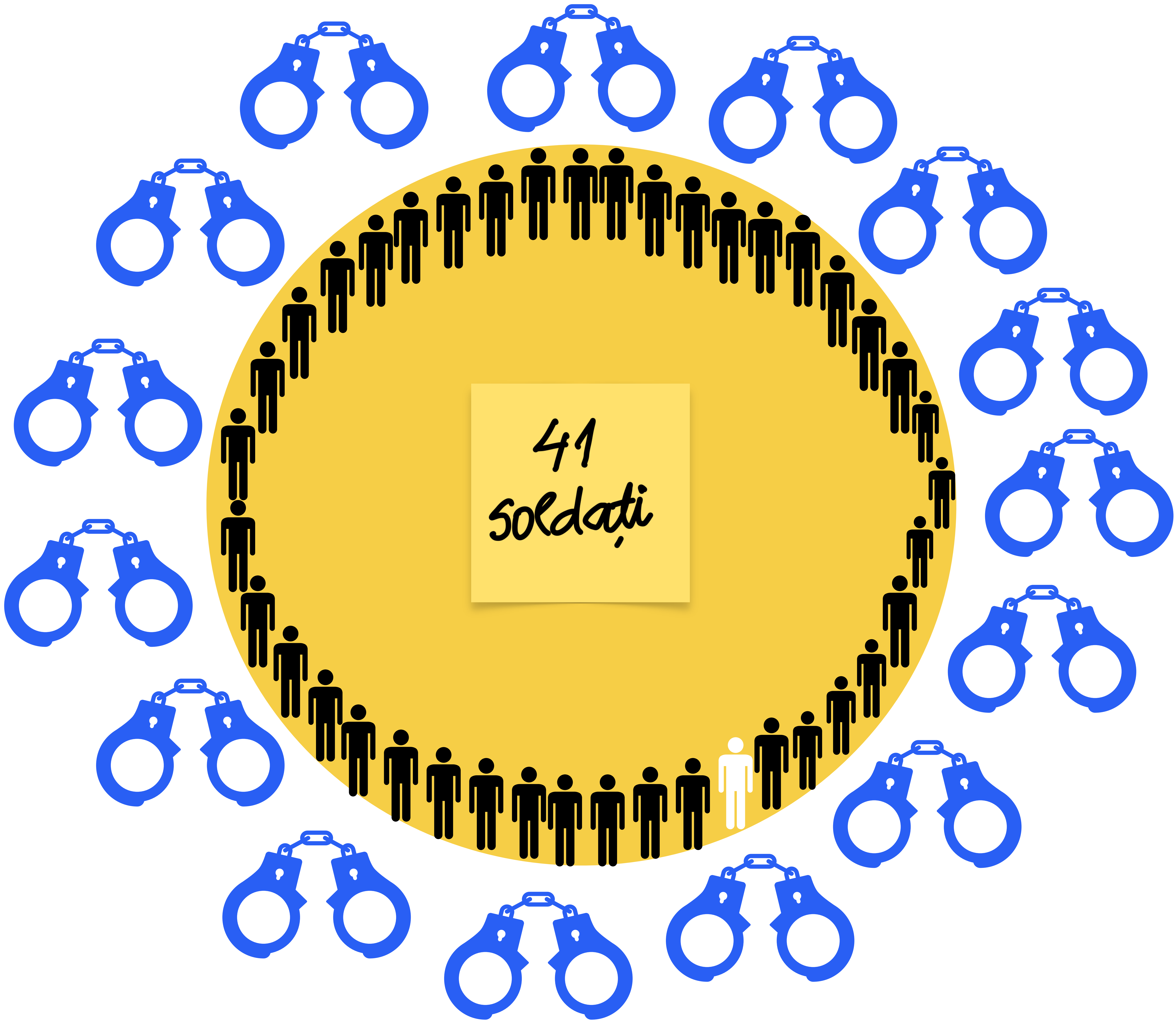
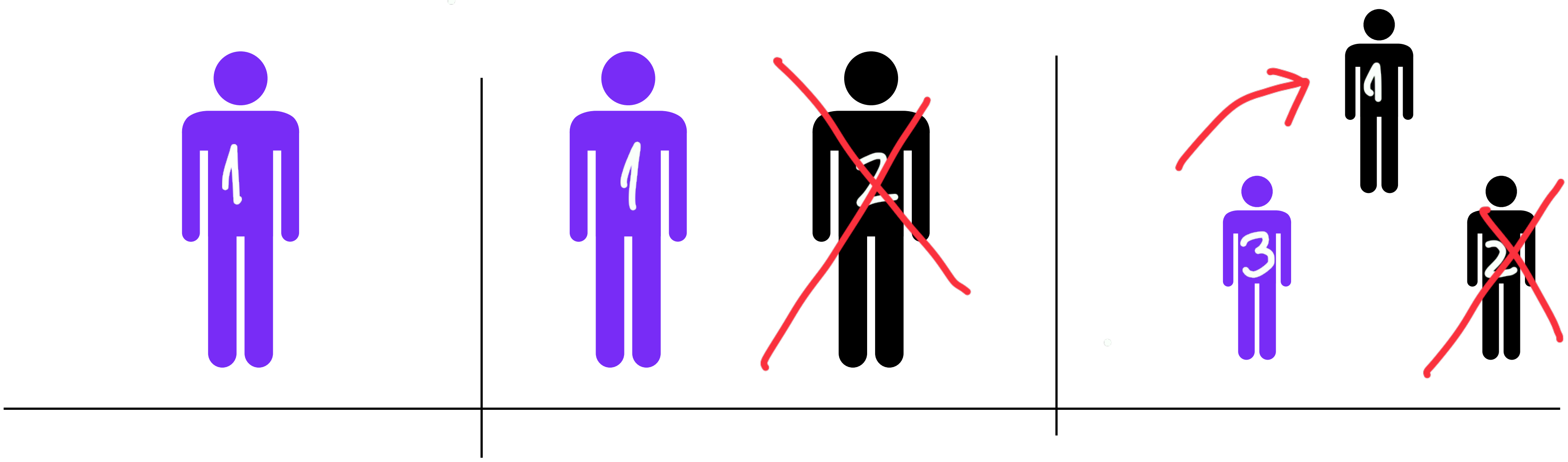
