Jeu de société

Bonjour je mange des pommes goulument tous les jours avec du basilic et de l'aïoli

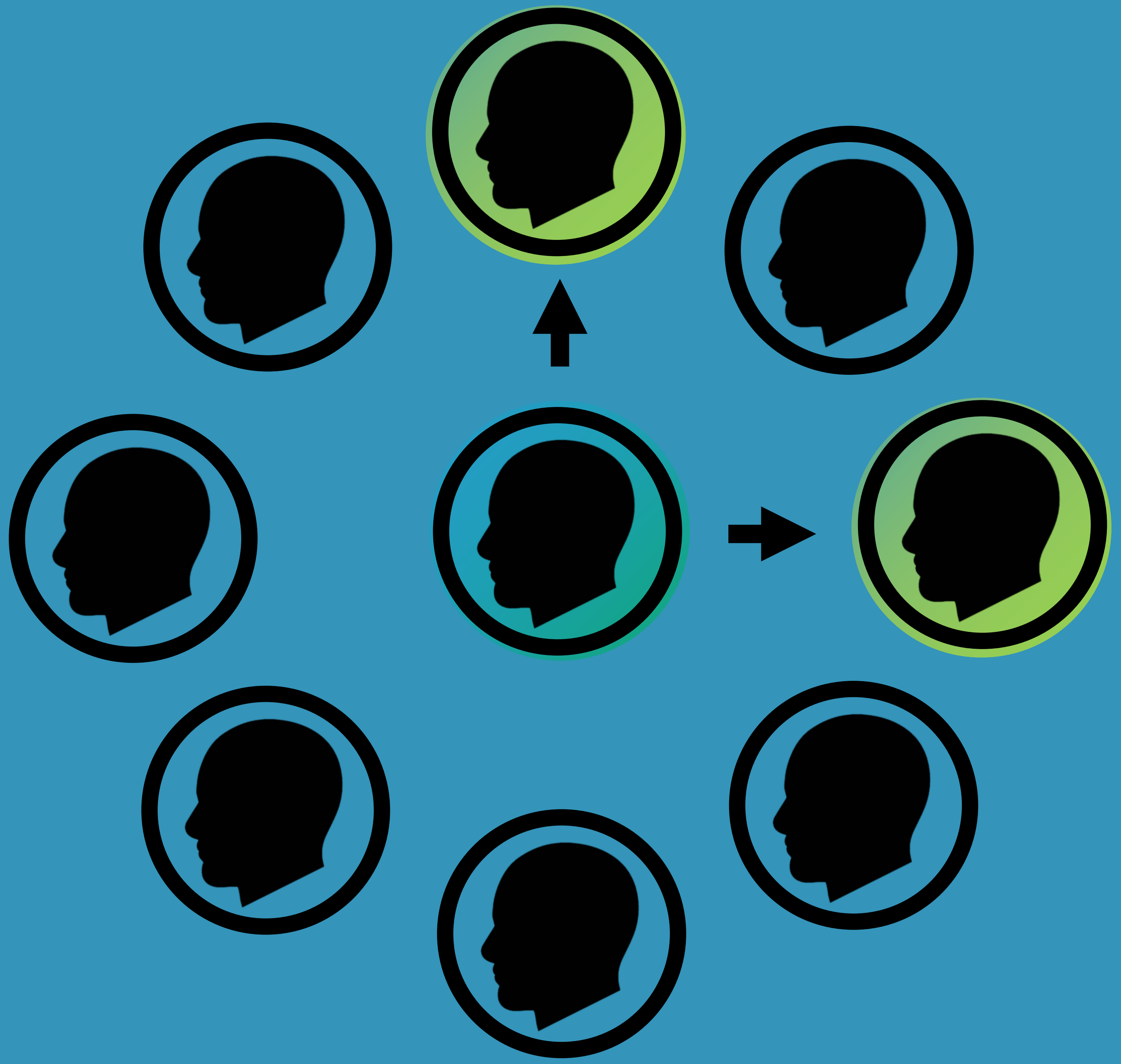
Sommaire

- Présentation du sujet
- Explication de notre méthode
- Démonstrations
- Conclusion

