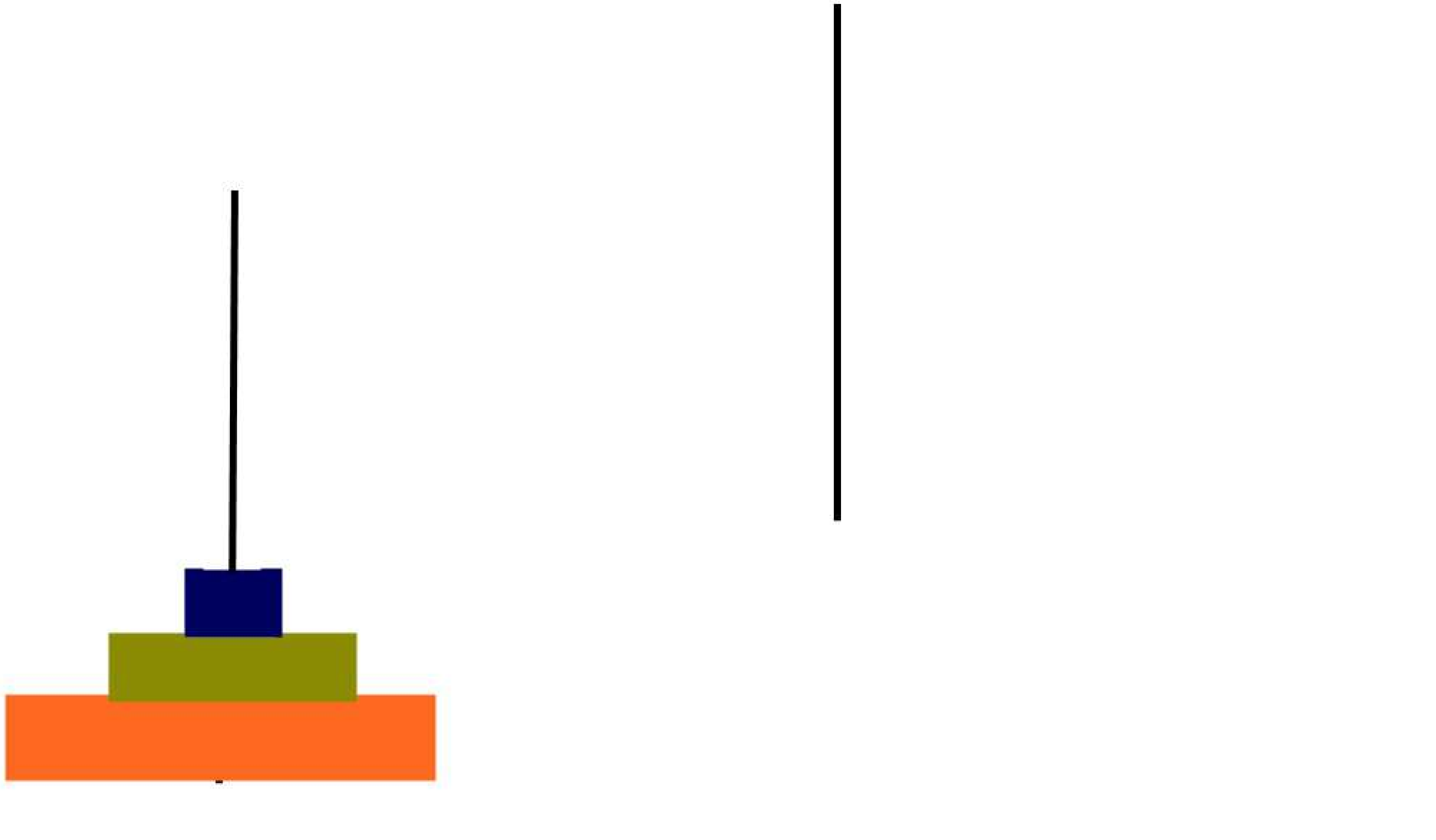

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