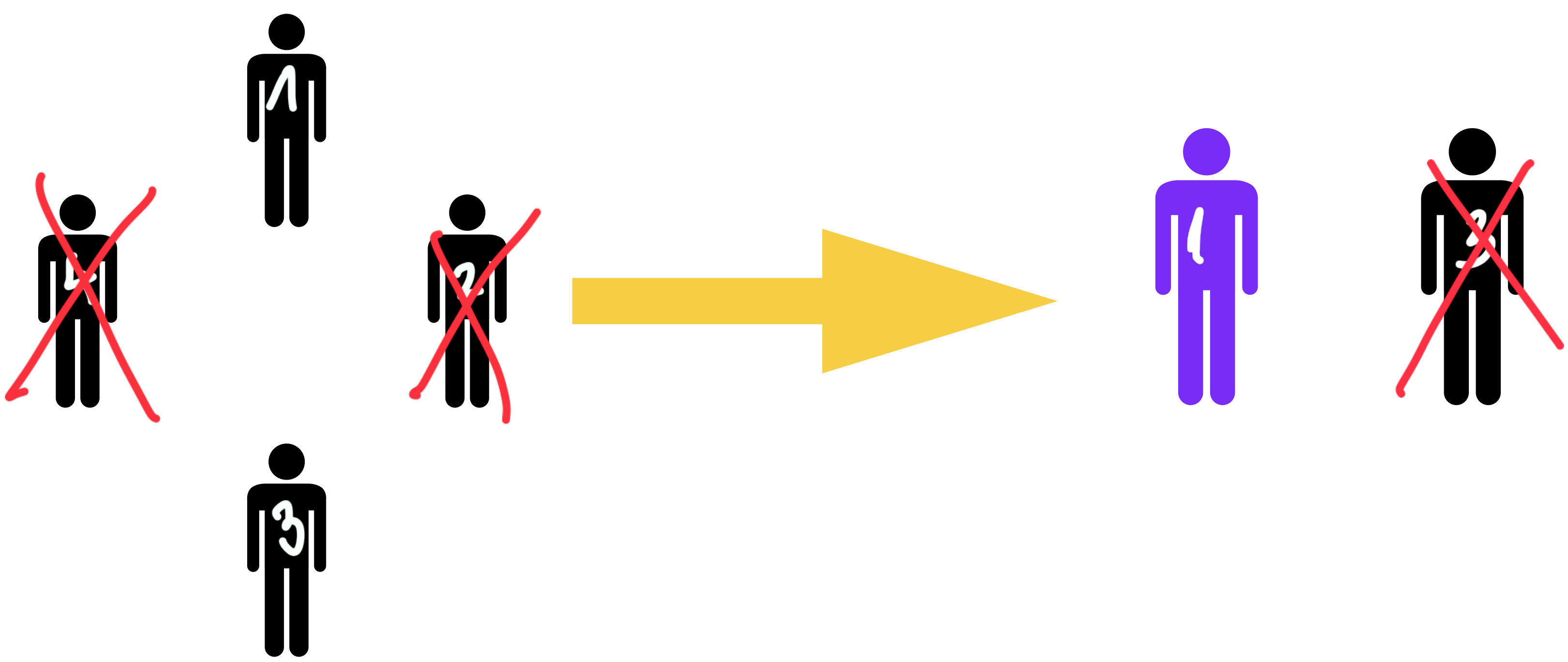
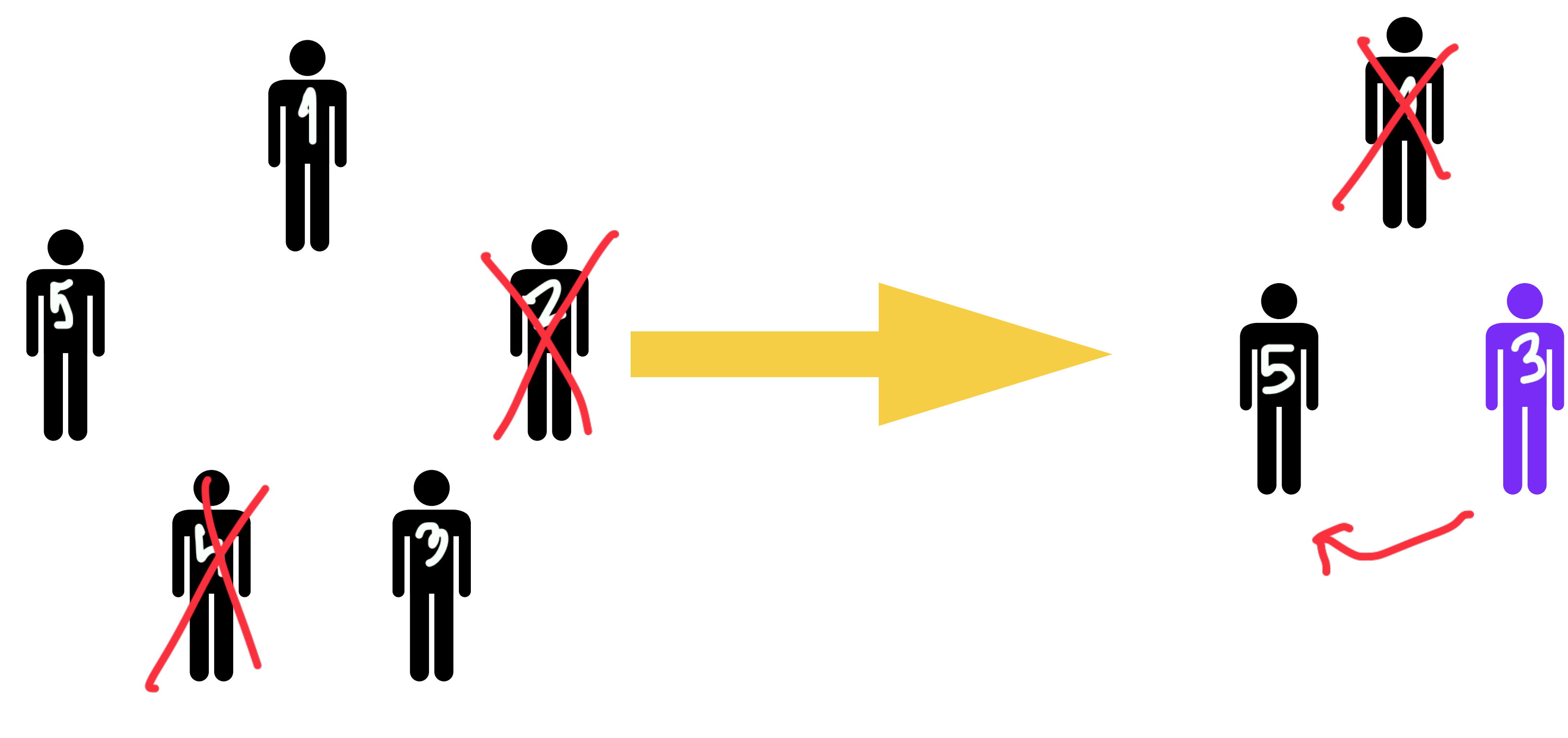