Présentation du sujet

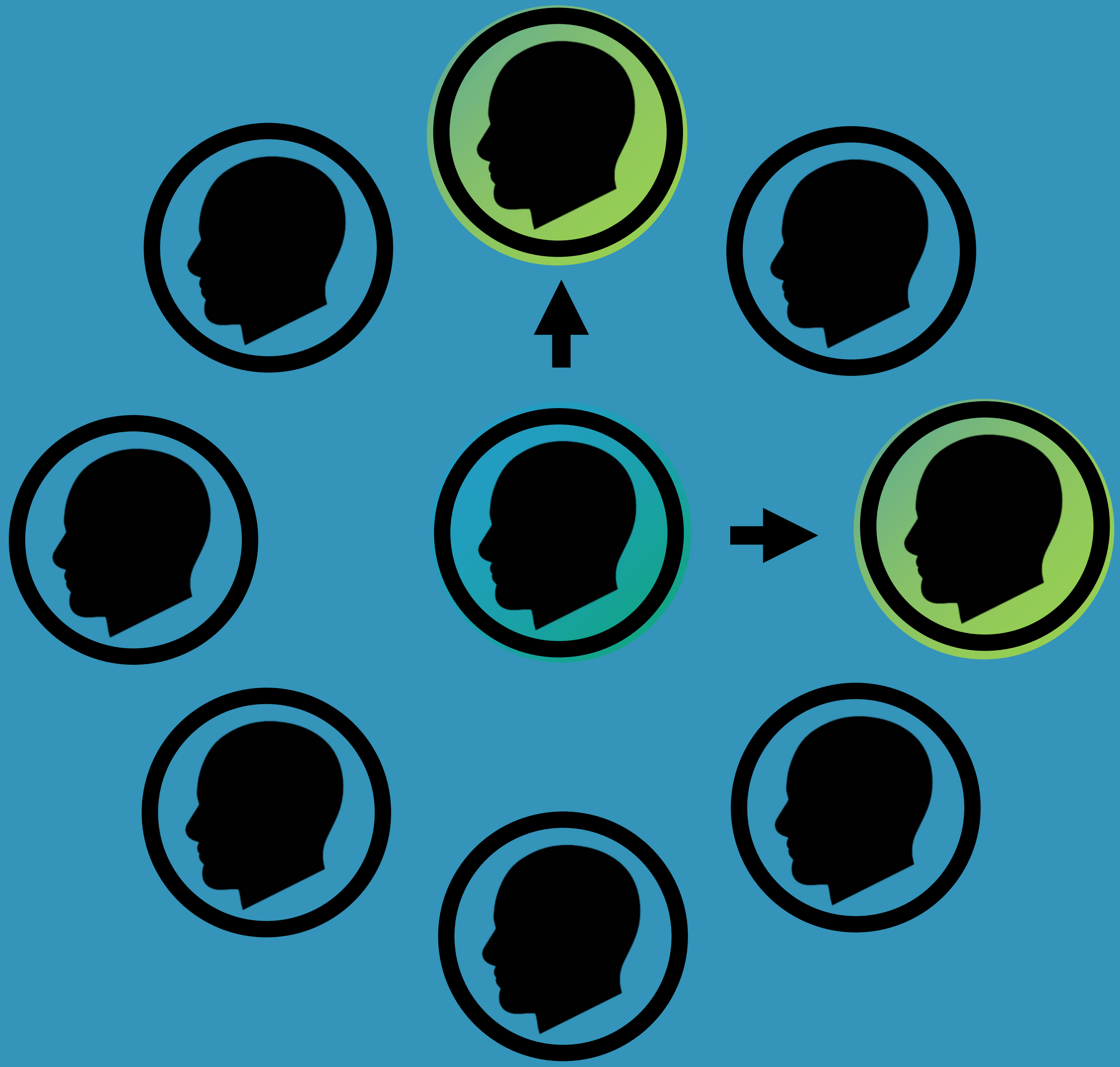
Premier exemple

$n=0$

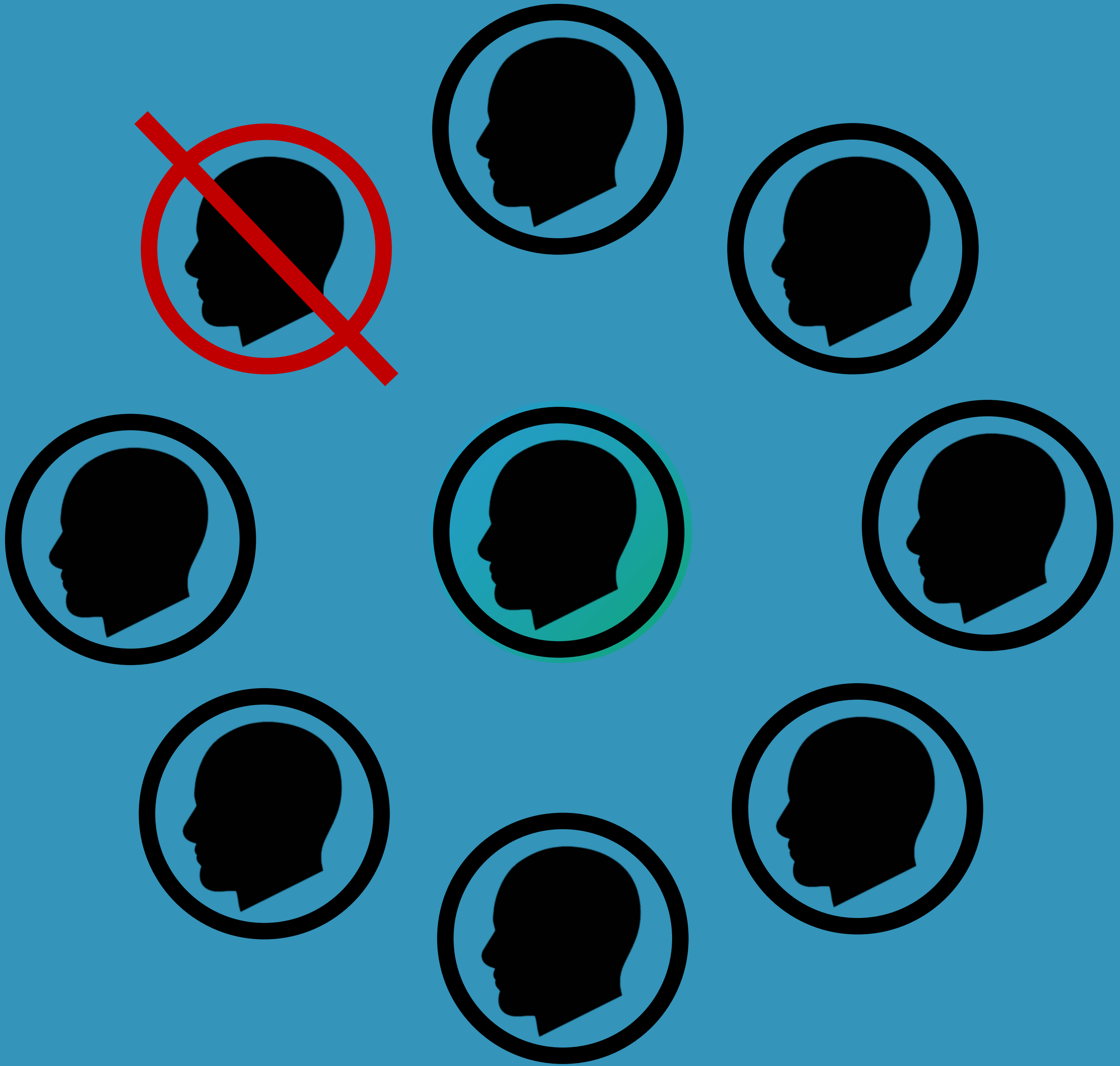


$N_0 = 8$

$n = 0$

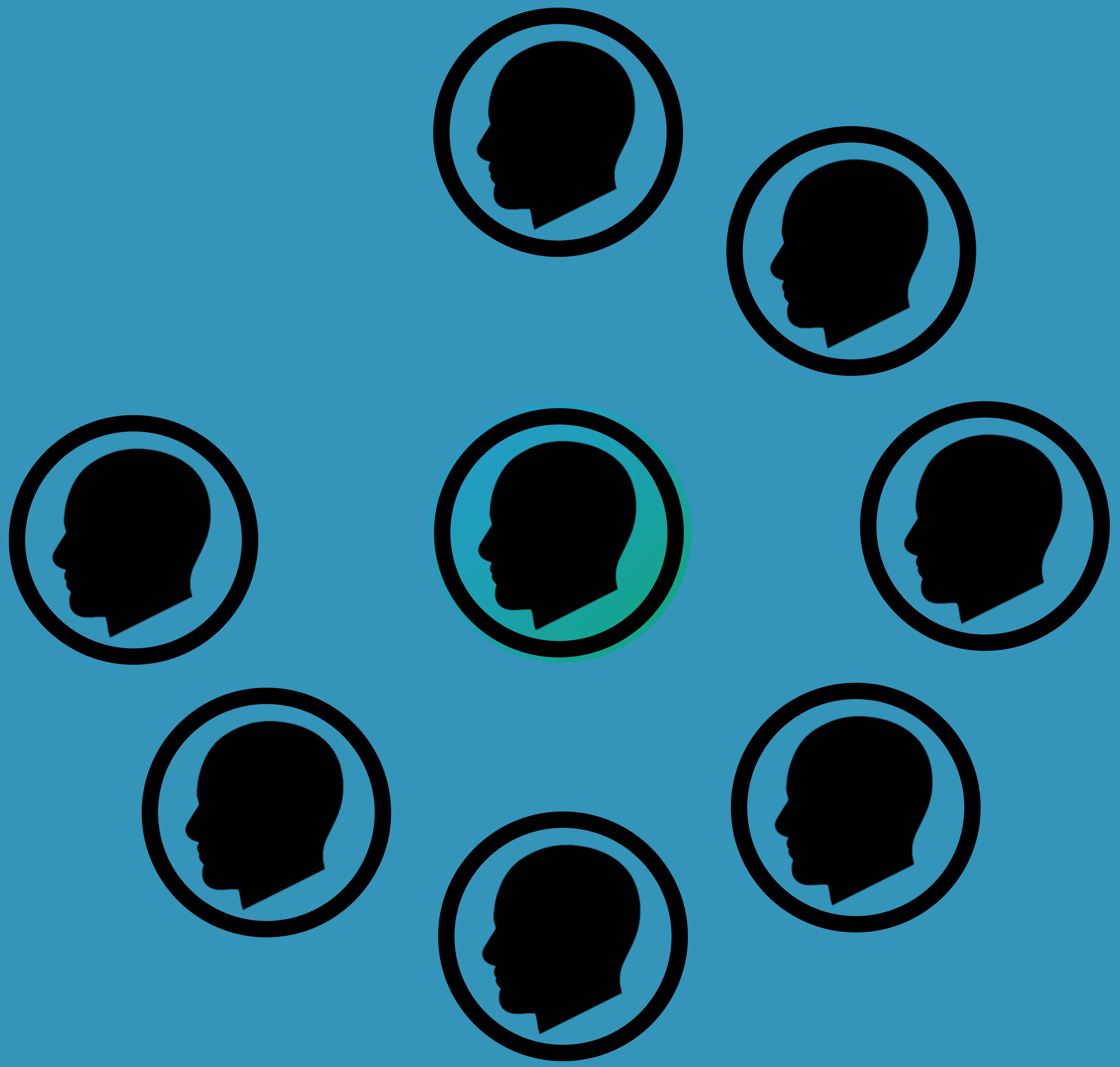


n = 1

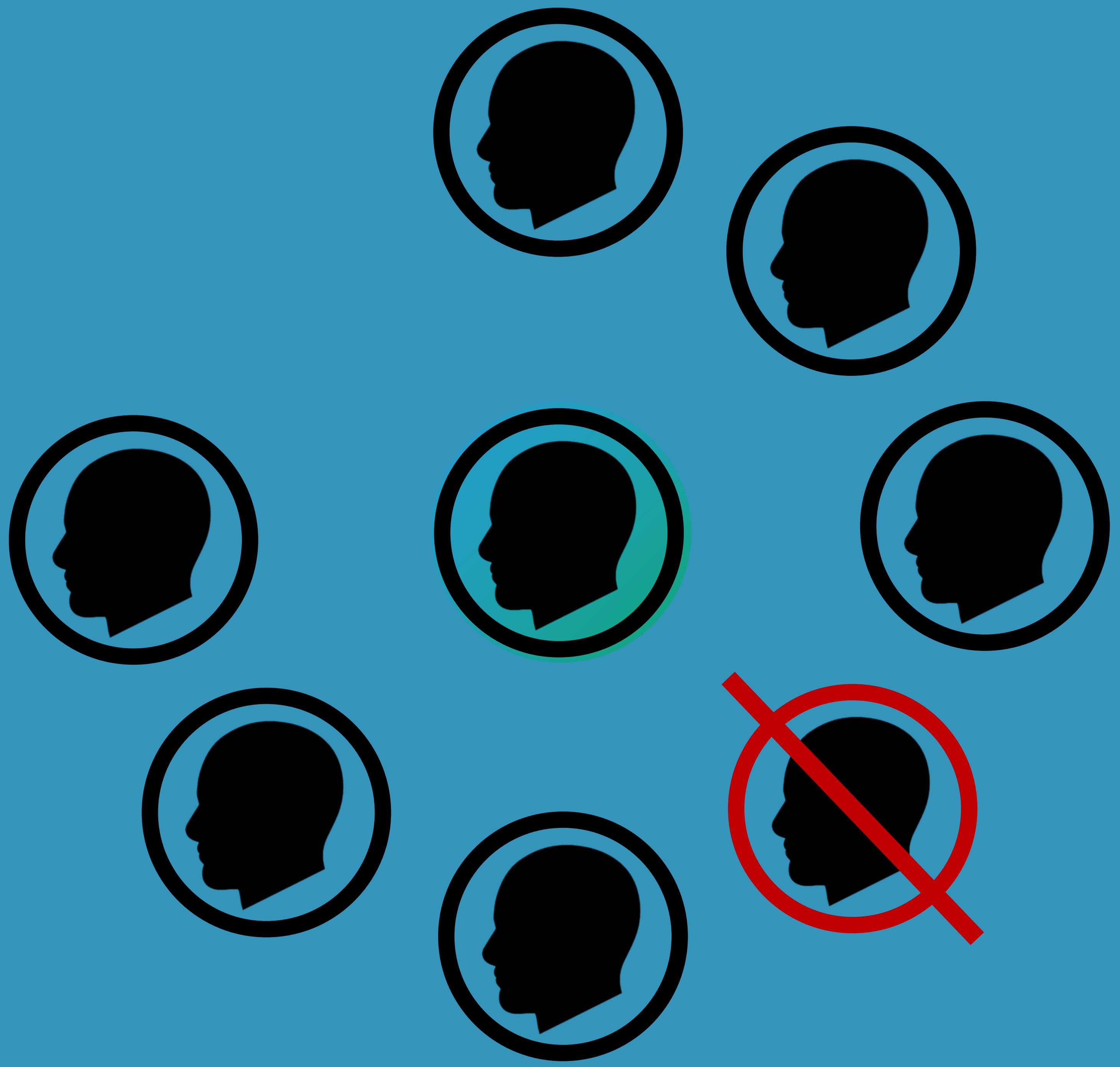


$$N_1 = 7$$

