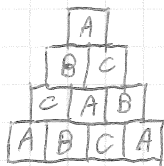


①



$$\rightarrow A = x$$

$$\textcircled{2} \quad (n) + (5-n) + (n) + (5-n) + (n) + (5-n) + (n) = n + 15$$

$$n \leq 4 \rightarrow \underline{15}$$

$$\textcircled{3} \quad \text{Nb total de segments: } 7d/2 \quad d \neq 6 \rightarrow d = 4$$

$$14 - 7 = \underline{7}$$

④  $n$  personnes

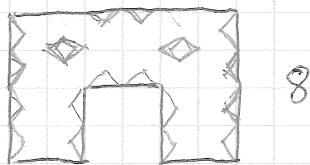
$$kn = (k+1)(n-5) \rightarrow n - 5k - 5 = 0$$

$$k = 15 + (k-1)n \rightarrow n = 15$$

$$\rightarrow k = 10/5 = 2$$

$$\rightarrow kn = \underline{30}$$

⑤



$$\textcircled{6} \quad 21 + 20 + 15 + 14 + 13 + 7 = 90$$

$$45 + 45? \text{ non}$$

$$44 + 46? \text{ non}$$

$$21 + 15 + 7 = 43$$

$$20 + 14 + 13 = 47$$

~~2222~~

$$\left[ \begin{array}{c} 7h13 \\ A \end{array} \right] \text{ et } \left[ \begin{array}{c} 7h17 \\ B \end{array} \right]$$

$$\rightarrow 13 \text{ minutes}$$
⑦ Mod 9  $\rightarrow$ 

$$\begin{array}{r} 4770 \\ 1776 \\ 4116 \\ \hline 066 \\ 7269 \end{array}$$

Ajout d'un 3 en colonne 2  $\rightarrow 5 \geq 81$  $\Rightarrow$  ajout en colonne 1 $\Rightarrow$  Somme mod 9 = 3 ou 6Somme impaire  $\rightarrow$  $\Rightarrow 111? \text{ OK}$ 

$$\begin{array}{r} 43617 \\ 13773 \\ \hline 671331 \end{array}$$

8

$$2L \quad 13H \quad 7Z$$

$$\begin{array}{r} -1 \quad -1 \quad +1 \\ -1 \quad +1 \quad -1 \\ \hline -2 \quad 0 \quad 0 \end{array}$$

$$\Delta \text{ change } Z \rightarrow 15H \rightarrow 5Z$$

2 nb pairs (0)  $\Rightarrow$  # chgts impair

$\rightarrow$  L impair H pair Z pair

$\rightarrow$  Créer le max de lions.

$$9L \quad 6H \quad 0Z$$

$$\underline{9L} \quad 0H \quad 0Z$$

9  $G + S + E = 270$

$$G = \frac{45}{100} (G + S) \quad 55G = 45S \quad 11G = 9S$$

$$G = \frac{22}{100} (G + S + E) \quad 78G = 22S + 22E$$

$$78G = \frac{22 \times 11}{9} G + 22E$$

$$22E = \frac{78 \times 9 - 22 \times 11}{9} G = \frac{460}{9} G$$

$$\left. \begin{array}{l} 78 \times 9 = 702 \\ 22 \times 11 = 242 \\ 9 \times 230 = 2070 \\ 27 \times 207 = 5589 \end{array} \right\}$$

$$G = \frac{99}{230} E$$

$$S = \frac{11}{9} G = \frac{121 \times 9}{9 \times 230} E = \frac{121}{230} E$$

$$G + S + E = \left( \frac{11}{230} + \frac{121}{9 \times 230} + 1 \right) E = 270$$

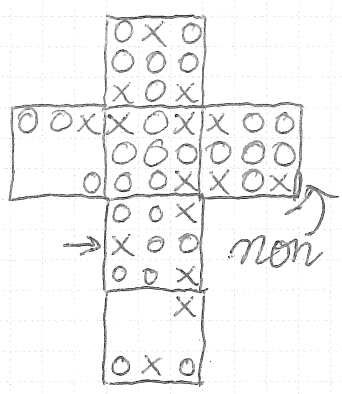
$$= \frac{99 + 121 + 2070}{2070} E = 270$$

$$E = \frac{270 \times 2070}{2290} = \frac{55890}{229}$$

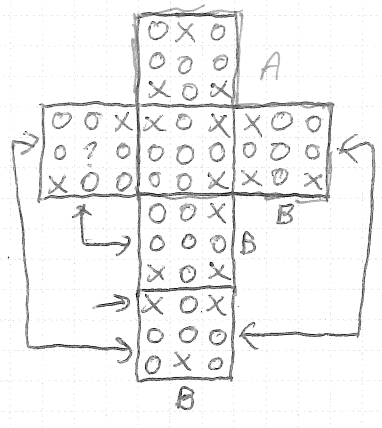
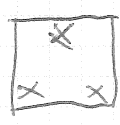
$$G + S + E = \left( \frac{99}{230} + \frac{121}{230} + 1 \right) E = \frac{450}{230} E = 270$$

$$\rightarrow E = \frac{270 \times 23}{45} = \frac{30 \times 23}{5} = 6 \times 23 = 138$$