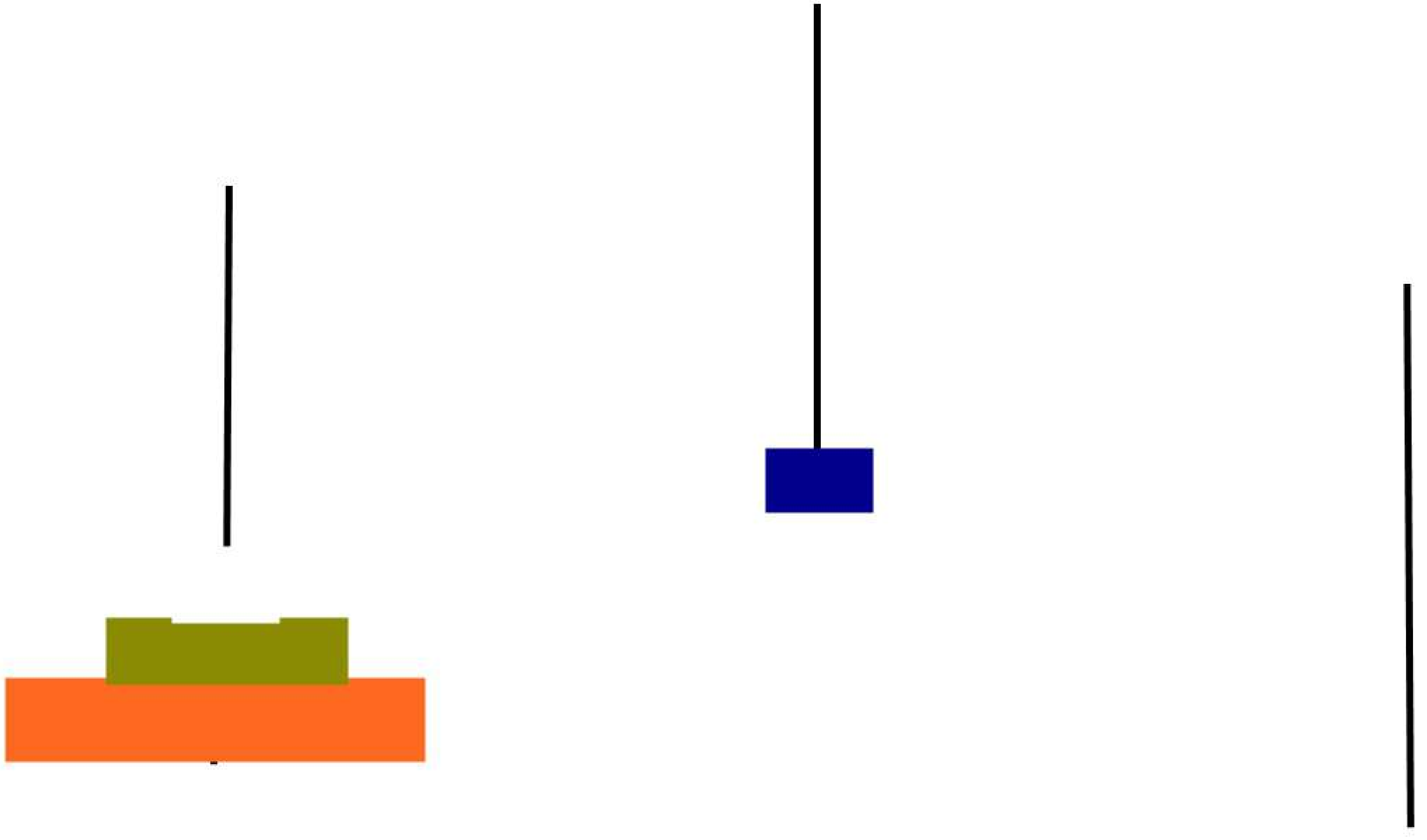

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