$$n = 1$$

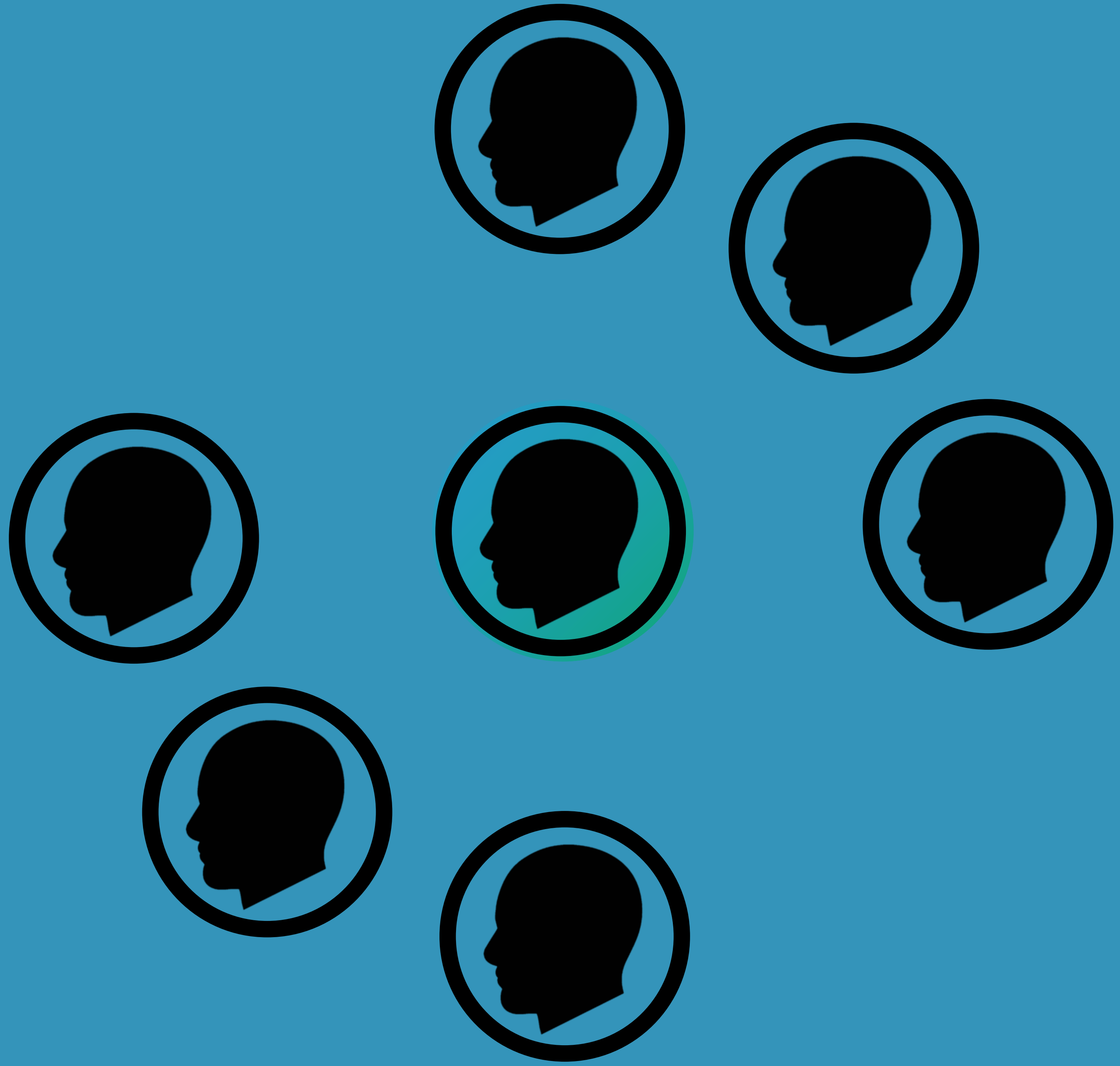


n=2

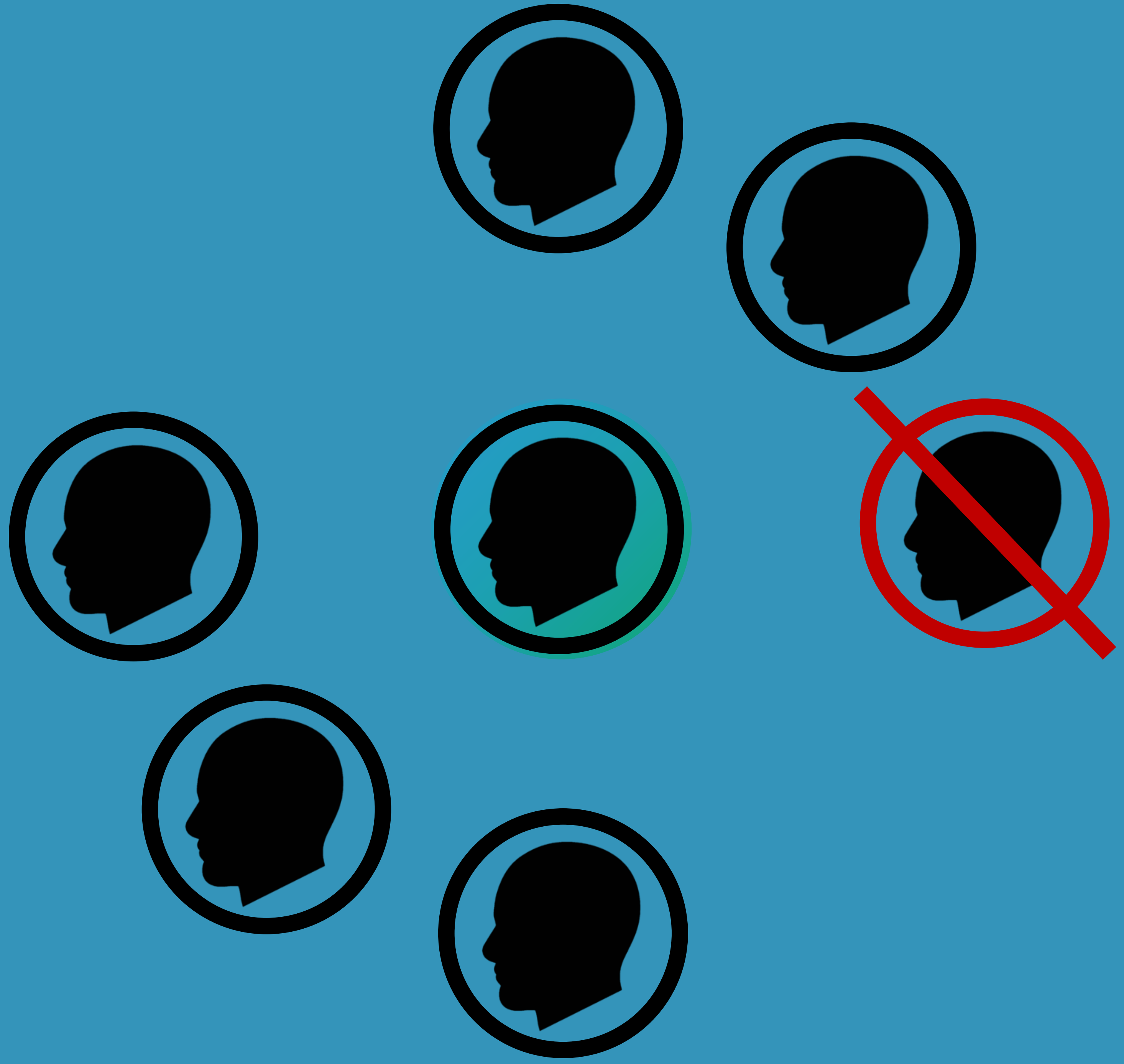


$$N_2 = 6$$

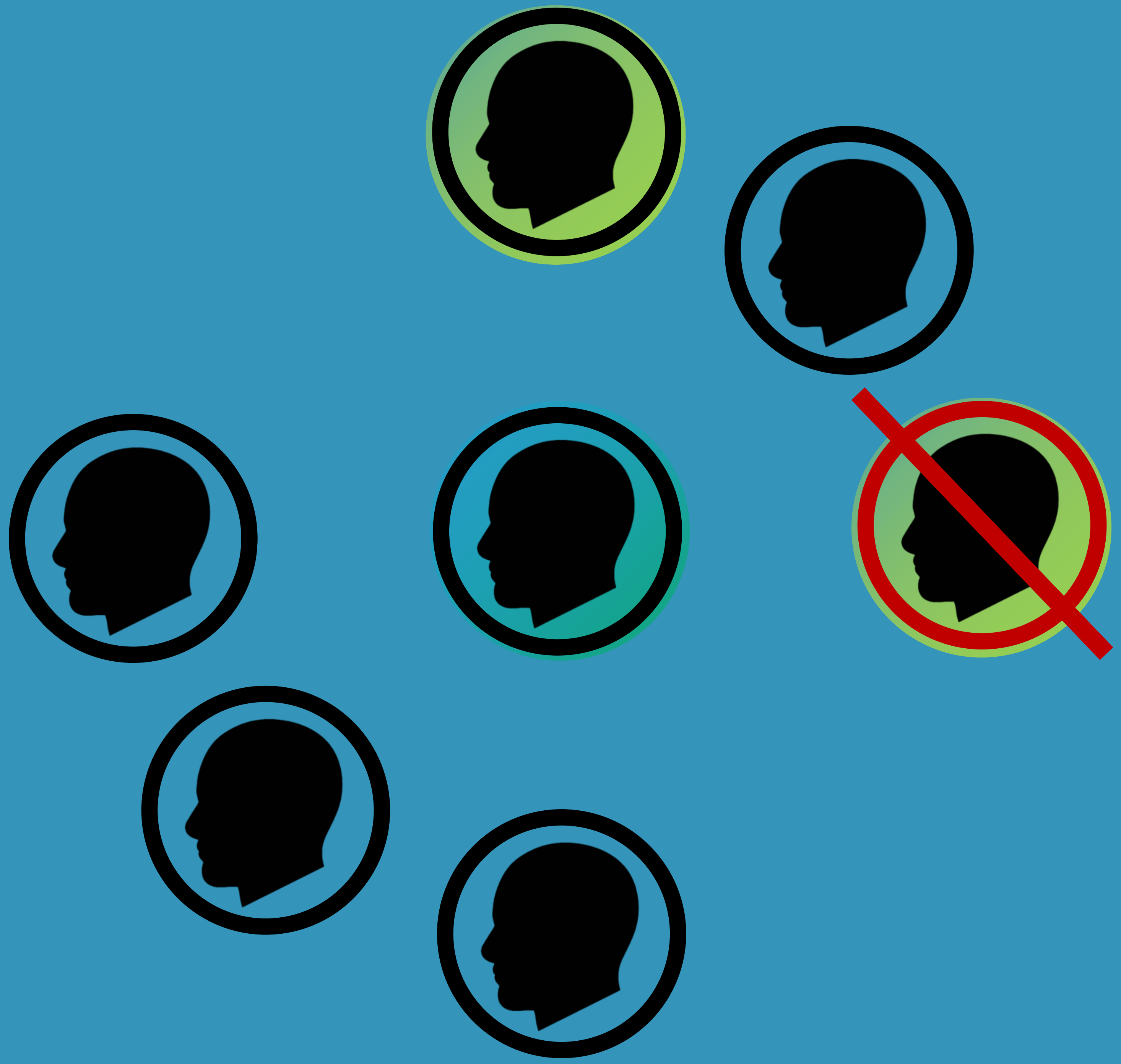
$$n = 2$$



n = 3



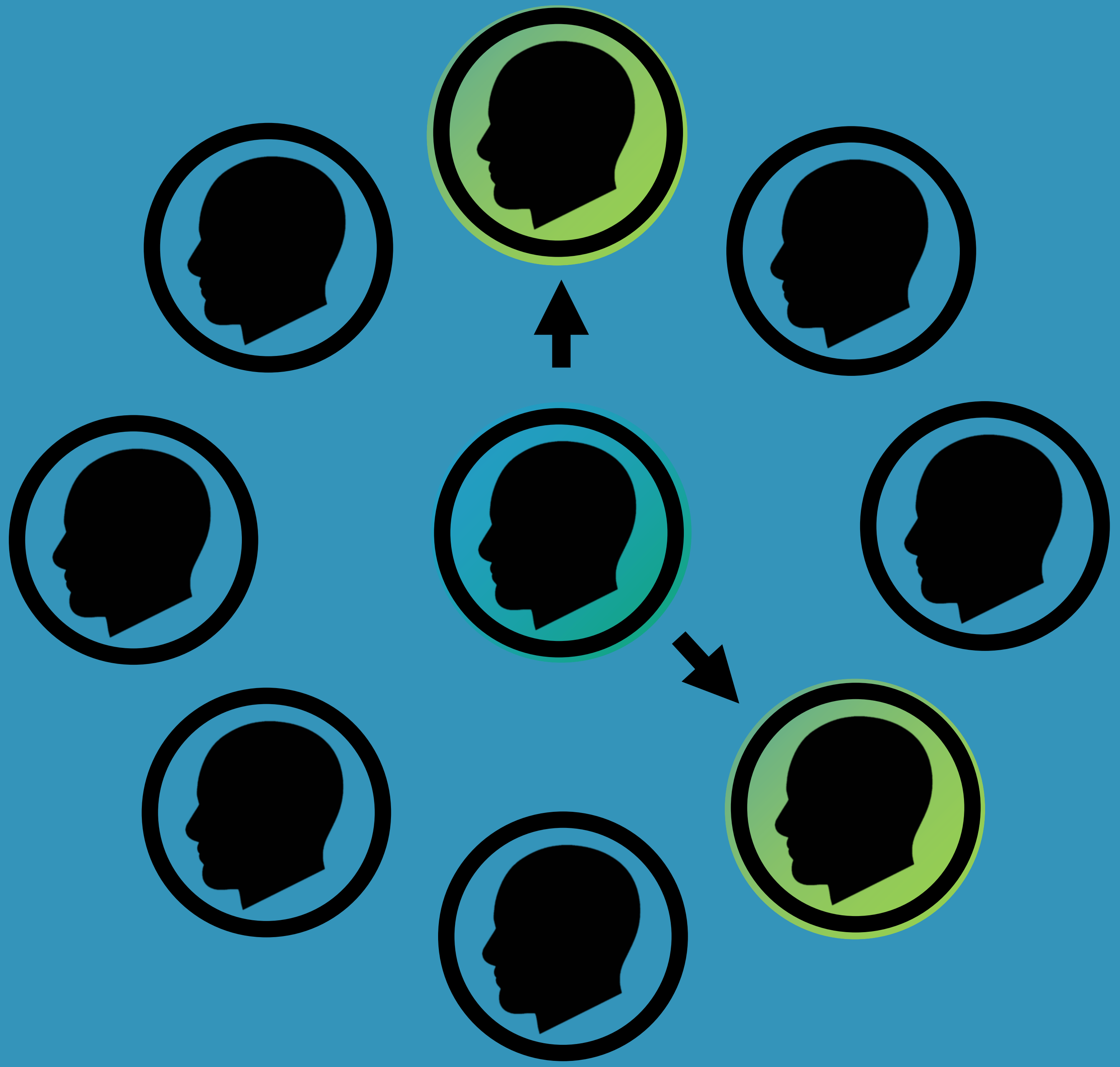
$n = 3$



Deuxième exemple