10

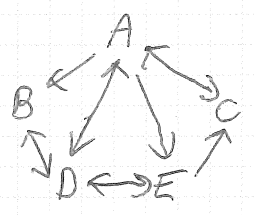


Au moins 2



3 + 3 + (0 ou 1) + (0 ou 1) → 6 ou 8  
 "?" → interview

11



$A = (C + D) / 2$   
 ~~$B = A$~~

$A = C + D / 3$   
 $B = A / 4 + D / 3$   
 $C = A / 4 + E / 2$   
 $D = A / 4 + B + E / 2$  )  $B + C = D$   
 $E = A / 4 + D / 3$

→  $B = E$   
 $C = D - B = D - E$   
 $A = \frac{1}{3} D - \frac{1}{3} E$   
 $D = \frac{1}{4} A + \frac{3}{2} E$   
 $E = \frac{1}{4} A + \frac{1}{3} D$  } →  $D - E = \frac{3}{2} E - \frac{1}{3} D$

$\frac{4}{3} D = \frac{5}{2} E$        $8D = 15E$

$A = \frac{4}{3} D - E = \left( \frac{4}{3} - \frac{8}{15} \right) D = \frac{12}{15} D = \frac{4}{5} D$

$B = E = \frac{8}{15} D$

$C = D - E = D - \frac{8}{15} D = \frac{7}{15} D$

$A + B + C + D + E = \left( \frac{4}{5} + \frac{8}{15} + \frac{7}{15} + 1 + \frac{8}{15} \right) D = \frac{50}{15} D = 100$

$D = 15 \times \frac{100}{50} = \underline{\underline{30}}$

14

$$L = 1?$$

$$IA1 \times NFE = FINA1E$$

$$A \times F \equiv 1$$

$$L \leq N \text{ donc } N = 2?$$

$$IA1 \times 2FE = FJ2A1E$$

$$IEA \times 1F2 = FI2A1E$$

) A petit, E grand et pair

$$\text{Si } E = 8, A = 4$$

$$I41 \times 2F8 = FJ2418$$

$$I84 \times 1F2 = FI2418$$

$$4F + 16 \equiv 18 [100] \text{ imp.}$$

$$\text{Si } E = 6, A = 3$$

$$I31 \times 2F6 = FI2316$$

$$I63 \times 1F2 = FI2316$$

$$3F + 12 \equiv 16 [100] \text{ imp.}$$

~~132~~

$$L = 6, E \text{ pair}$$

$$F \leq 5$$

$$A \text{ ou } N \text{ pair.}$$

$$I \geq 2$$

$$N \leq 5 \text{ (chiffres de 0 à 6)}$$

$$\bullet \text{ Si } N = 5, E = 0, A \text{ pair}$$

$$IA6 \times 5F0 = FI5A60 \rightarrow F = 1$$

$$IA6 \times 510 = 1I5A60$$

$$IOA \times 615 = 1I5A60 \quad A = 4$$

$$\bullet 46 \times 510 = 1.5460$$

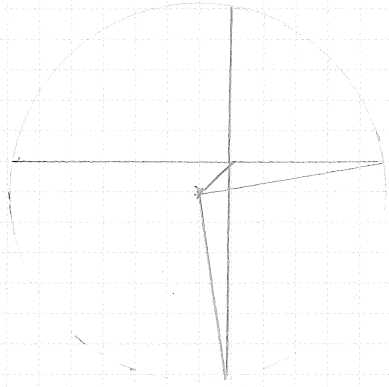
$$\bullet 04 \times 615 = 1.5460$$

$$4 \times 615 = 2460 \rightarrow I \times 615 = 1I30 \text{ non}$$

$$\rightarrow I = 2$$

$$125460$$

13



14 suite

Si  $N=4$ ,  $A$  grand,  $E$  petit  
 $A=5$ ,  $E=0$

$$I56 \times 4F0 = FI4560 \rightarrow F=1$$

$$I56 \times 410 = 1I4560 \quad \text{non}$$

~~16~~ 16

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	0	1	5	2	2	2	2	2	0	2	0	2	0	1	2	0	1	2	5

De  $5n$  à  $5n+4$

$k < 5$

$$f(5n) = f(n)$$

$$f(5n+k) = f(4n+k)$$

$$f(2015) = f(403) = 0$$

$$f(403) = f(323) = f(259) =$$

21 22 23 24 25 26 27 28 29 30

0 1 2 5 2

$$f(2016) = f(1613)$$

$$f(2017) = f(1614)$$

2030? 2050?