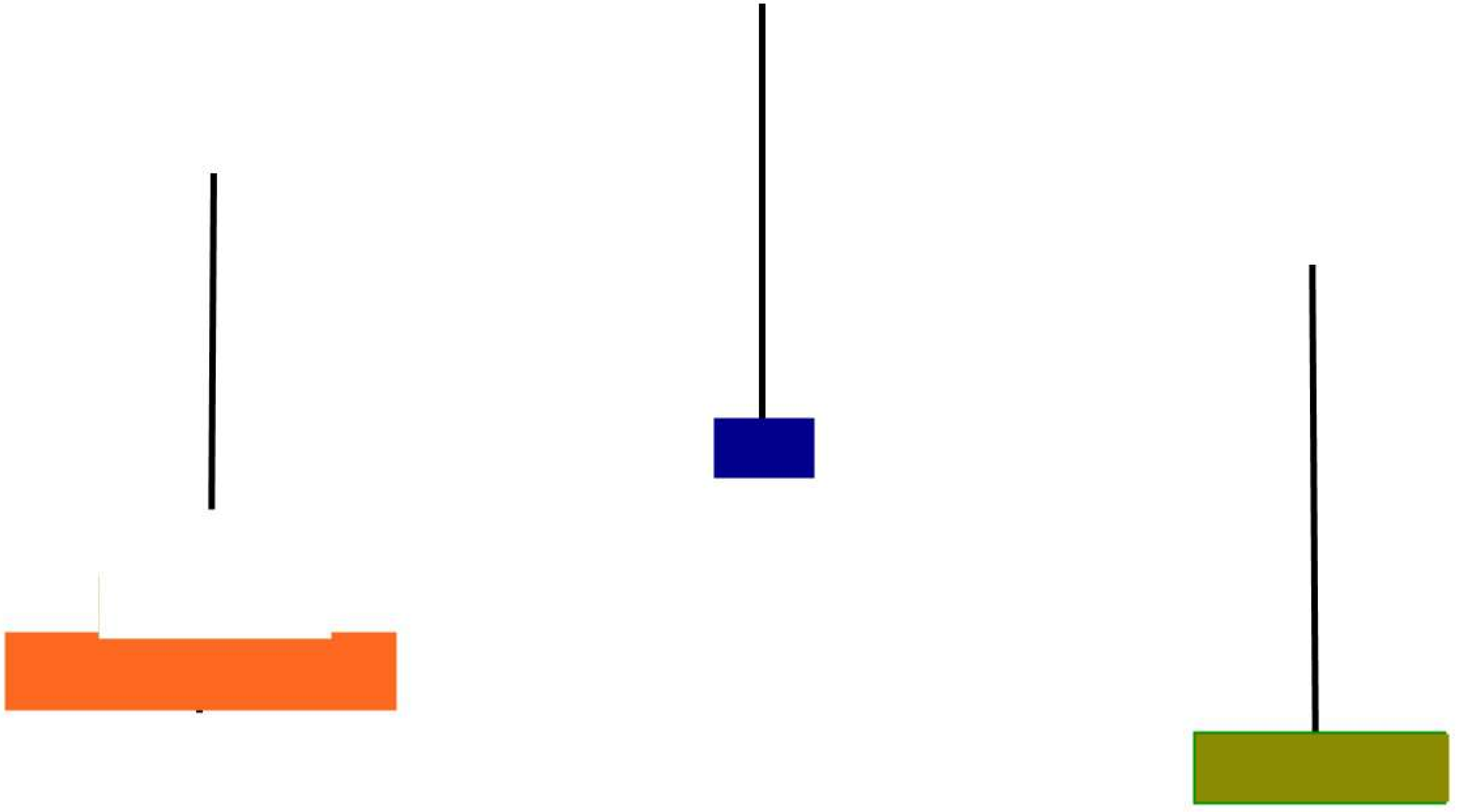

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