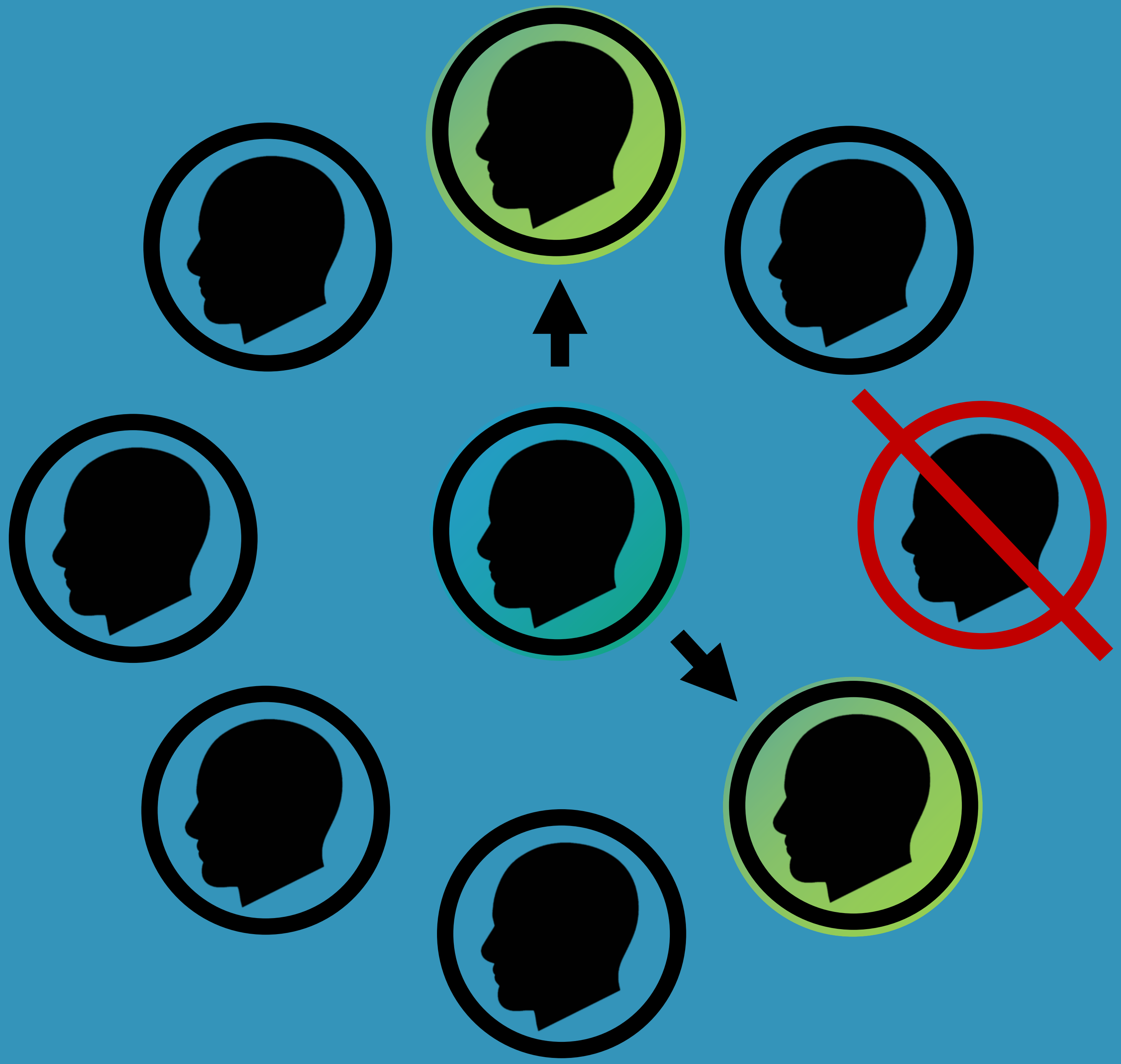
$D_0 = 3$

$n = 0$



$$D_0 = 3$$

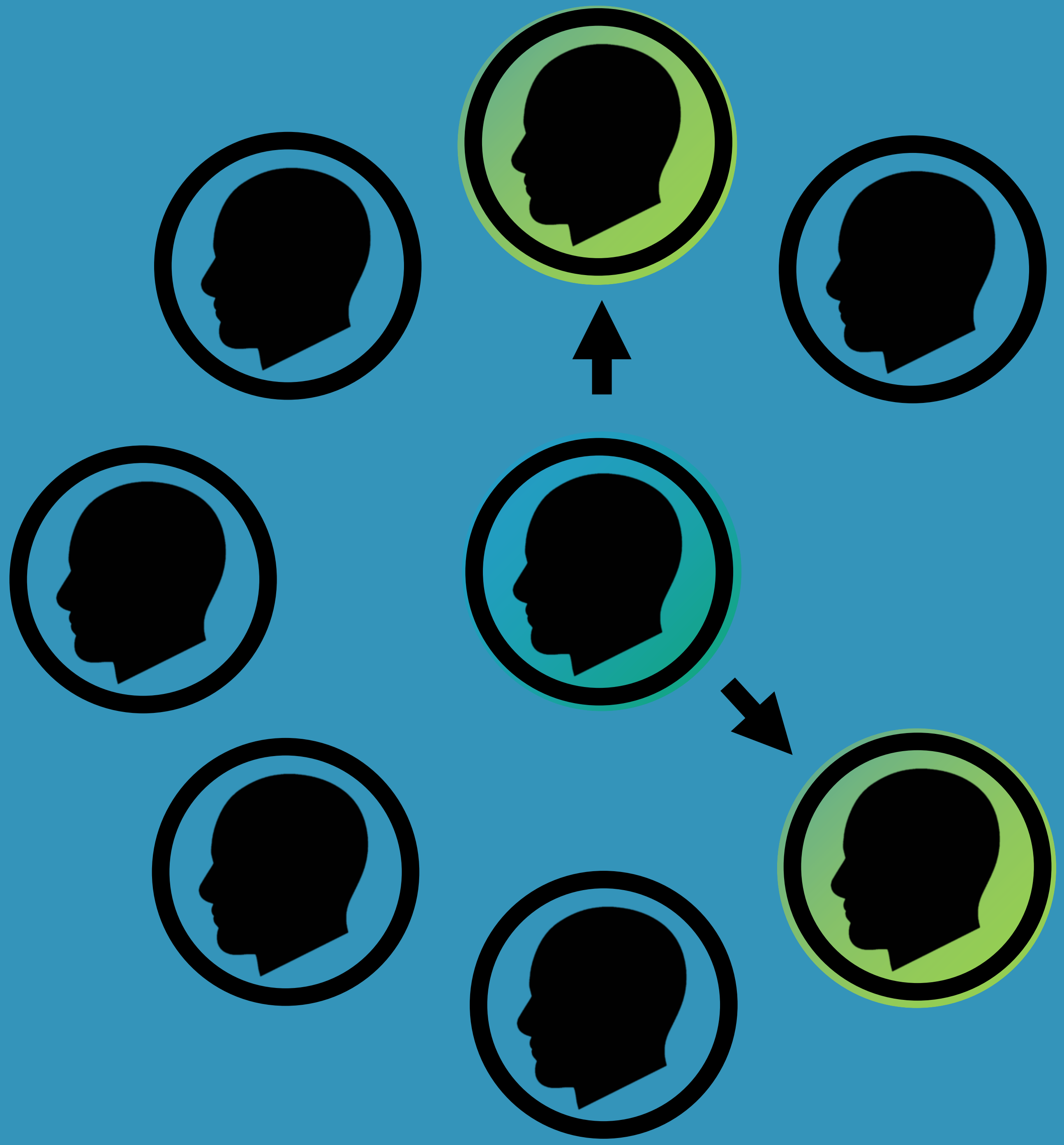
$$n = 1$$



$$D_0 = 3$$

$$D_1 = 2$$

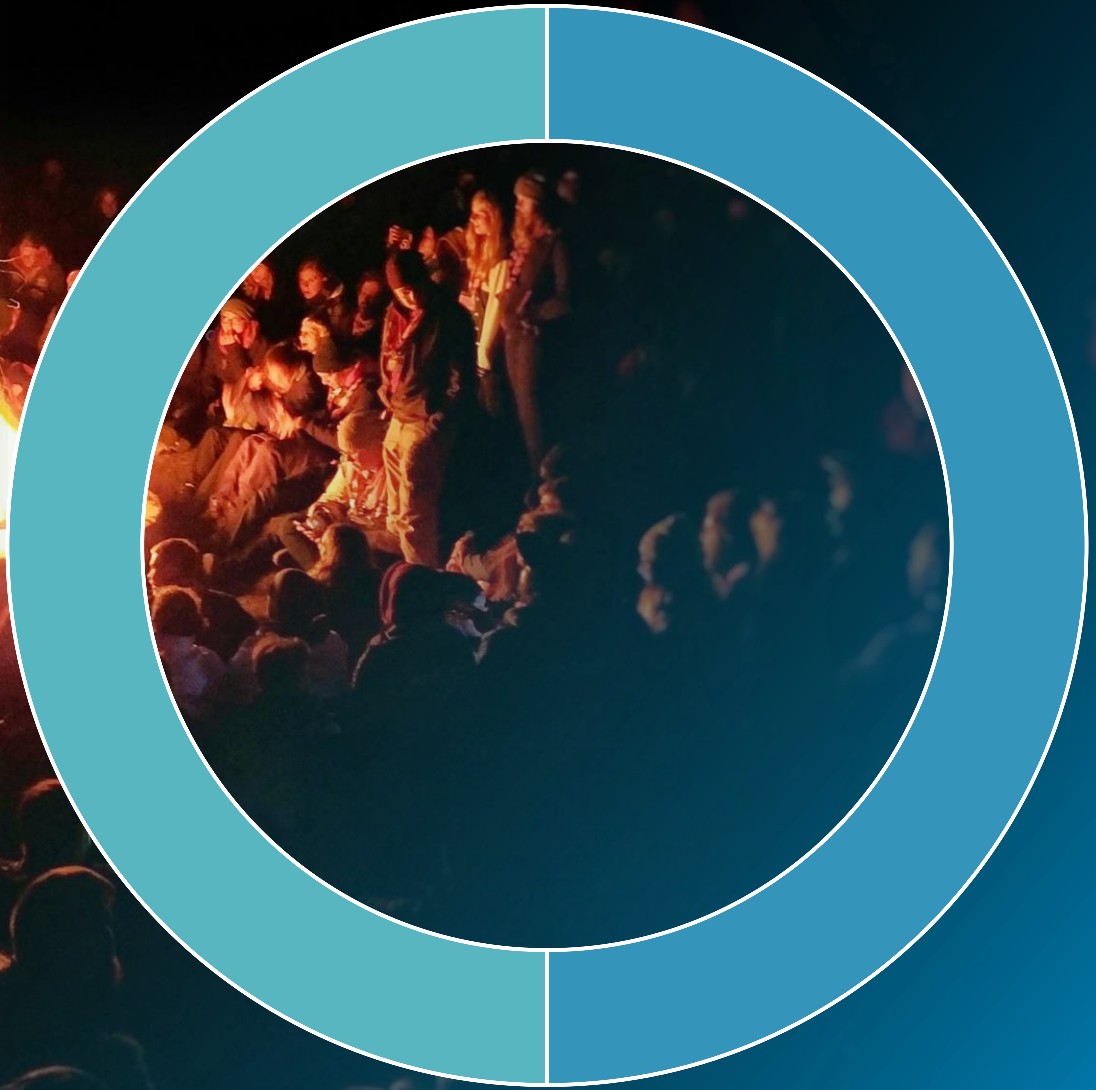
$$n = 1$$



Qu'est ce qu'une stratégie optimale ?