COORDONATOR:
ASIS.UNIV.DRD.
VÎNTU IOAN
VLADIMIR
SESIUNEA DE COMUNICARI MATEMATICE, 9
DECEMBRIE 2023
Facultatea de Matematică și
Informatică, Universitatea “Ovidius”
din Constanta

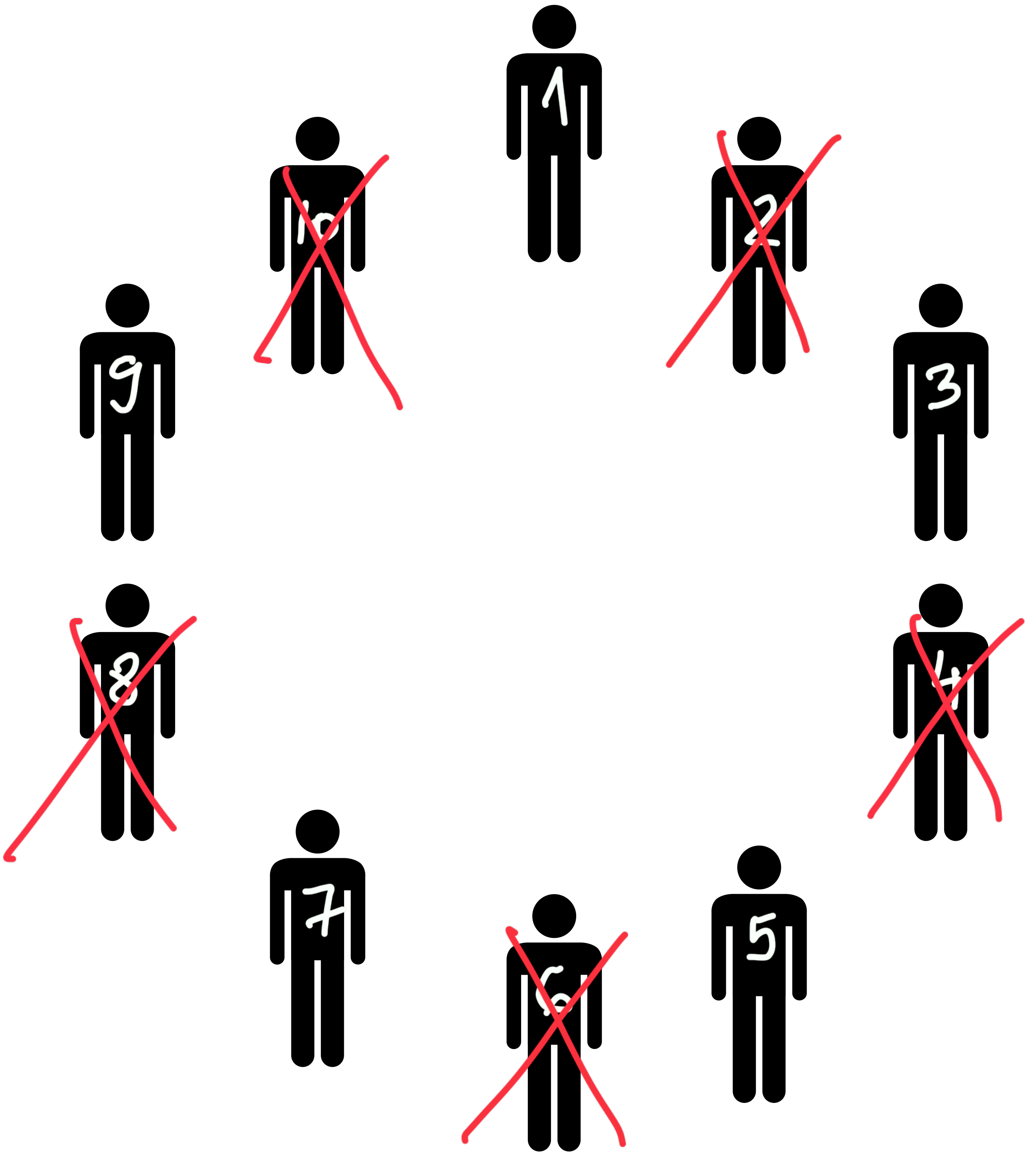
Problema Iosefiană
Galileea, 1 d.H.
Iosif Flavius
AȘTEFĂNOAE NICOLAE


