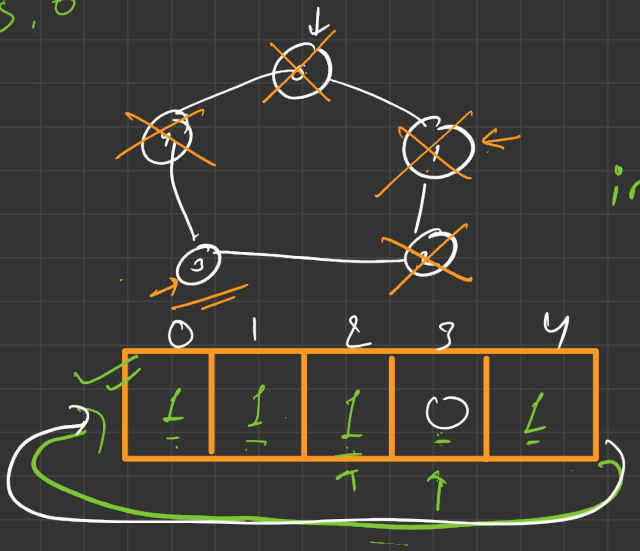
Predict The Winner

vector<bool> s;



n = 5

k = 3

index = (index+1) % n

(4+1) % 5

5 % 5

0

(2+1) % 5

3

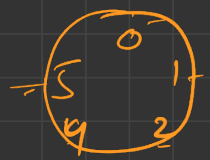
vector < bool > Person (n, 0)

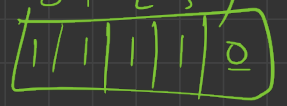
person_left = 5

index

size

k





k = 10

~~k = 4~~

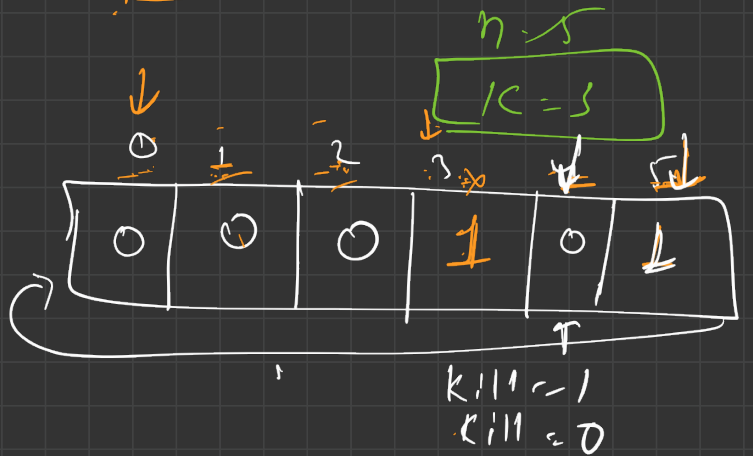
n = 6

skip = k - 1

10 - 1

9 % 5

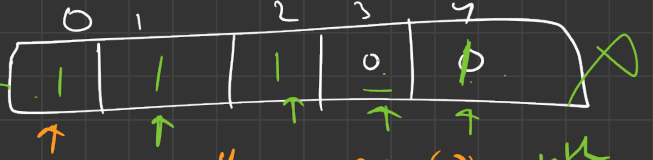
4



10 % 6

= 4

```
int winner(vector<bool>&person, int n, int index,
           int per_left, int k) {
    if (per_left == 1) {
        for(int i=0; i<n; i++) {
            if (person[i] == 0)
                return i;
        }
    }
int kill = (k-1) % per_left;
while (kill--) {
    index = (index+1) % n;
    while (person[index] == 1) {
        index = (index+1) % n;
    }
}
person[index] = 1;
while (person[index] == 1) {
    index = (index+1) % n;
}
return winner(person, n, index, per_left-1, k)
}
```



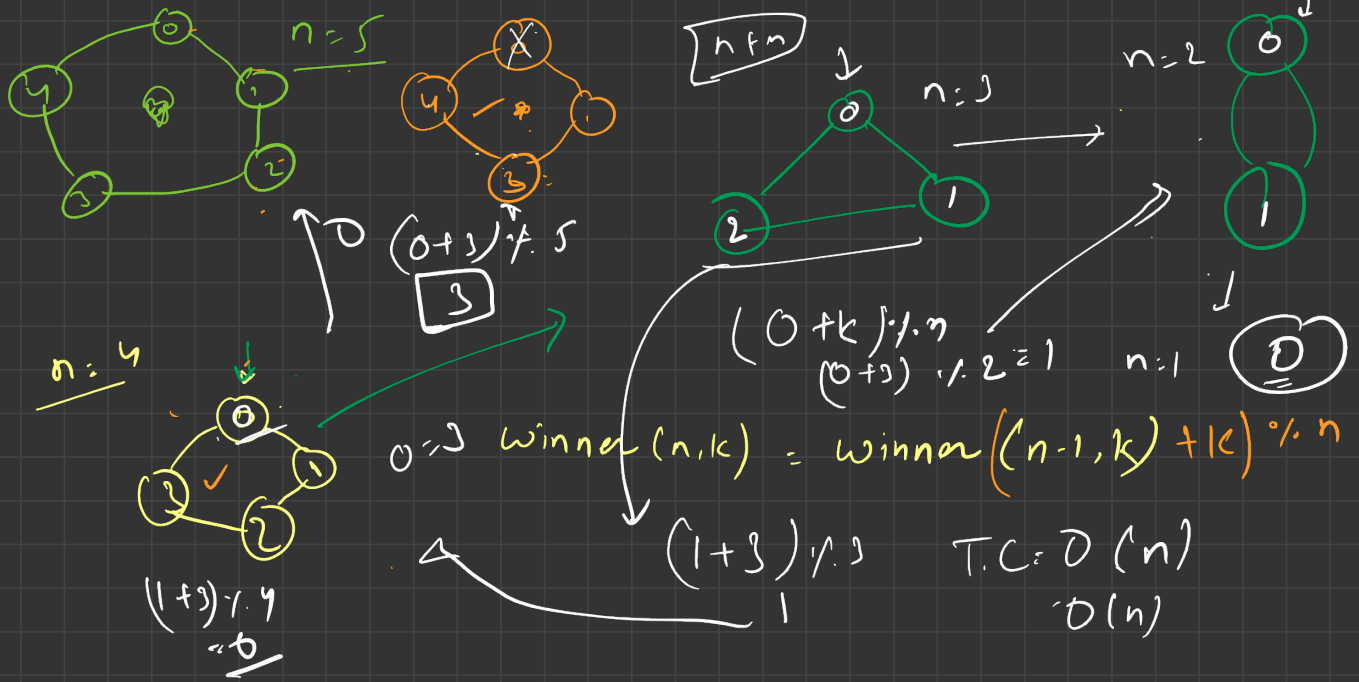
$n = 5$
$k = 3$

① kill the person, k^{th}
② find next alive person

n + n + n + n ... n

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

$S.C = O(n)$



```
int winner (int n, int k) {
    if (n == 1)
        return 0;
    return (winner (n-1, k) + k) % n ;
```

n=1