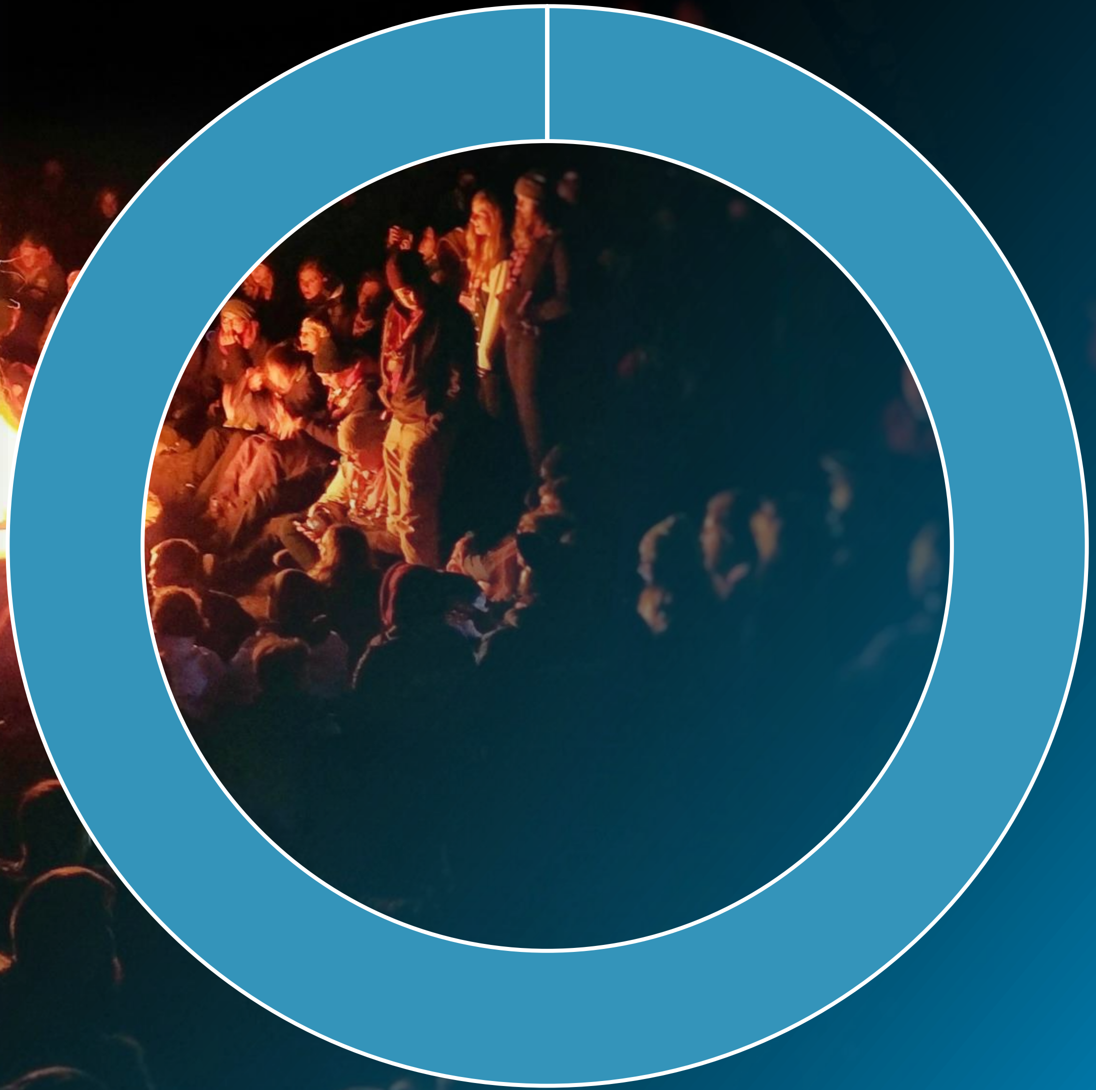
Sans technique

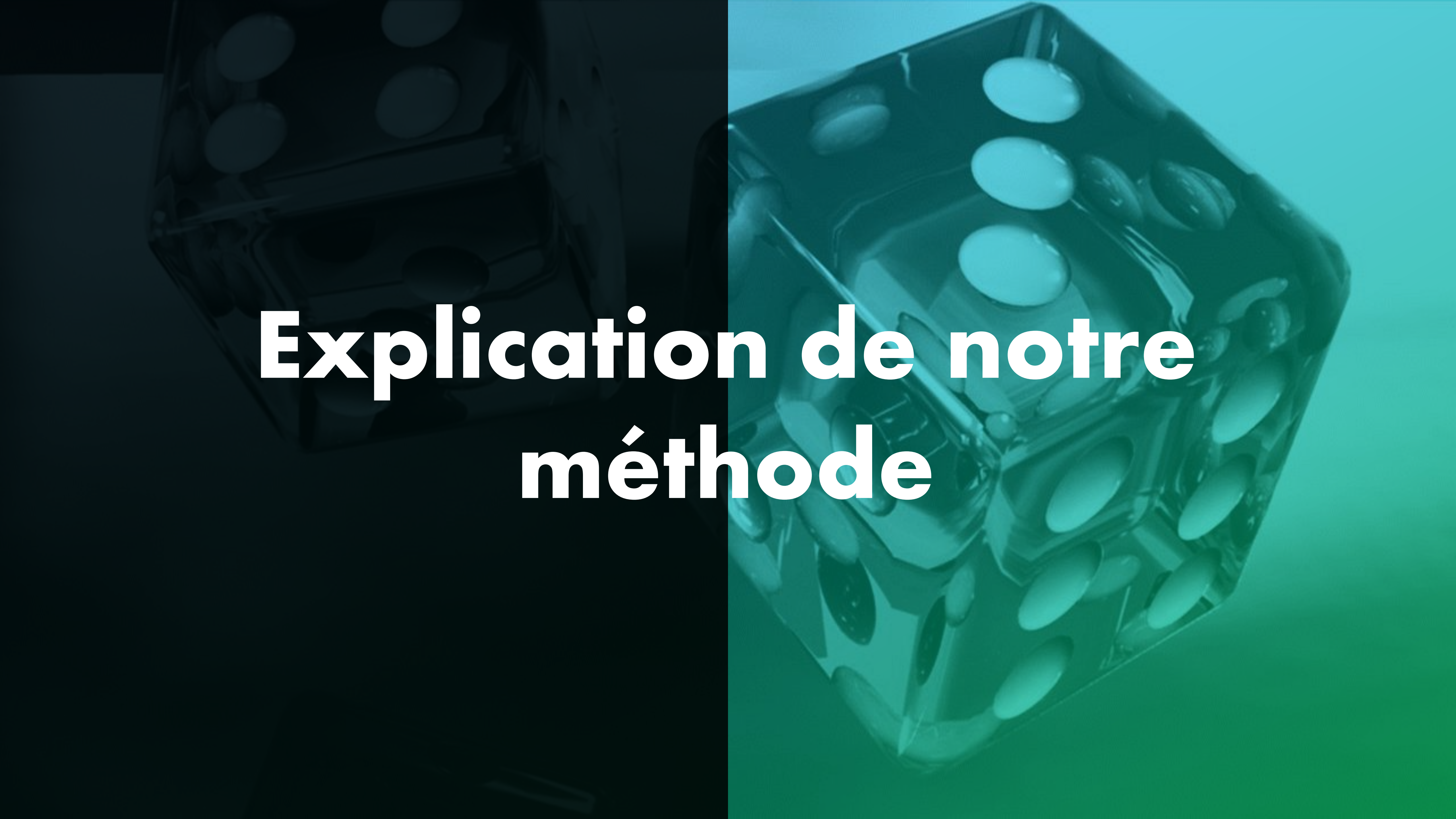
Rapidité : 50%
Chance : 50%



Avec technique optimale

Rapidité : 100%
Chance : 0%



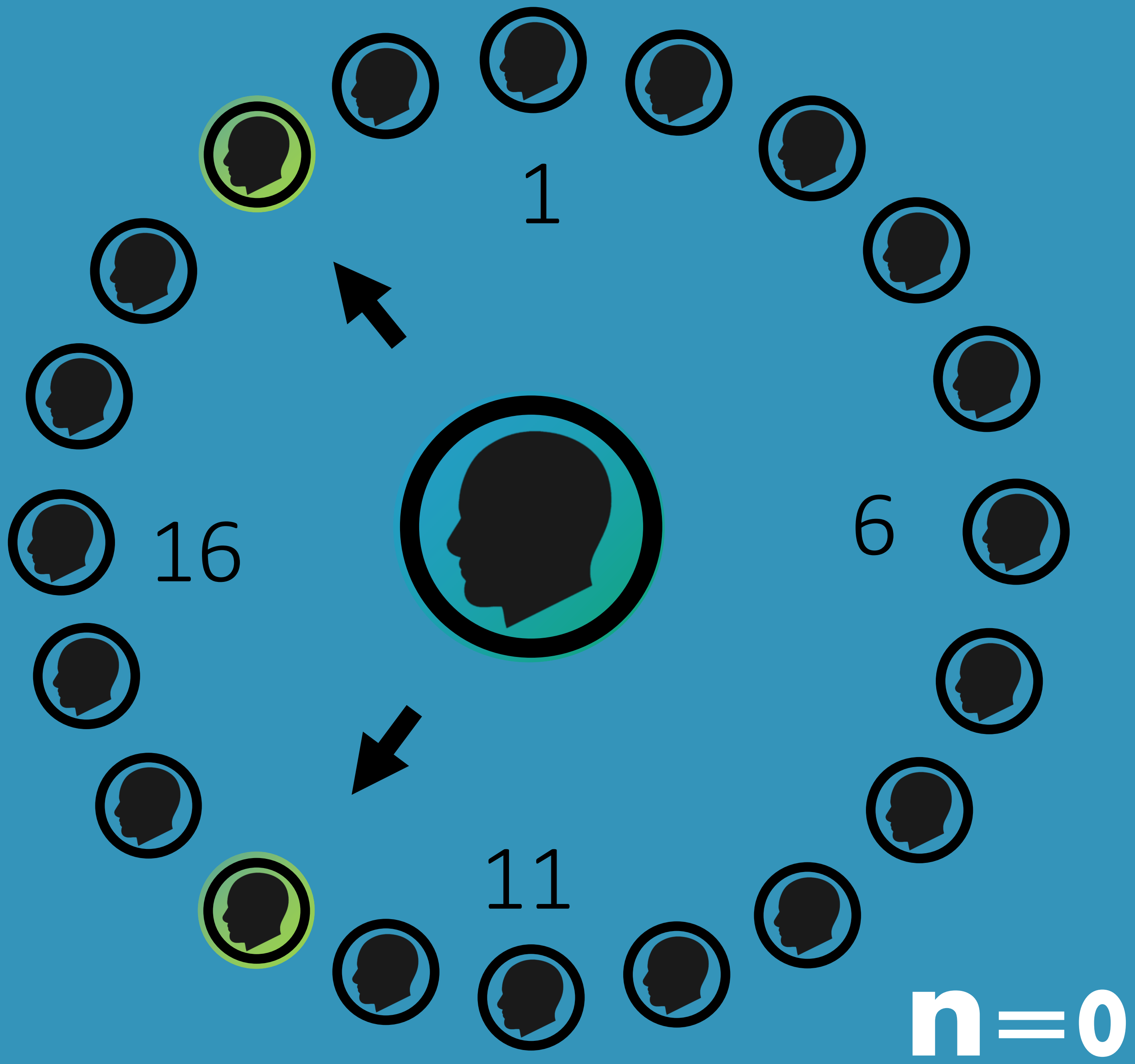

Explication de notre méthode

Rapprocher les deux joueurs

$$(D_n < D_{n-1})$$

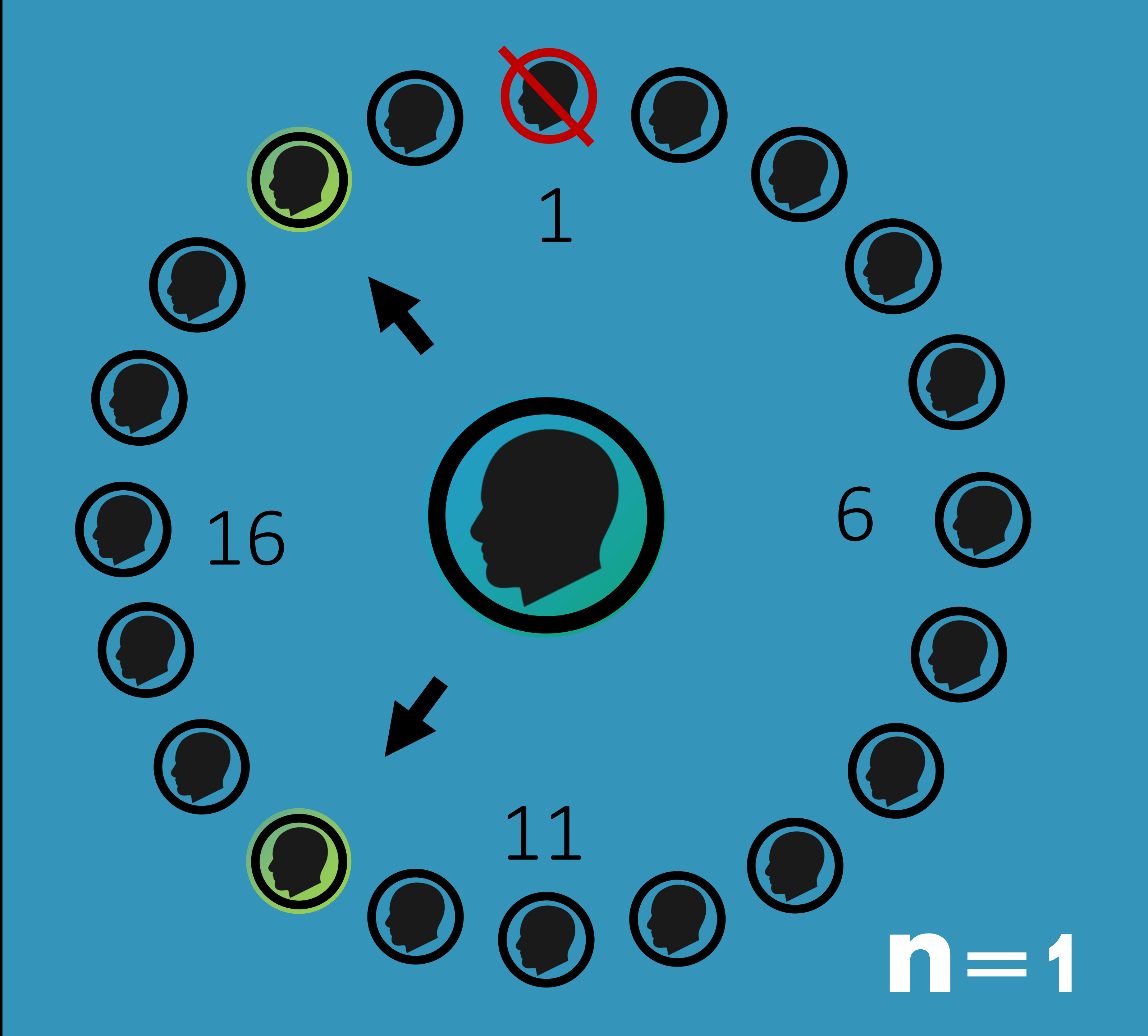
$N_0 = 20$

$D_0 = 6$



$$N_0 = 20$$

$$D_0 = 6$$

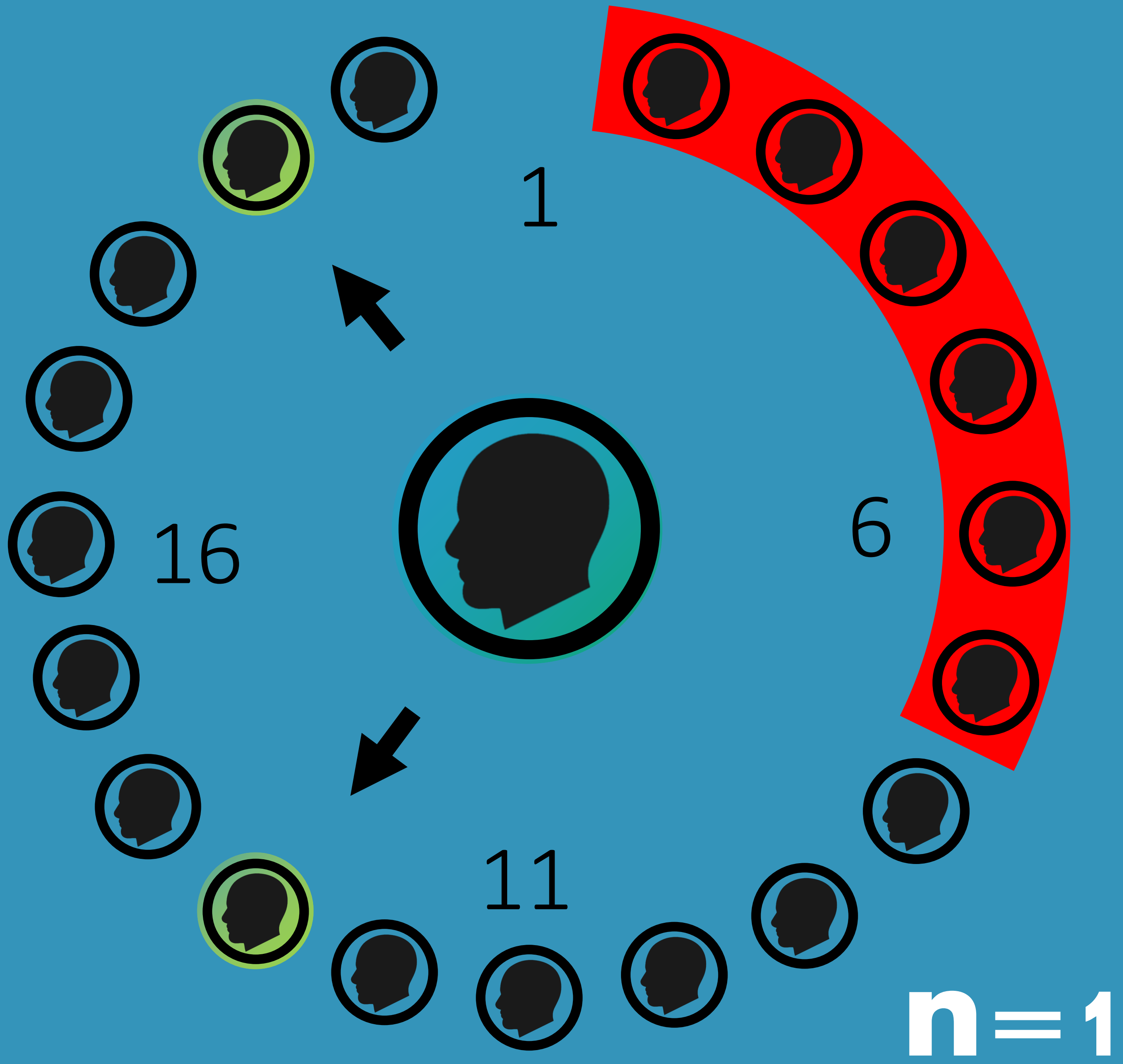


On se décale de :