41
soldați





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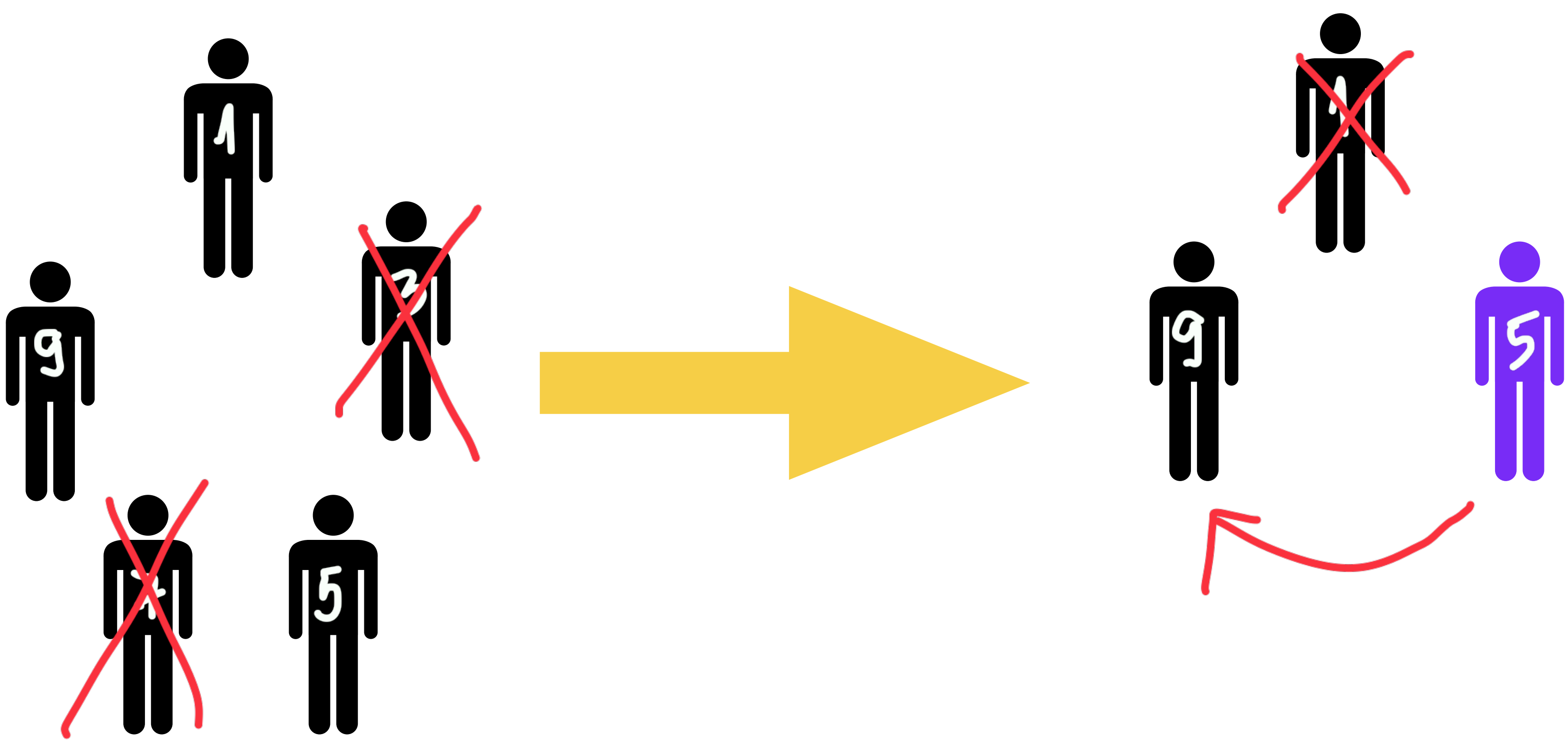
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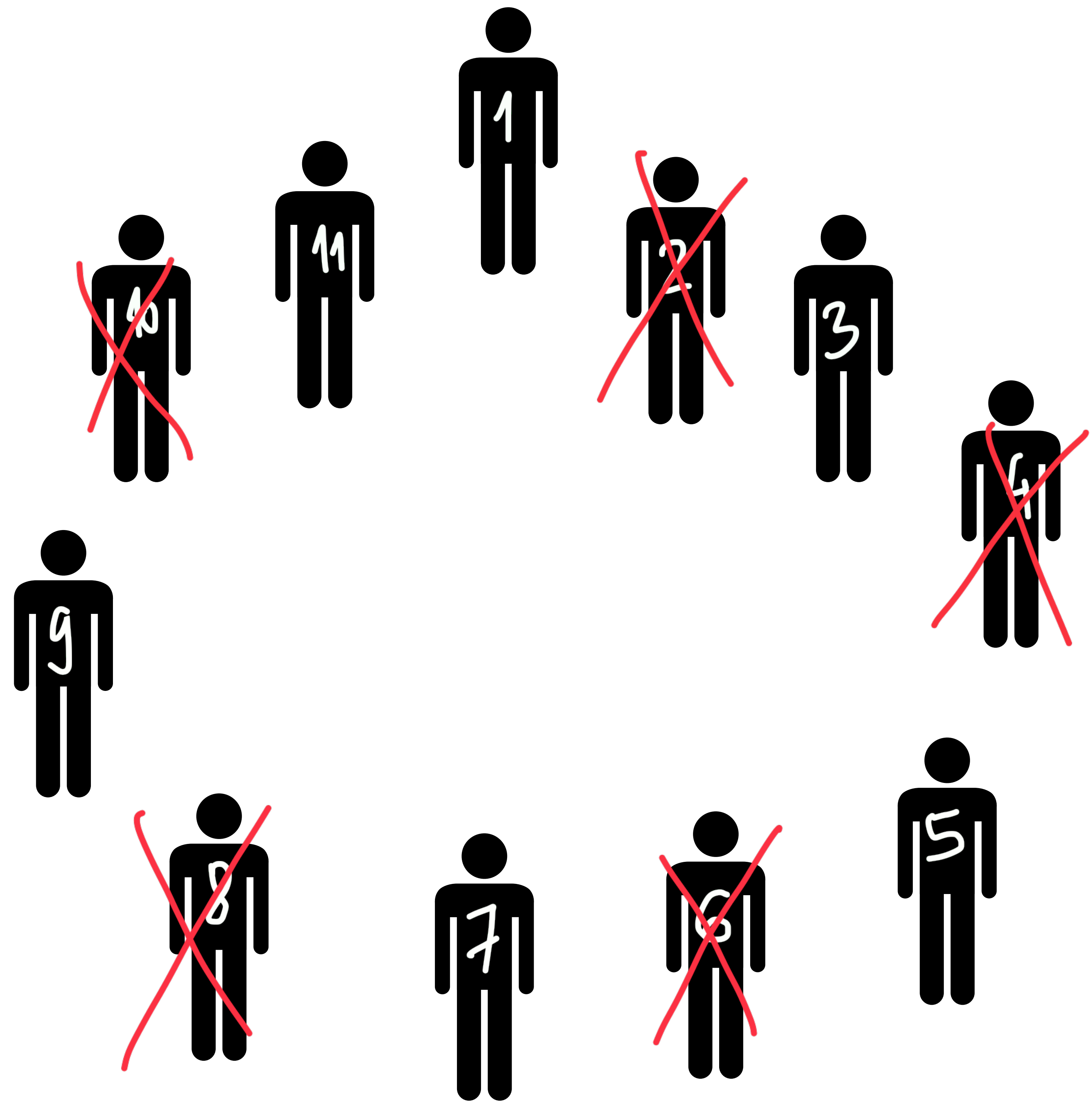
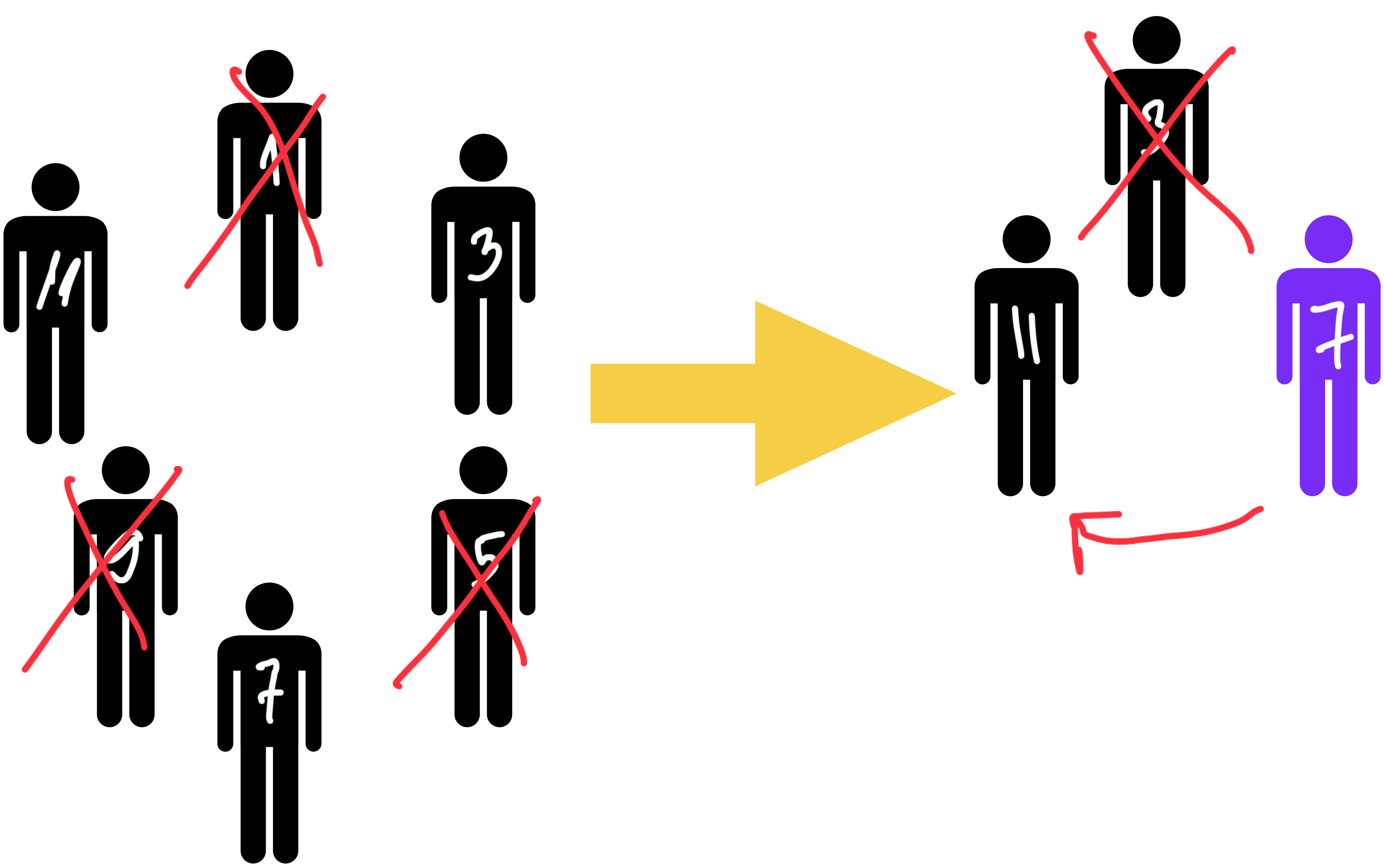




n numărul de soldați	$W(n)$ poziția câștigătoare
1	1
2	1
3	3
4	1
5	3
6	5
7	7
8	1
9	3
10	5
11	7
12	9
13	11
14	13
15	15
16	1

n numărul de soldați	$W(n)$ poziția câștigătoare
1	1
2	1
3	3
4	1
5	3
6	5
7	7
8	1
9	3
10	5
11	7
12	9
13	11
14	13
15	15
16	1

