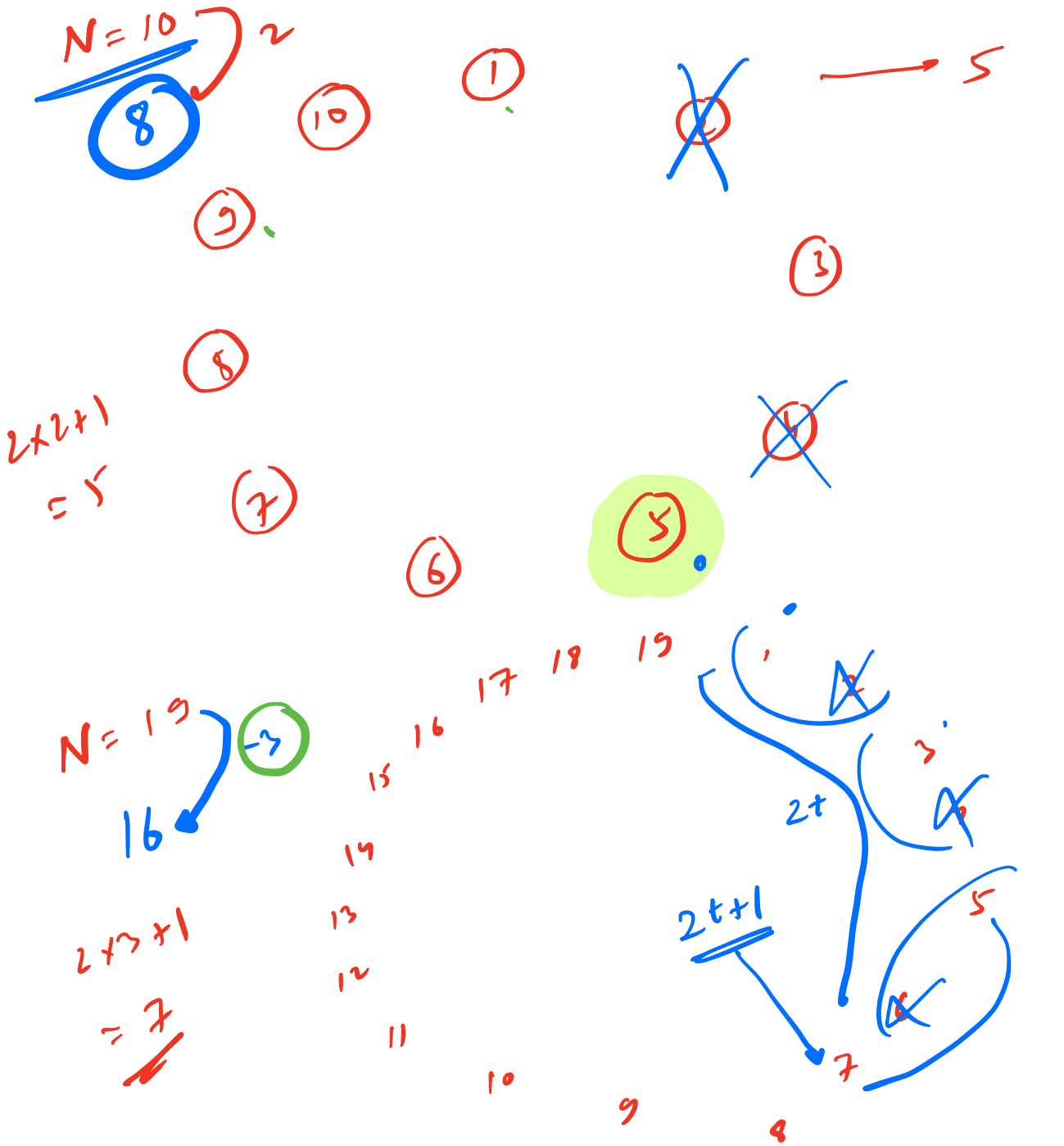
$4 \rightarrow 1$

$2 \rightarrow 1$

$1 \rightarrow 1$

Obz: if $N = 2^x$

ANS $\rightarrow$ 1



Who will have the sword after killing t people?

→ $2t + 1 <= N$

Given N

find the closest power of 2 <= N

N = 31

16

t = 31 − 16

t = 15

2t + 1 = 2 × 15 + 1

= 31 ✓

N = 75

$\log_2(75)$

O(1)

6 · x

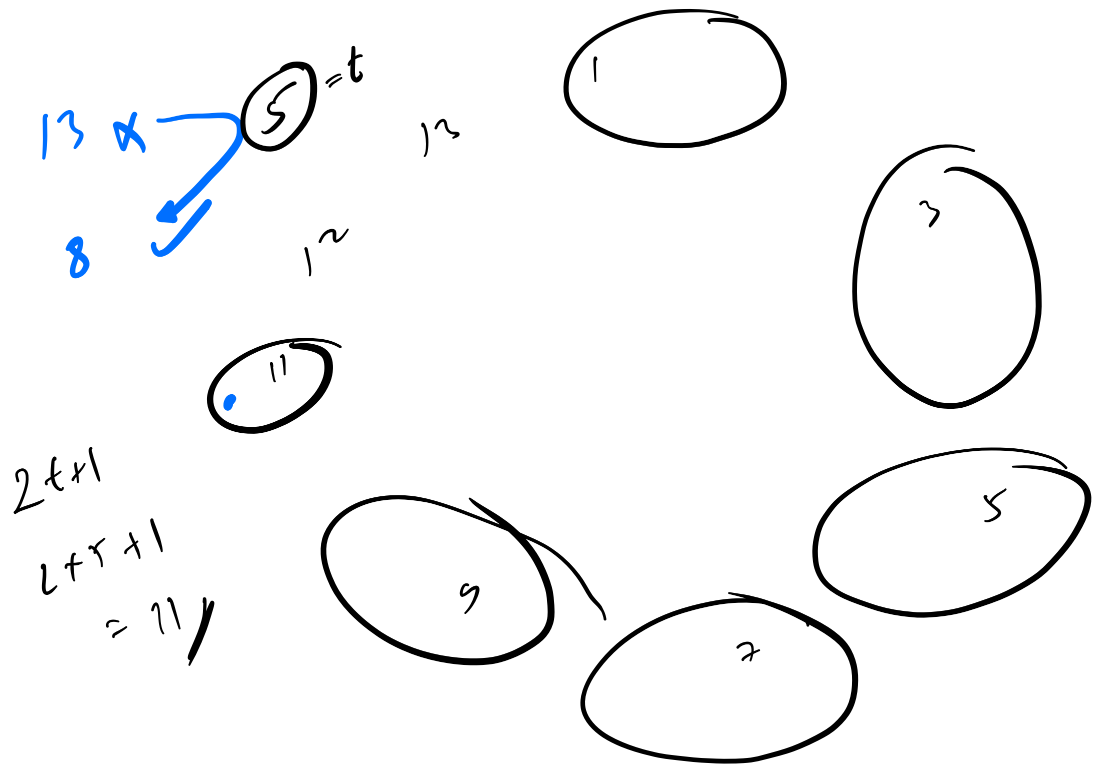
2^6 → 64

1 2 4 8 16 32 64 75 128

TC = O(log N)

2 × 11 + 1

= 23 ✓



13
8
5 = t
13
12
11
1
3
5
7
9
2t+1
2+5+1
= 11