$$D_0 + 1$$

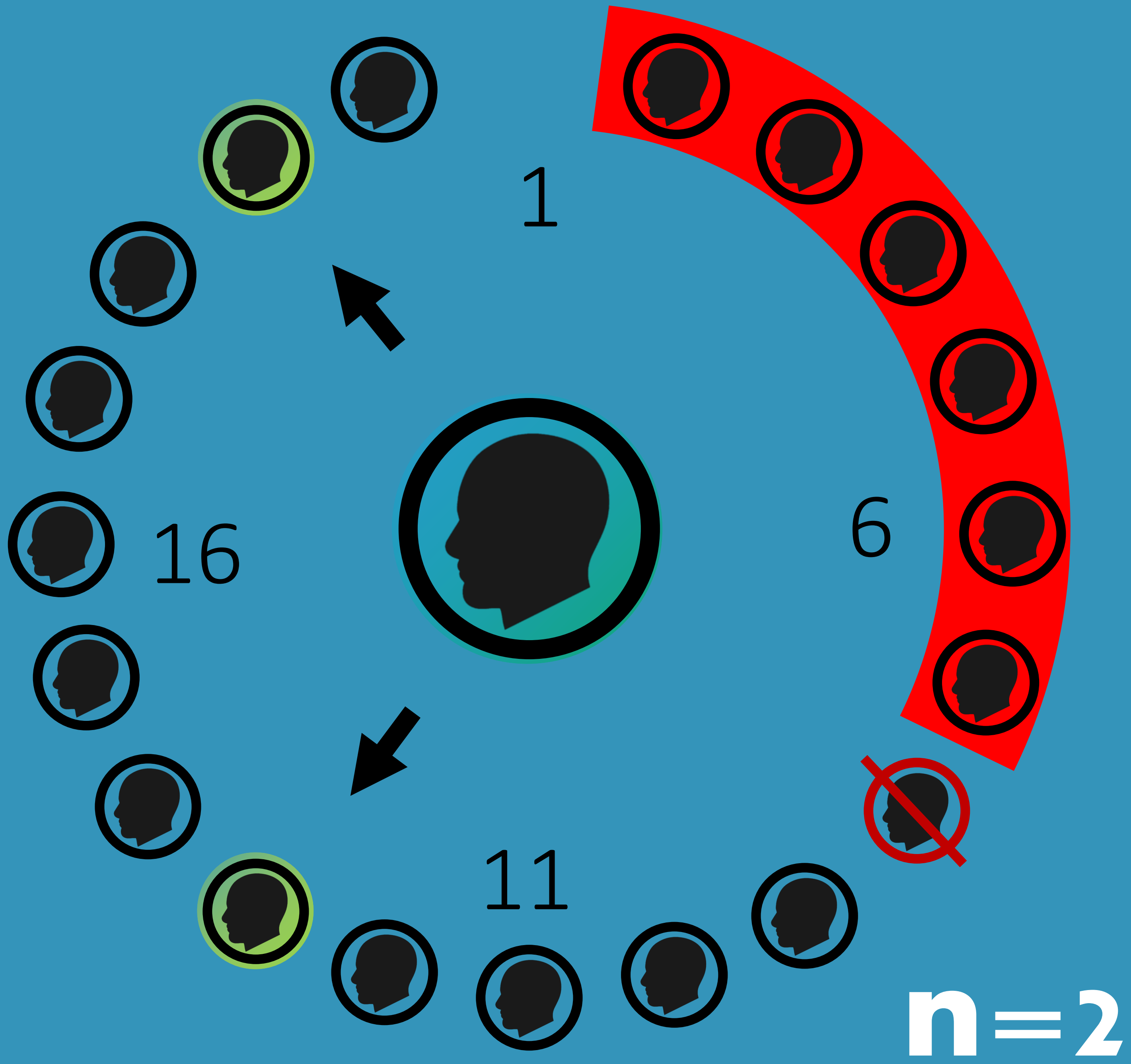
$$J_1 = 1$$

$$D_1 = D_0 = 6$$



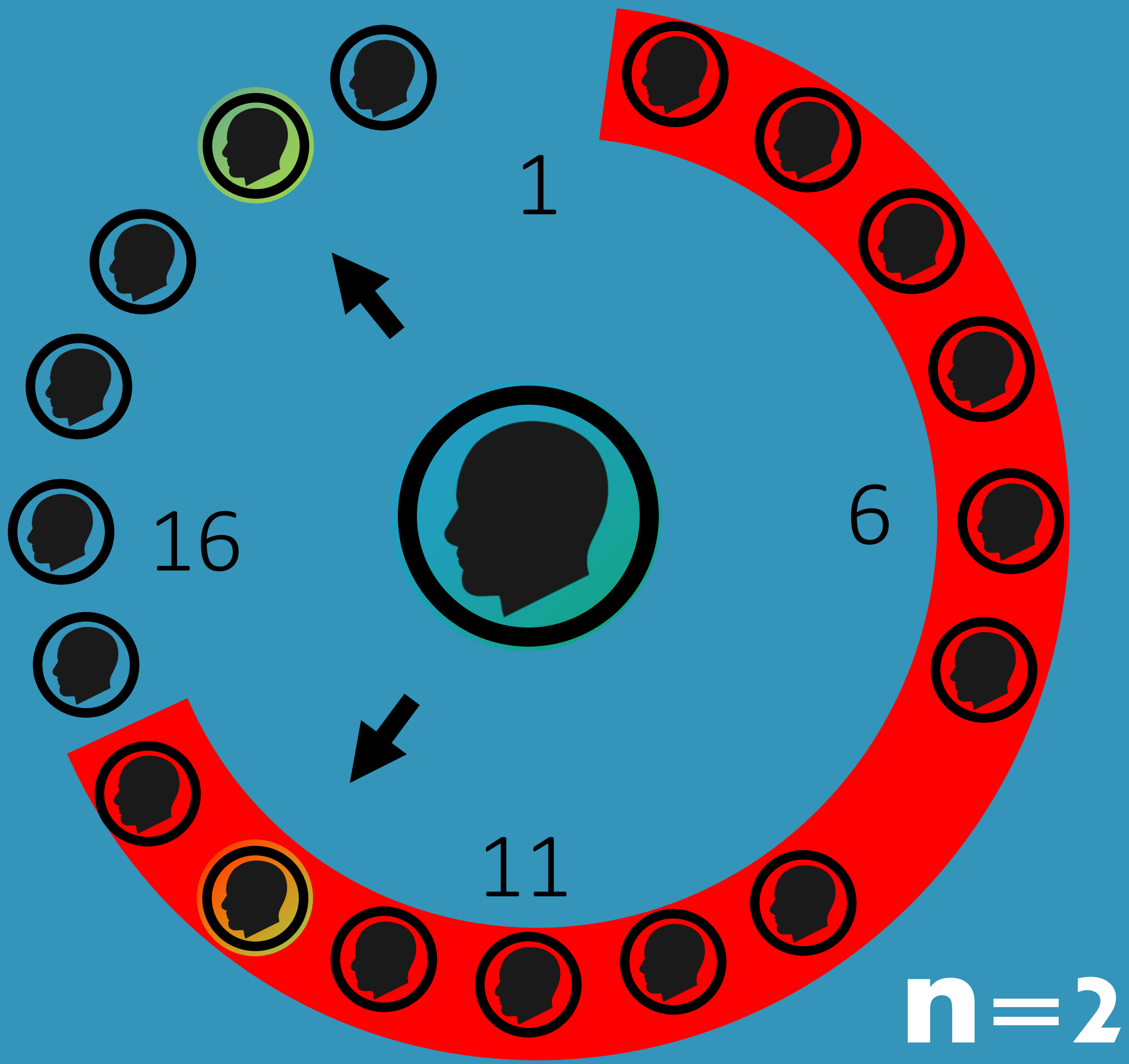
$$J_2 = 8$$

$$D_2 = D_0 = 6$$



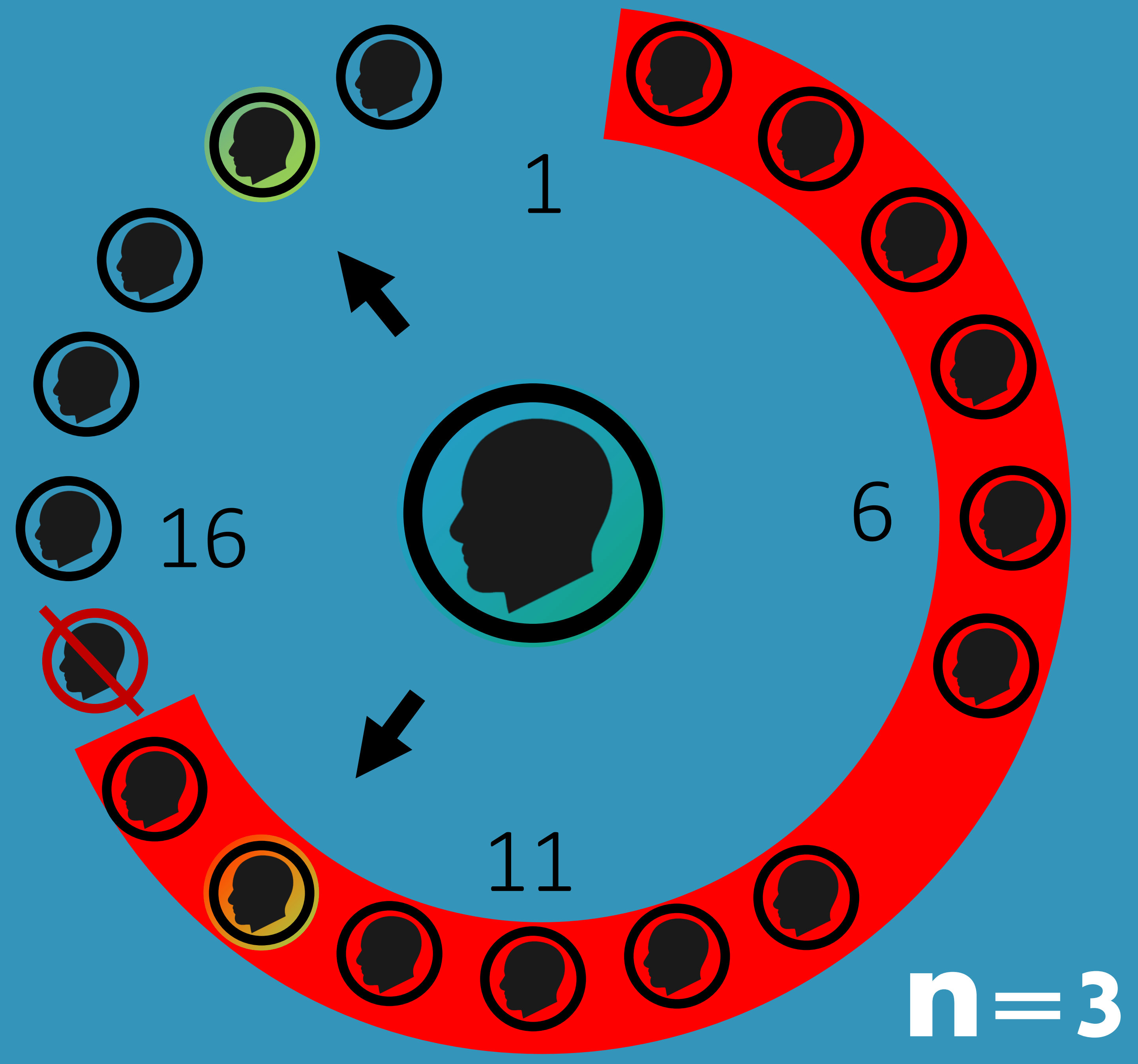
$J_2 = 8$

$D_2 = D_0 = 6$



$$J_3 = 15$$

$$D_3 < D_0$$



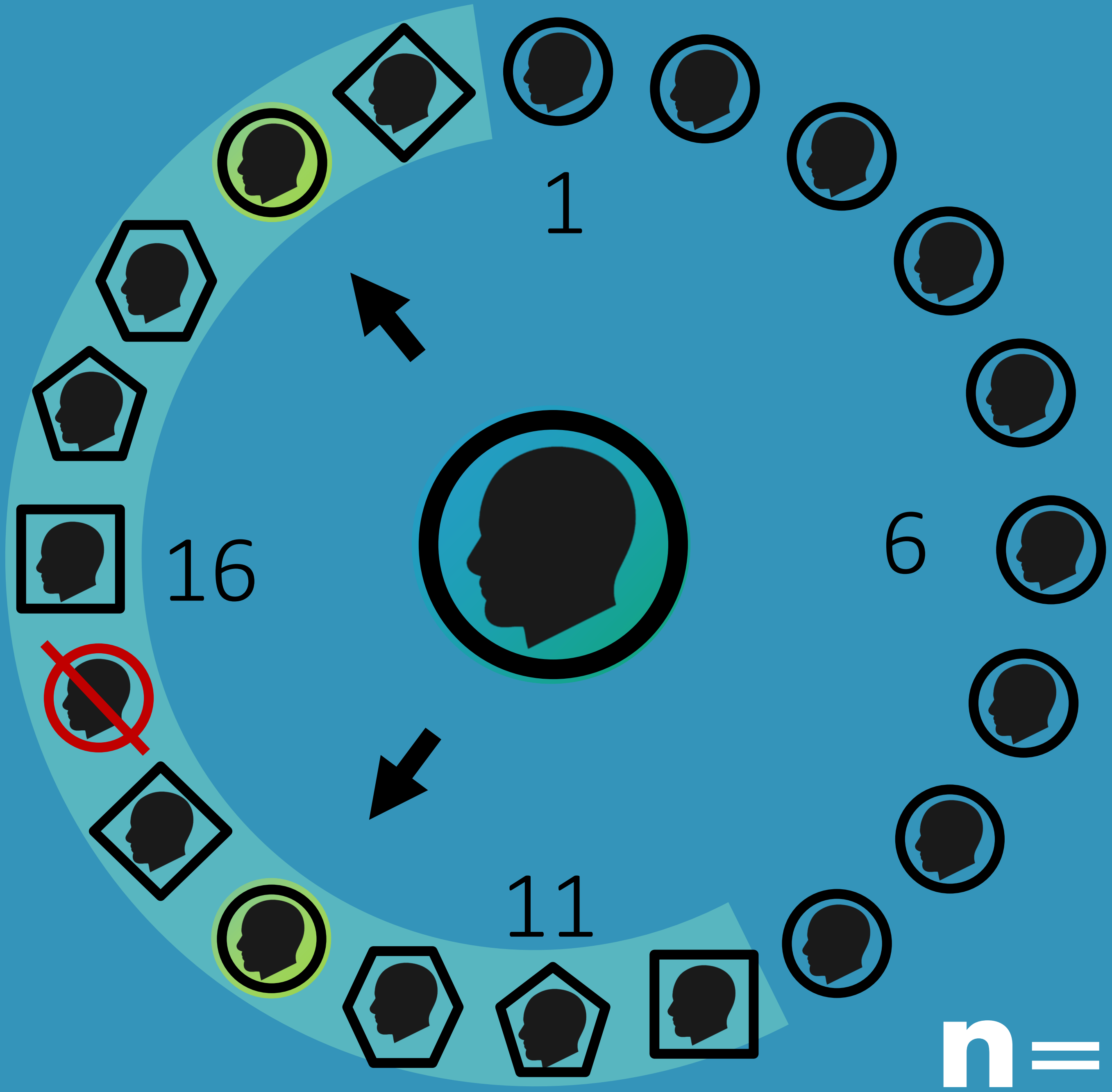
Phase 2

Trouver les joueurs par dichotomie

$$J_3 = 15$$

$$D_3 < D_0$$

$$Y = [\![10; 20]\!] \setminus \{15\}$$

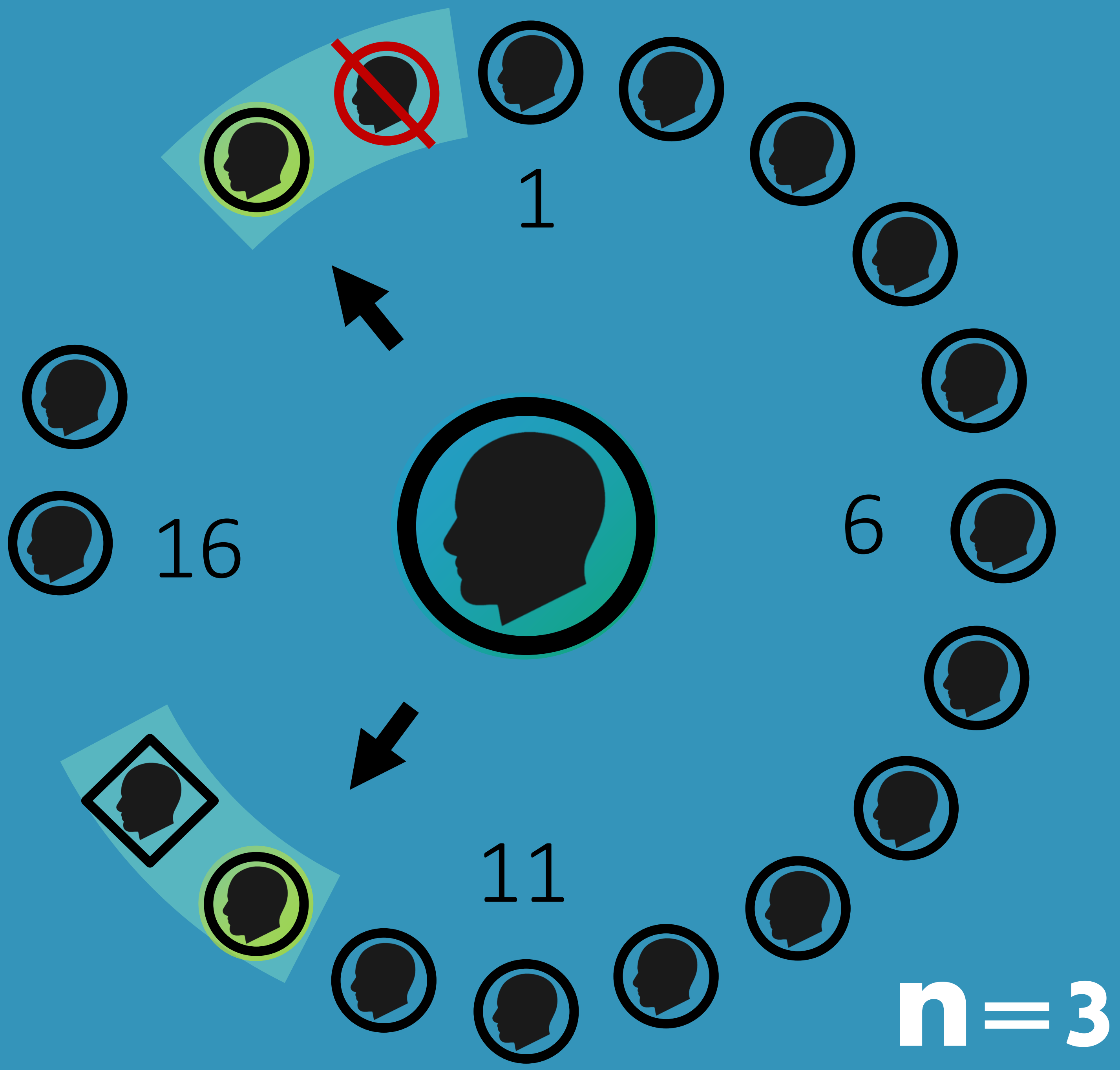


$n = 3$

$$J_3 = 15$$