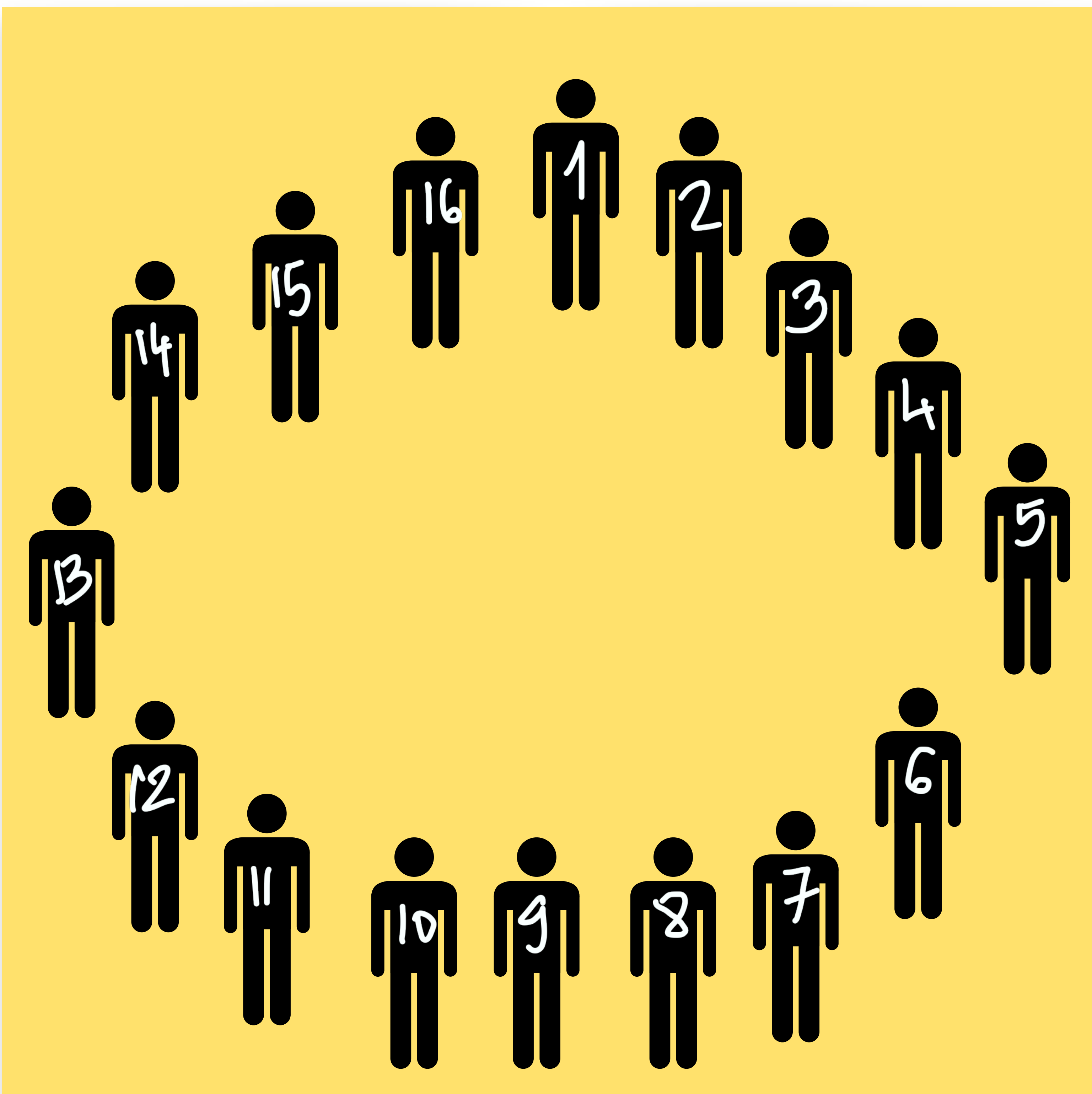
numărul de soldați

o putere a lui 2

Dacă $n = 2^k$, atunci

$$W(n) = 1$$

poziția câștigătoare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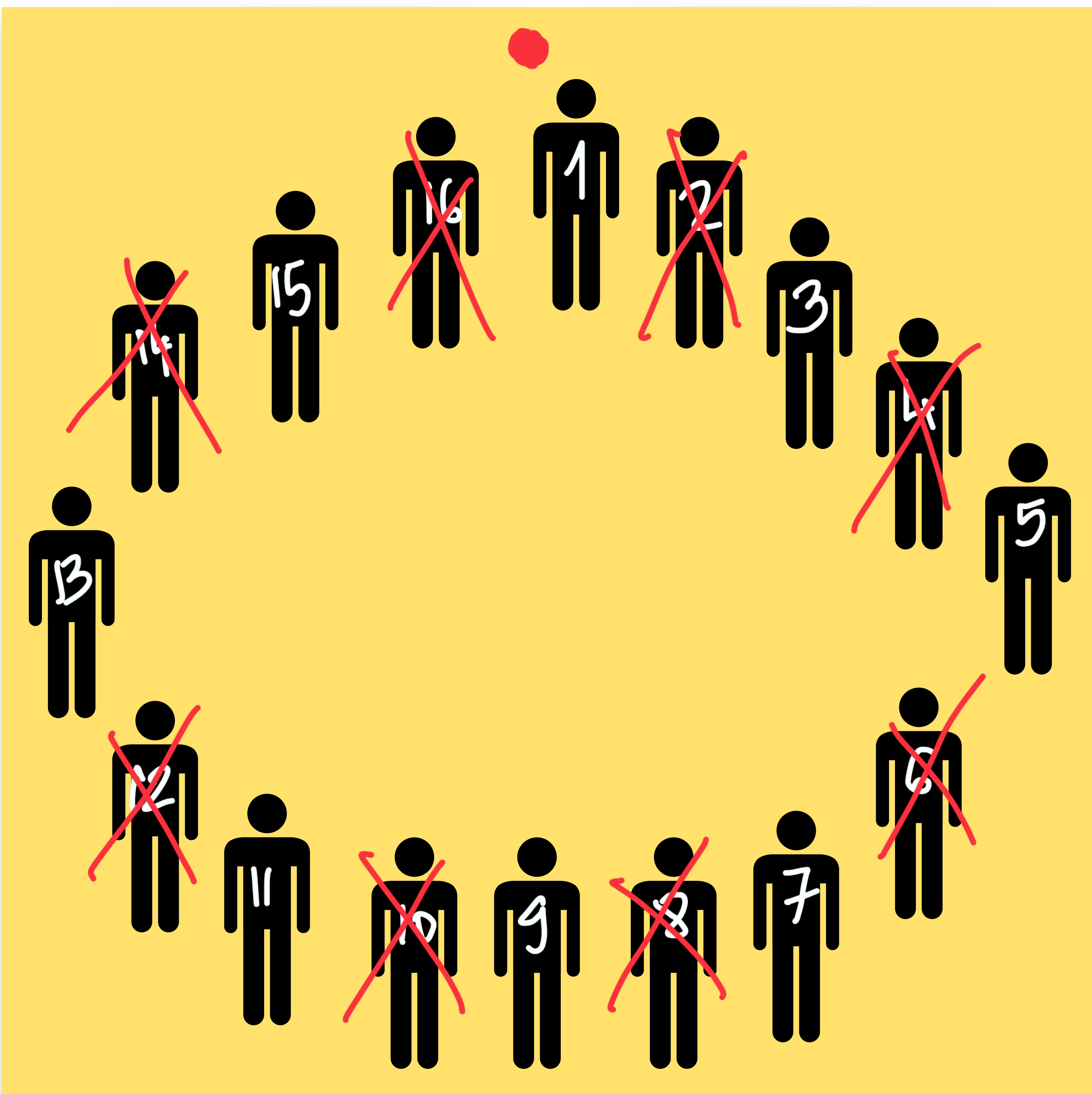
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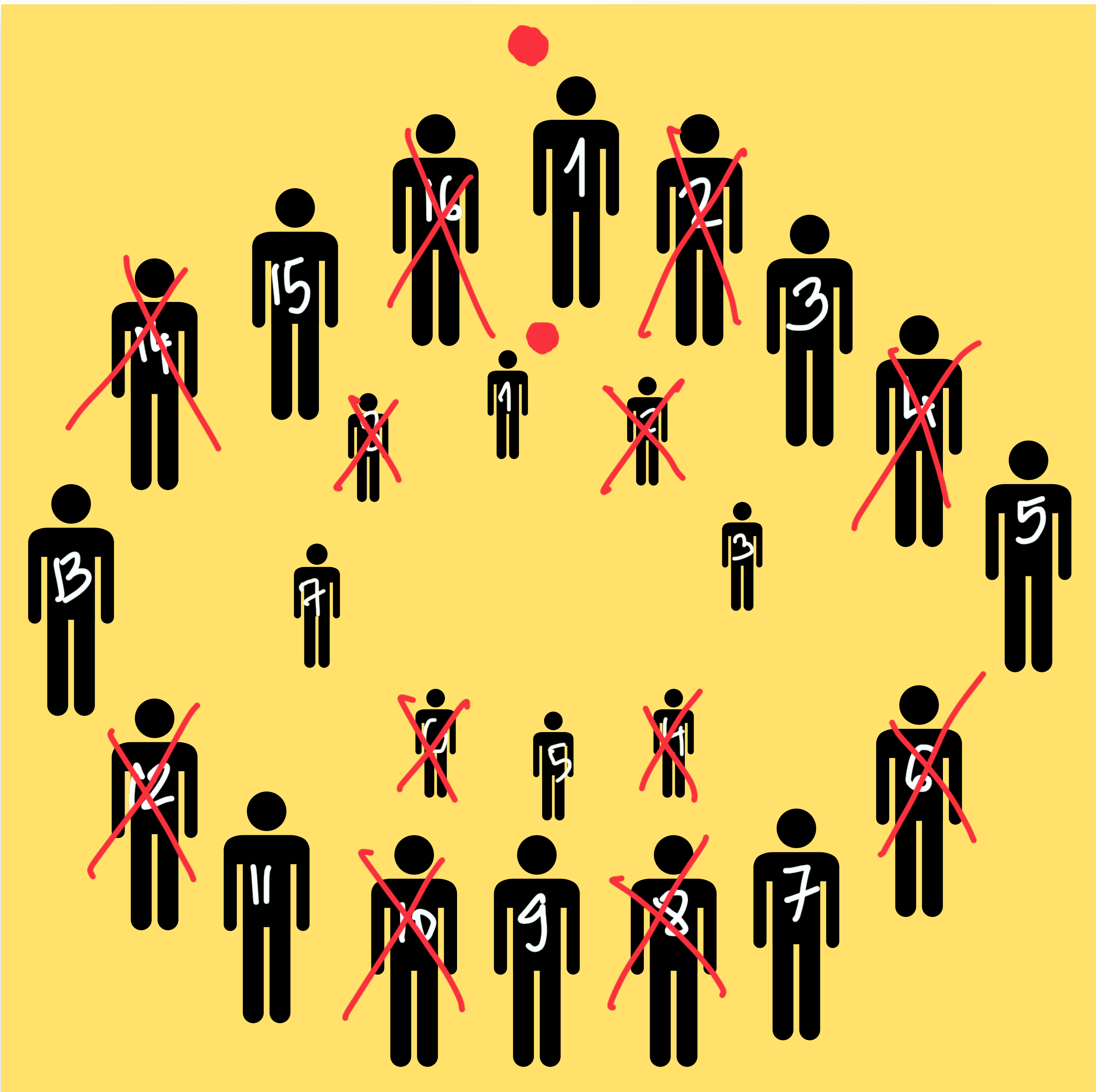
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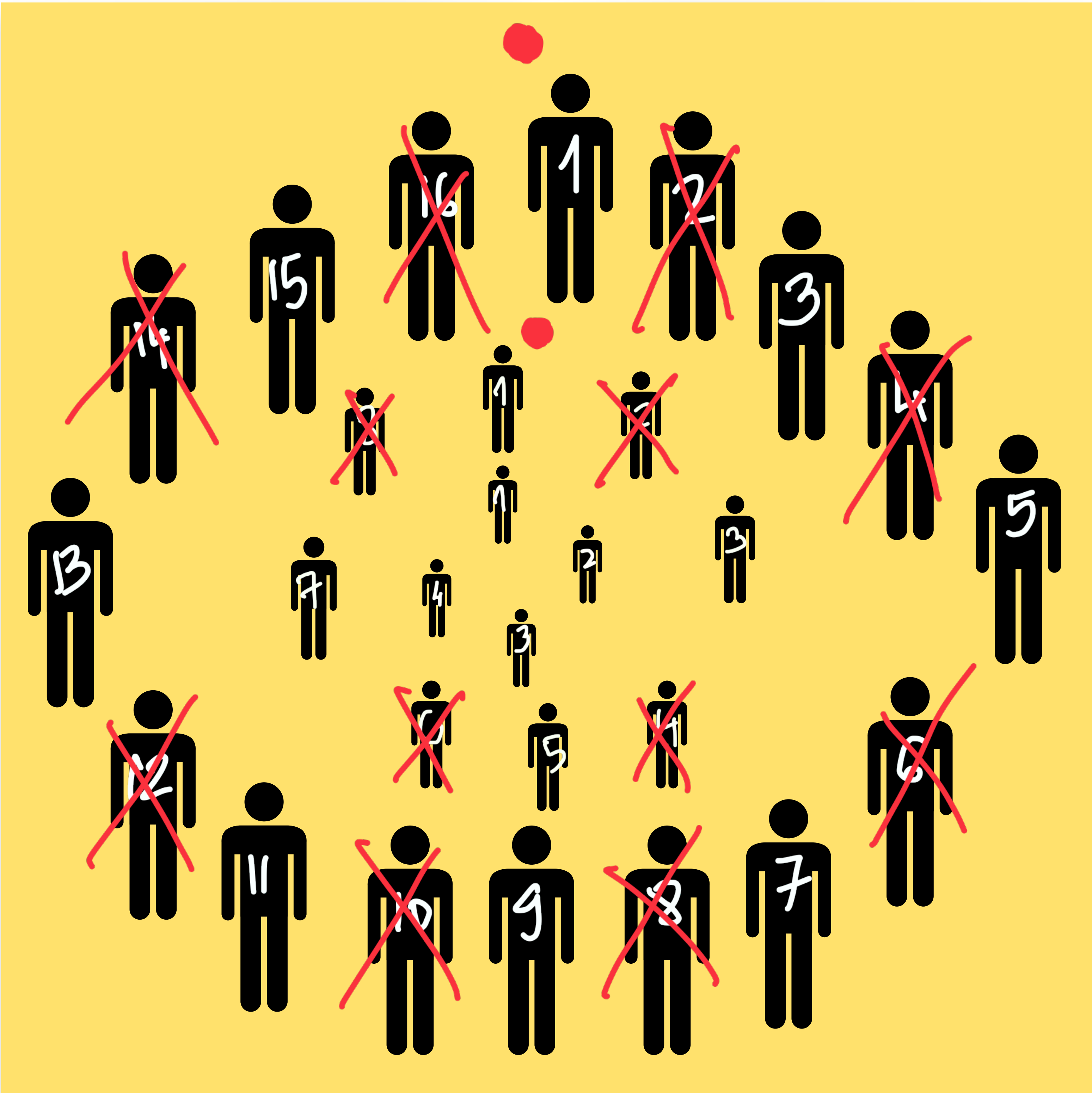