$$D_3 < D_0$$

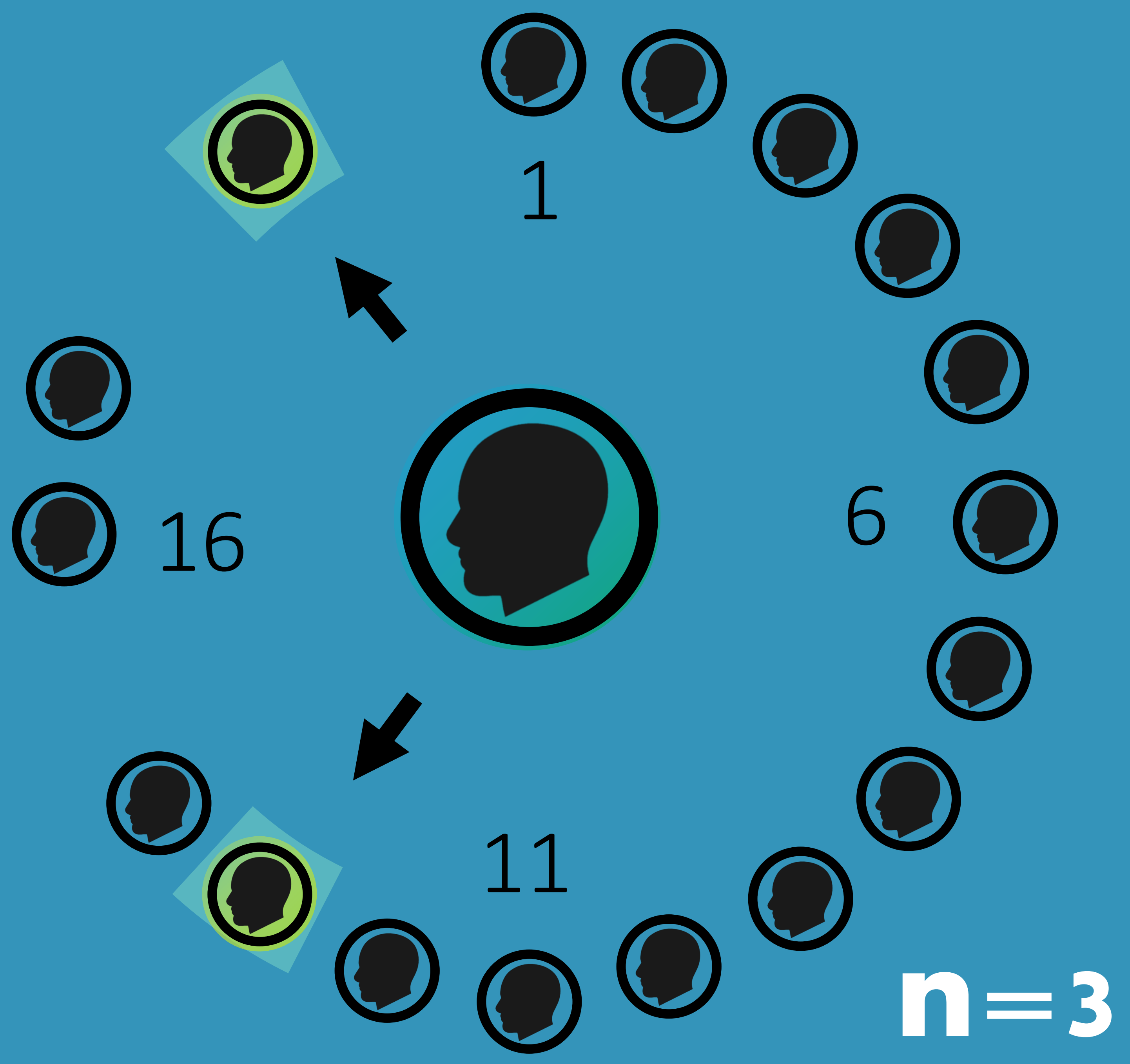
$$Y = [\![16; 20]\!]$$



$$J_3 = 15$$

$$D_3 < D_0$$

$$Y = [\![16; 20]\!]$$



Formules & Démonstrations

Nombre de tours, phase 1

$$\left\lfloor \frac{N}{D_0 + 1} \right\rfloor$$

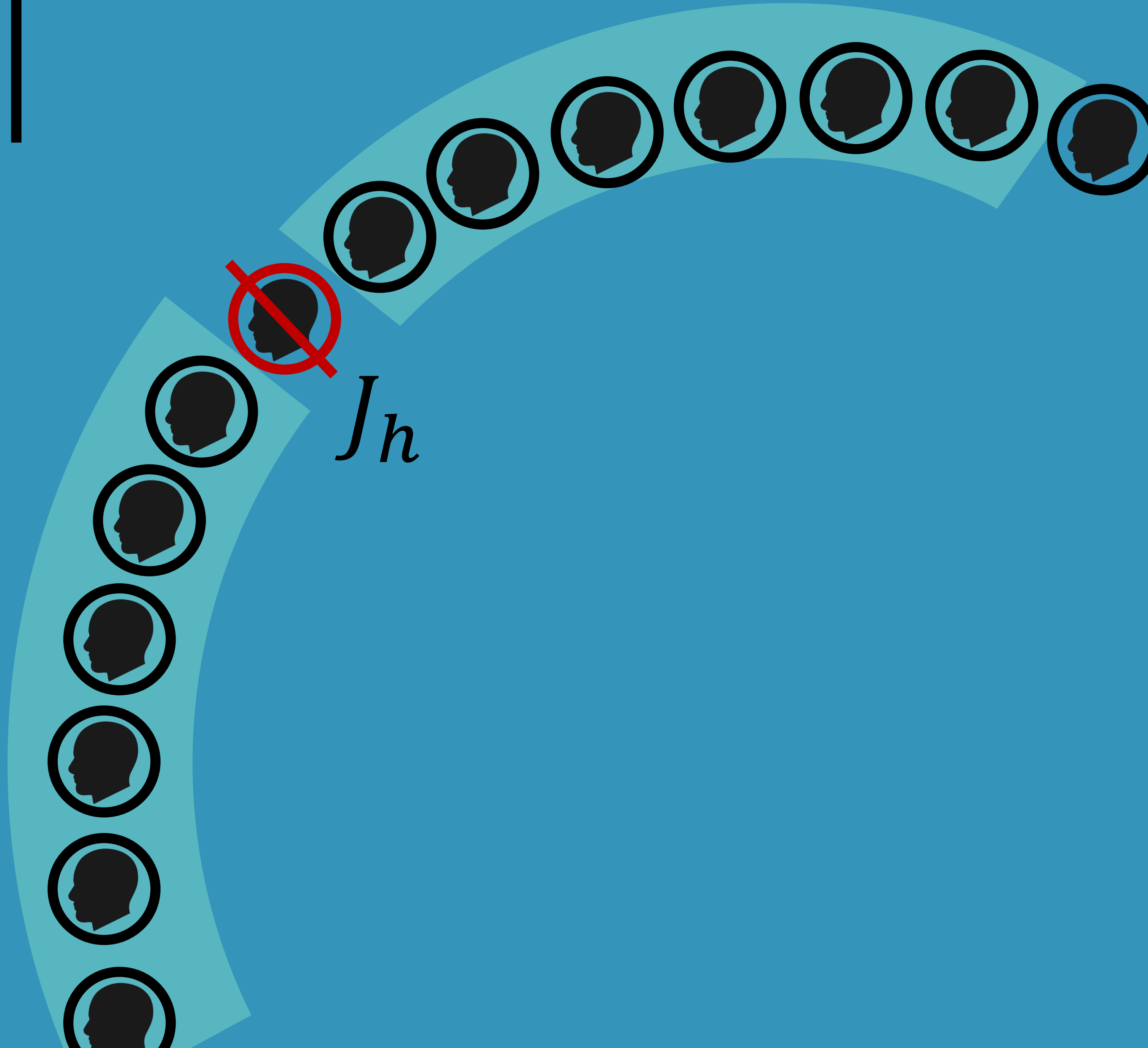
Nombre de tours, phase 2

$$On\ pose \qquad h = \left\lceil \frac{N}{D_0 + 1} \right\rceil$$

$$On\ a\ donc \qquad D_h = D_0 - 1$$

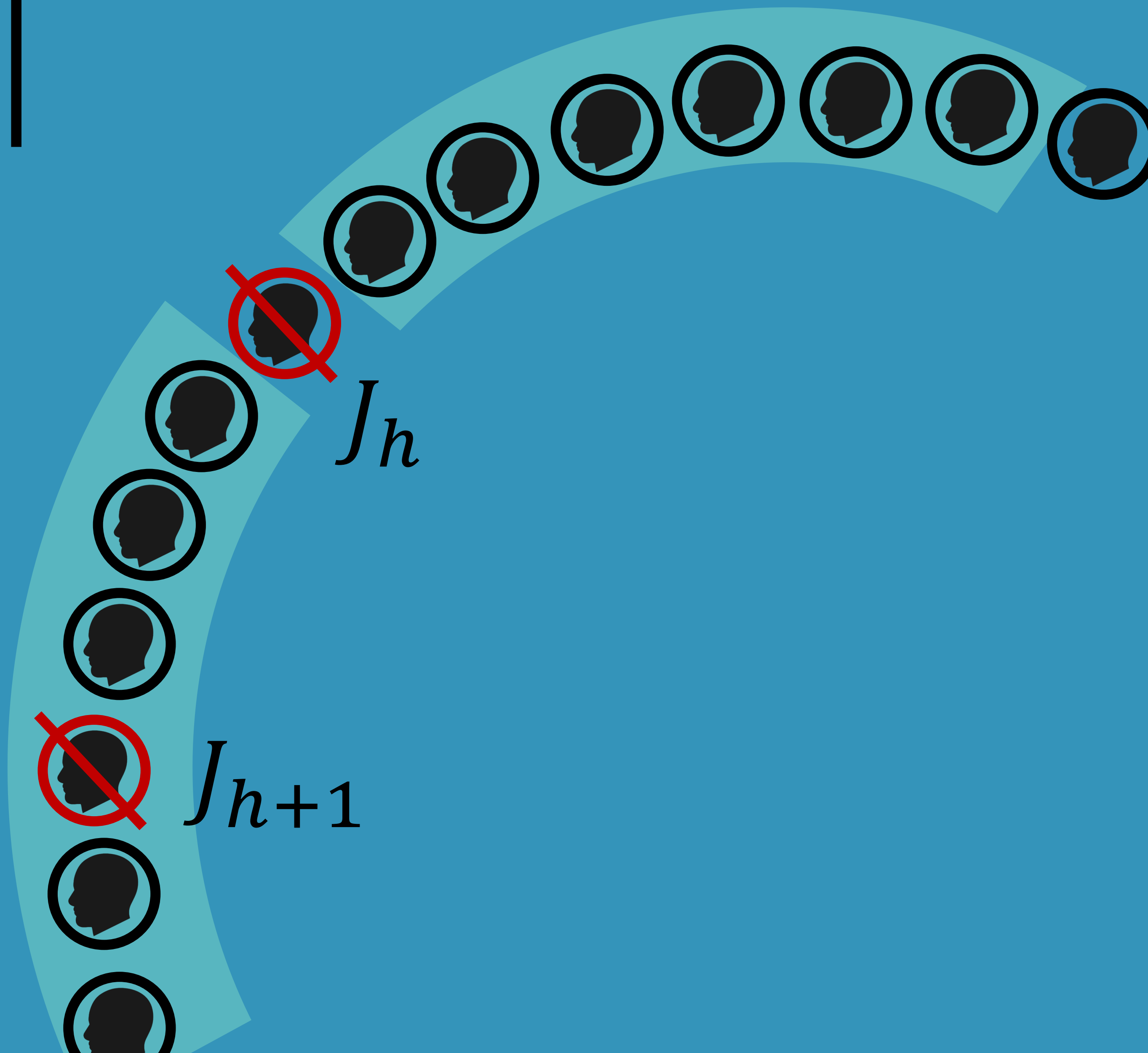
$$D_h \neq 0 \quad et \quad D_h \neq 1$$