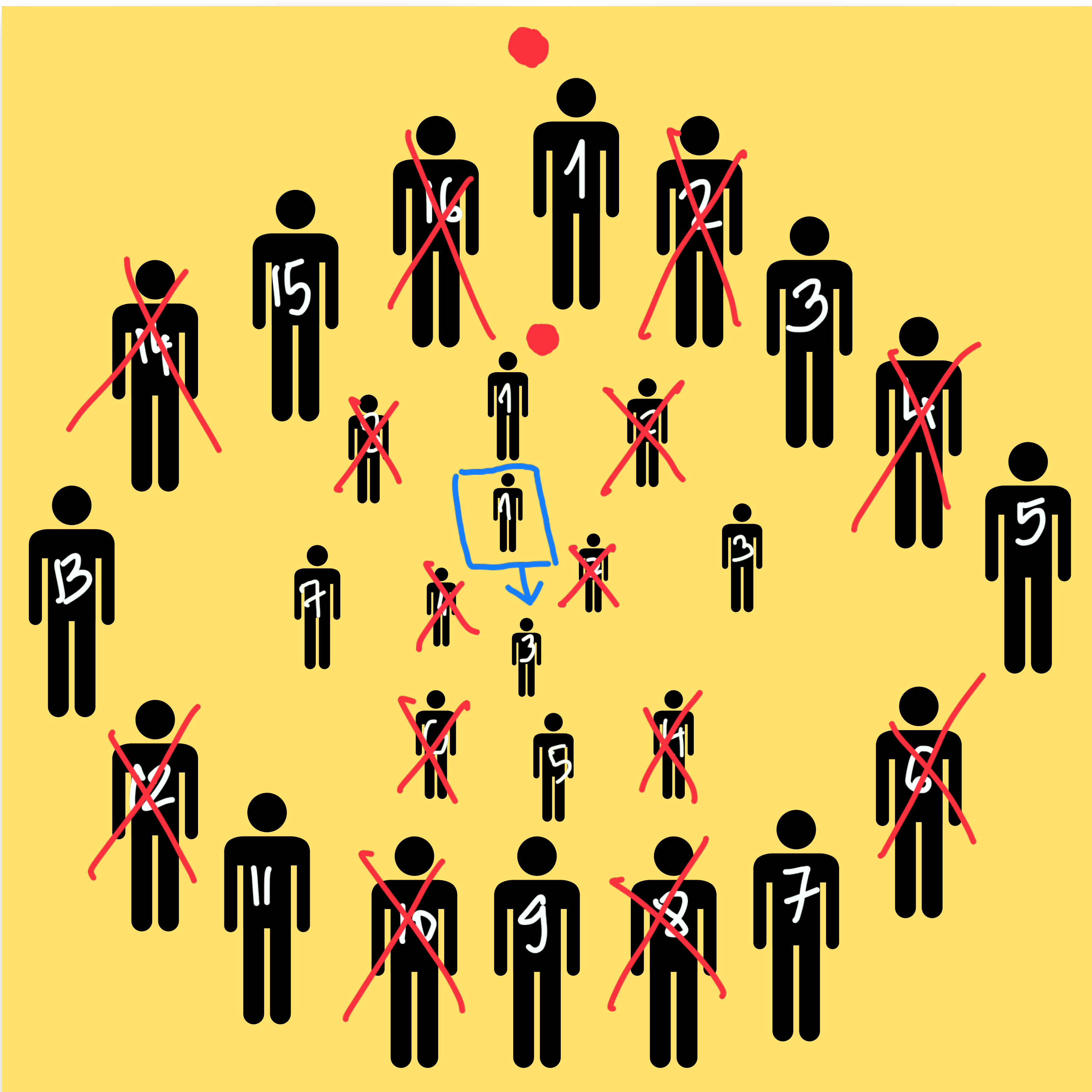
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cea mai mare putere posibilă

$$N = 2^{k} + \ell$$

cea mai mare putere posibilă

$$N = 2^{k} \cdot \ell$$

$$77 = 64 + 8 + 4 + 1$$

$$77 = 2^{6} + 2^{3} + 2^{2} + 2^{0}$$

Binar:

2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	0	0	1	1	0	1

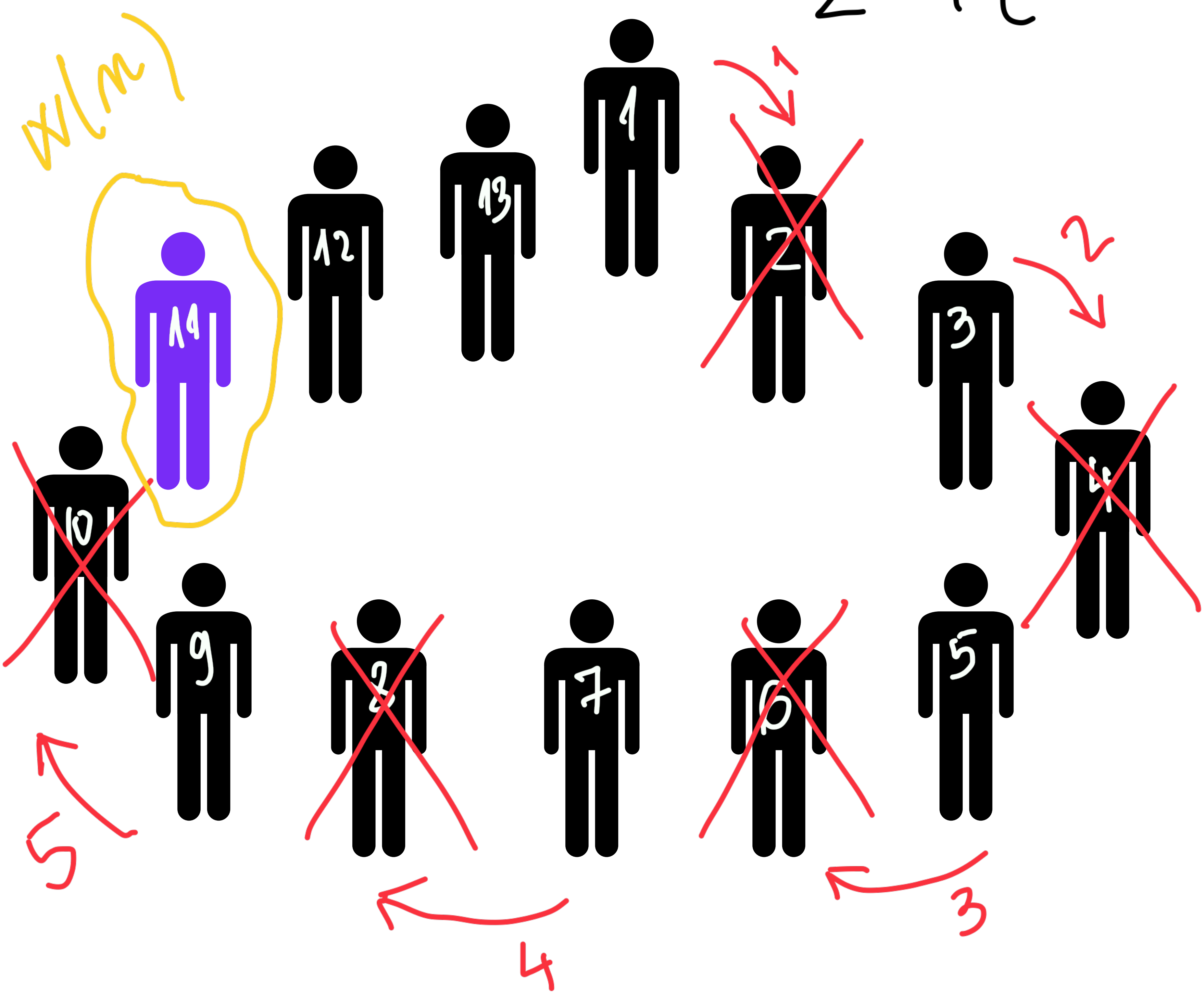
$$77 = 64 + 8 + 4 + 1$$

$$= \underbrace{64} + \underbrace{13}$$

$$= 2^k + \ell$$

Pentru $\underline{n = 13} = 2^3 + 5$

$$= 2^k + \ell$$



Așadar,

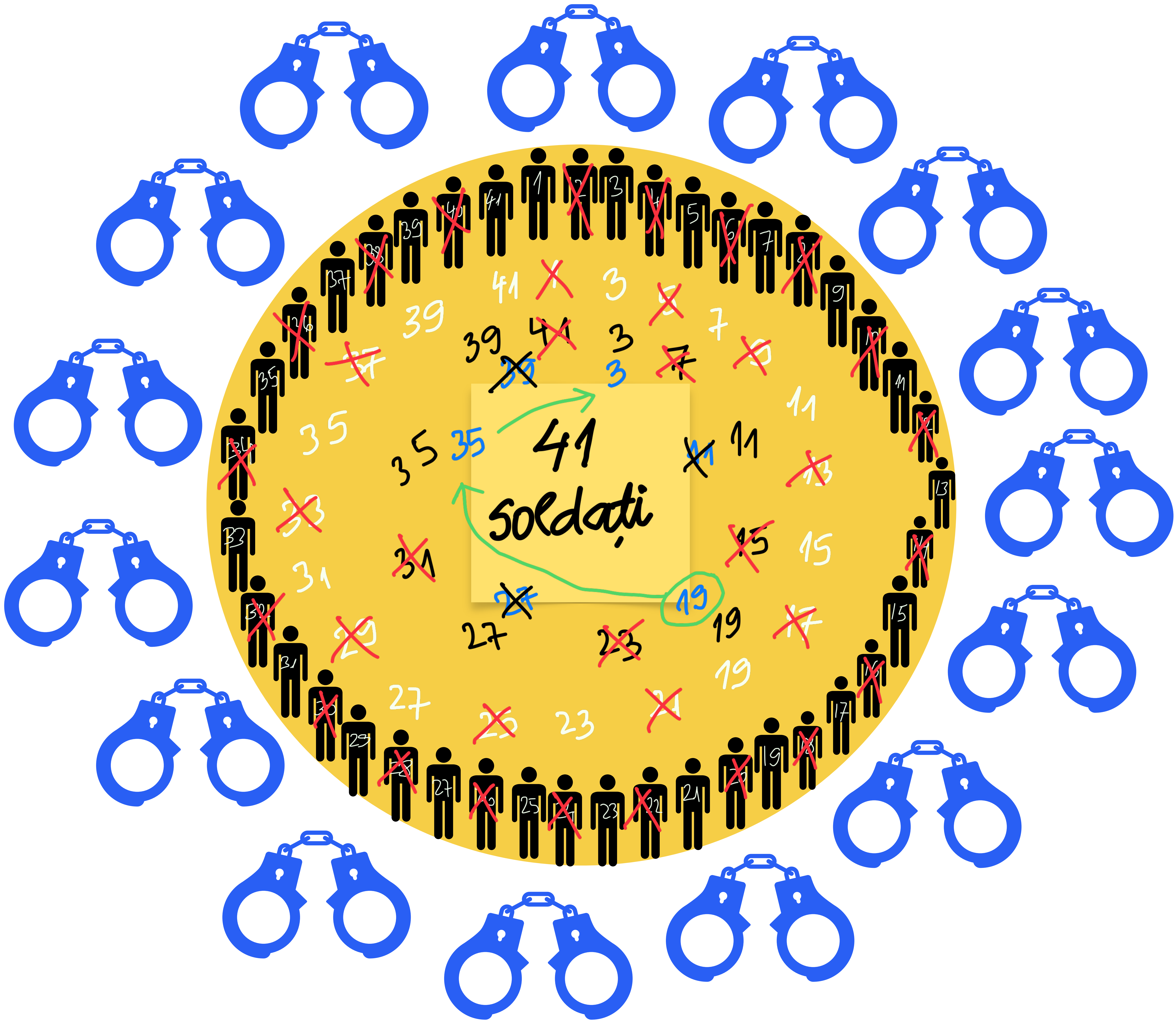
Dacă $\underline{n = 2^k + \ell}$, unde $\ell < 2^k$

Atunci $\boxed{W(n) = 2\ell + 1}$

n	$2^k + \ell$	$W(n) = 2\ell + 1$
1	$1 + 0$	$2 \cdot 0 + 1 = 1$
2	$2 + 0$	$2 \cdot 0 + 1 = 1$
3	$2 + 1$	$2 \cdot 1 + 1 = 3$
4	$4 + 0$	$2 \cdot 0 + 1 = 1$
5	$4 + 1$	$2 \cdot 1 + 1 = 3$
6	$4 + 2$	$2 \cdot 2 + 1 = 5$
7	$4 + 3$	$2 \cdot 3 + 1 = 7$
8	$8 + 0$	$2 \cdot 0 + 1 = 1$
9	$8 + 1$	$2 \cdot 1 + 1 = 3$
10	$8 + 2$	$2 \cdot 2 + 1 = 5$
11	$8 + 3$	$2 \cdot 3 + 1 = 7$
12	$8 + 4$	$2 \cdot 4 + 1 = 9$
13	$8 + 5$	$2 \cdot 5 + 1 = 11$

...


$n = \underbrace{41}_{2^5 + 9}$
$9 \rightarrow \ell$
$\Rightarrow \boxed{W(n) = 2\ell + 1 = 19}$

41
soldați

$$n = 41 = 2^5 + 2^3 + 2^0$$

2^5	2^4	2^3	2^2	2^1	2^0
1	0	1	0	0	1

$$\Rightarrow 10011 = 2^4 + 2^1 + 2^0 = \boxed{19}$$


Vă Mulțumesc