$$J_{h+1} = J_h \pm \left\lceil \frac{D_h}{2} \right\rceil$$



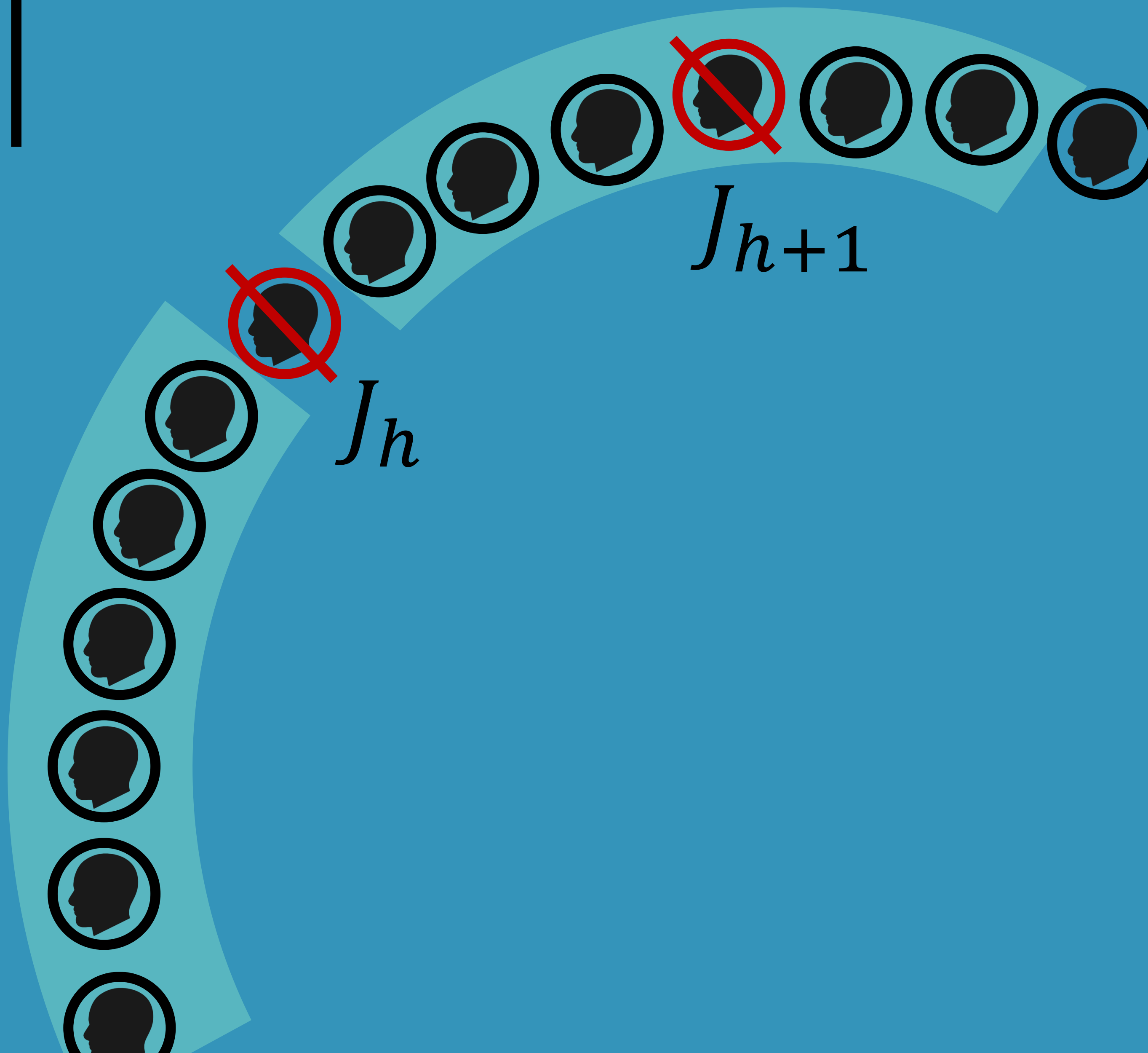
$$D_h = D_0 - 1 = 7$$

$$J_{h+1} = J_h \pm \left\lceil \frac{D_h}{2} \right\rceil$$



$$D_h = D_0 - 1 = 7$$

$$J_{h+1} = J_h \pm \left\lceil \frac{D_h}{2} \right\rceil$$



$$D_h = D_0 - 1 = 7$$

$$Dans\ le\ pire\ des\ \ cas\ D_{h+1} = \ D_h$$

$$Donc\ dans\ le\ pire\ des\ \ cas:$$

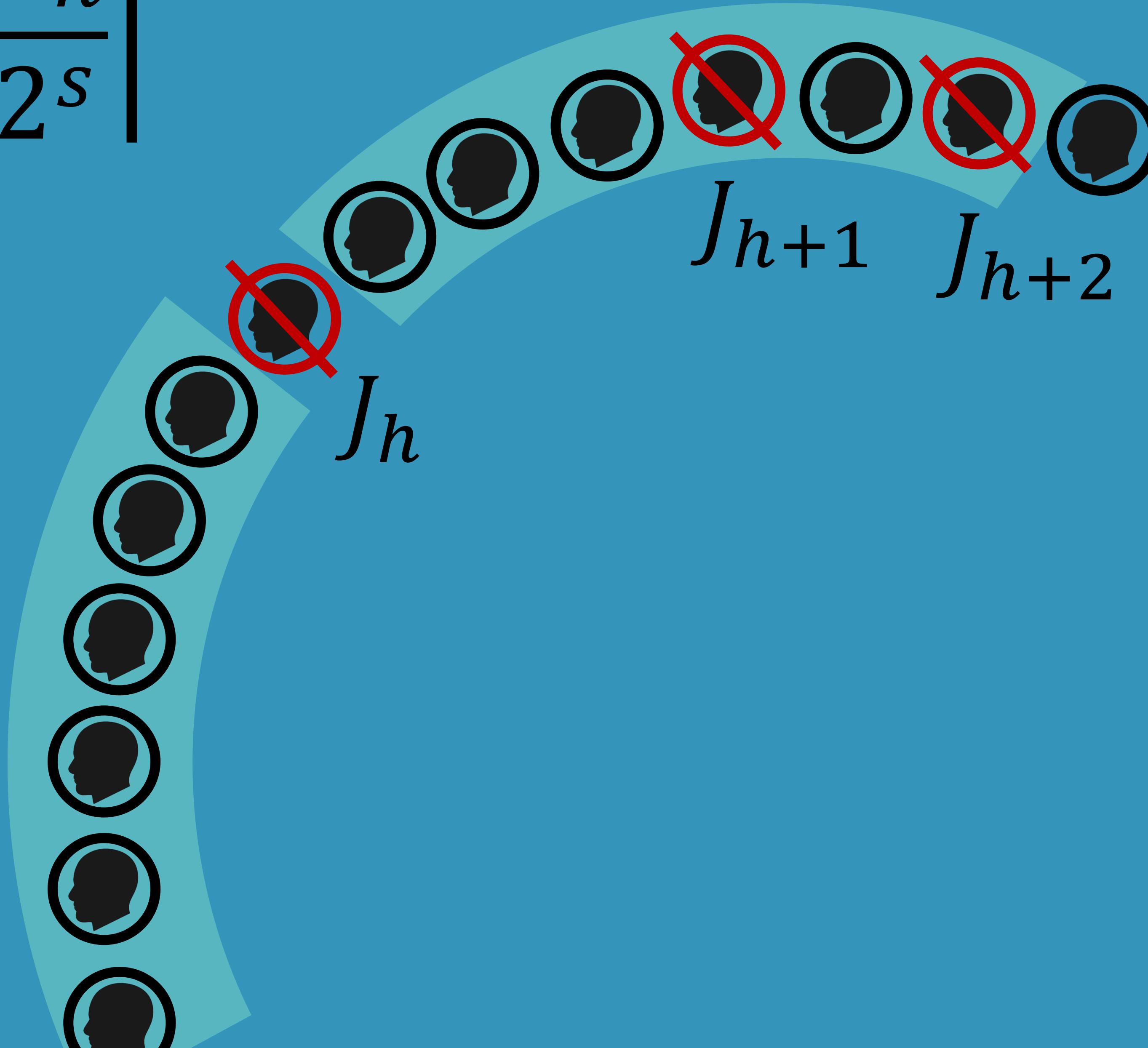
$$D_{h+s} = \ D_h$$

$$Ainsi \quad J_{h+2} = J_{h+1} + \left\lceil \frac{D_h}{2} \right\rceil$$

$$De\ manière\ générale :$$

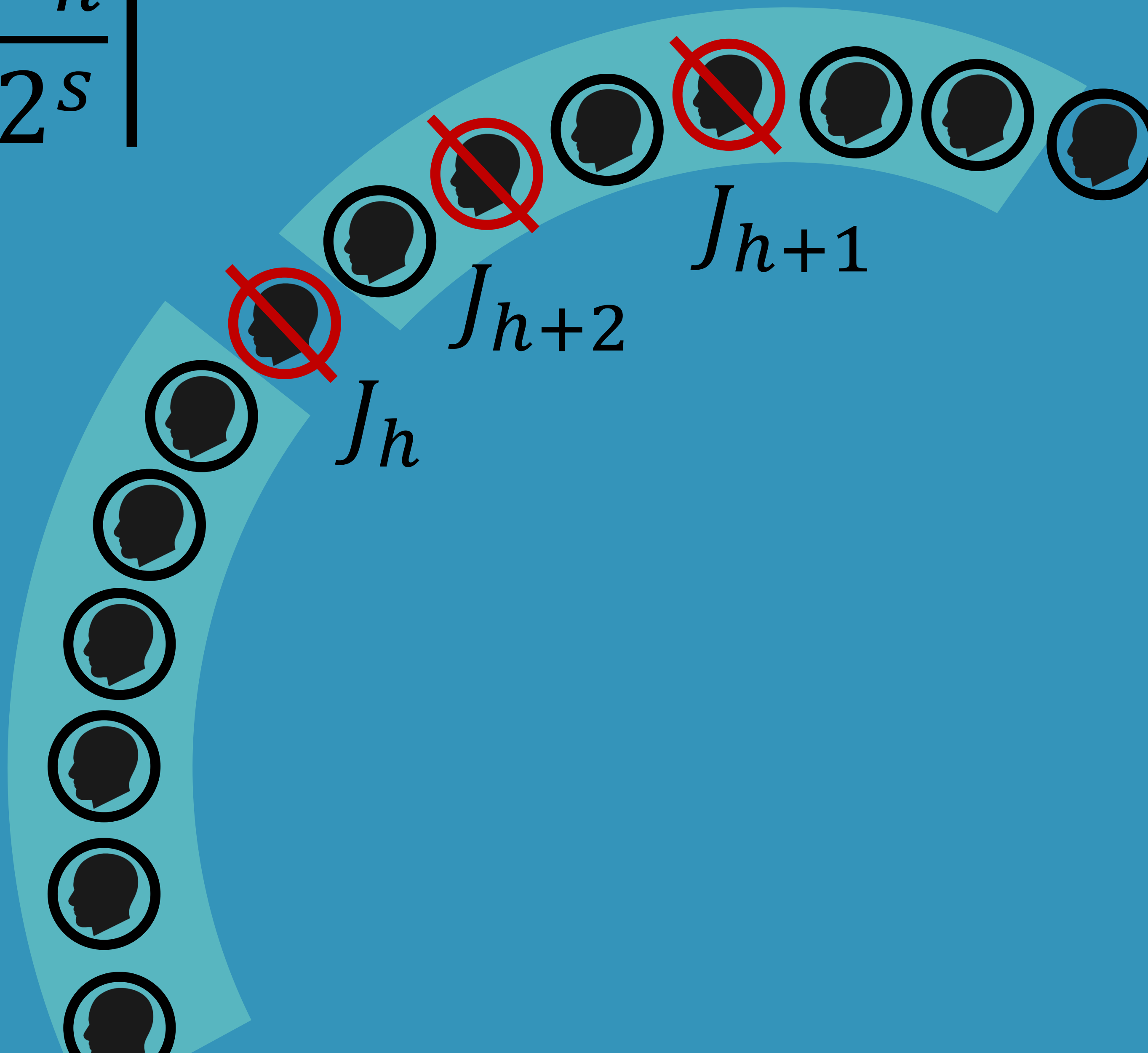
$$J_{h+s} = J_{h+s-1} + \left\lceil \frac{D_h}{2^s} \right\rceil$$

$$J_{h+s} = J_{h+s-1} + \left\lceil \frac{D_h}{2^s} \right\rceil$$



$$D_h = D_0 - 1 = 7$$

$$J_{h+s} = J_{h+s-1} + \left\lceil \frac{D_h}{2^s} \right\rceil$$



$$D_h = D_0 - 1 = 7$$

Il ne restera qu'un seul joueur à éliminer lorsque:

$$\left\lceil \frac{D_h}{2^s} \right\rceil = 1$$

$$\Leftrightarrow \lceil D_h \rceil = 2^s$$

$$\Leftrightarrow s = log_2(D_h)$$

On aura donc gagné au tour :

$$s + h$$

$$\Leftrightarrow log_2\,(D_h) + \left\lceil \frac{N}{D_0 + 1} \right\rceil$$