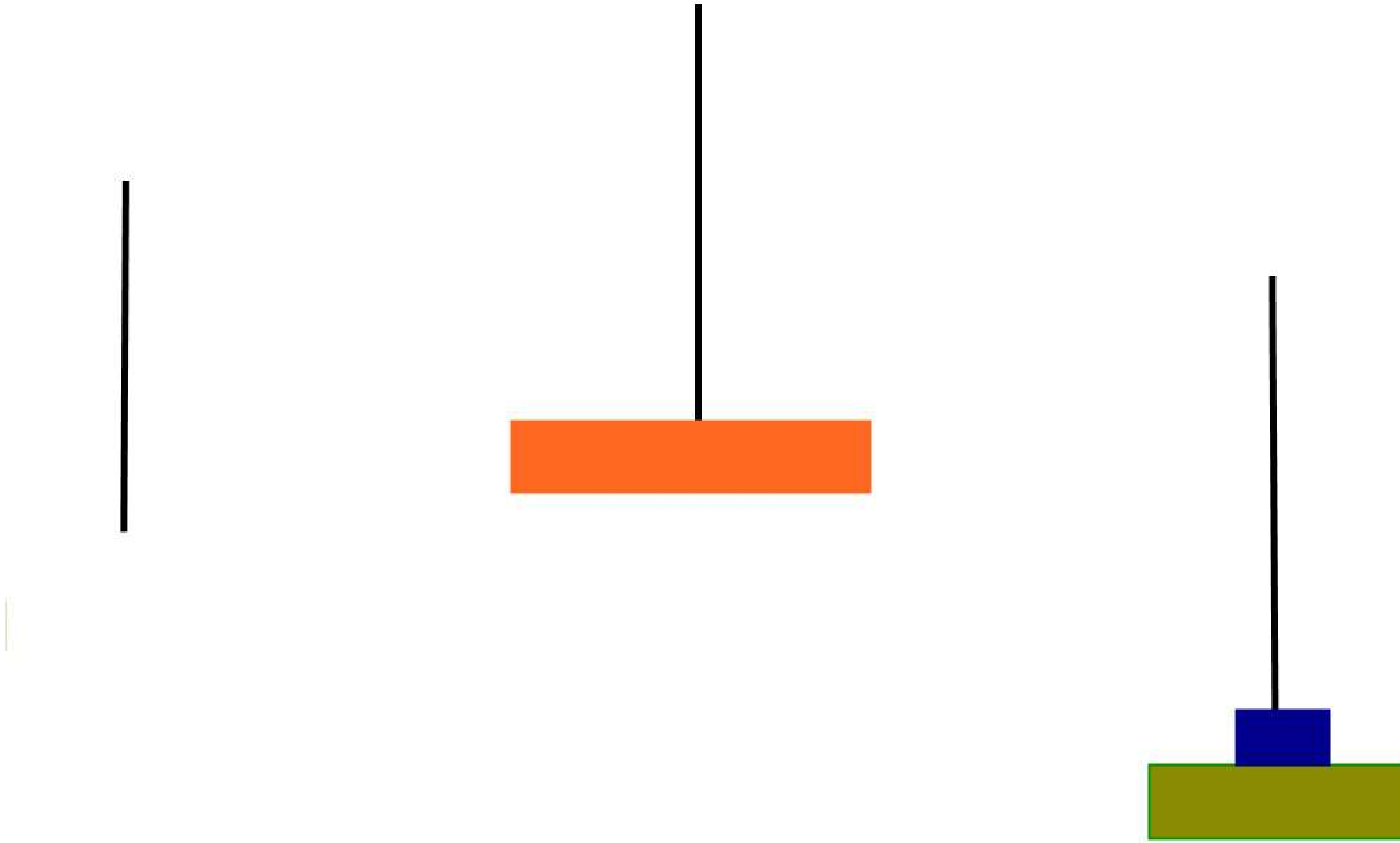

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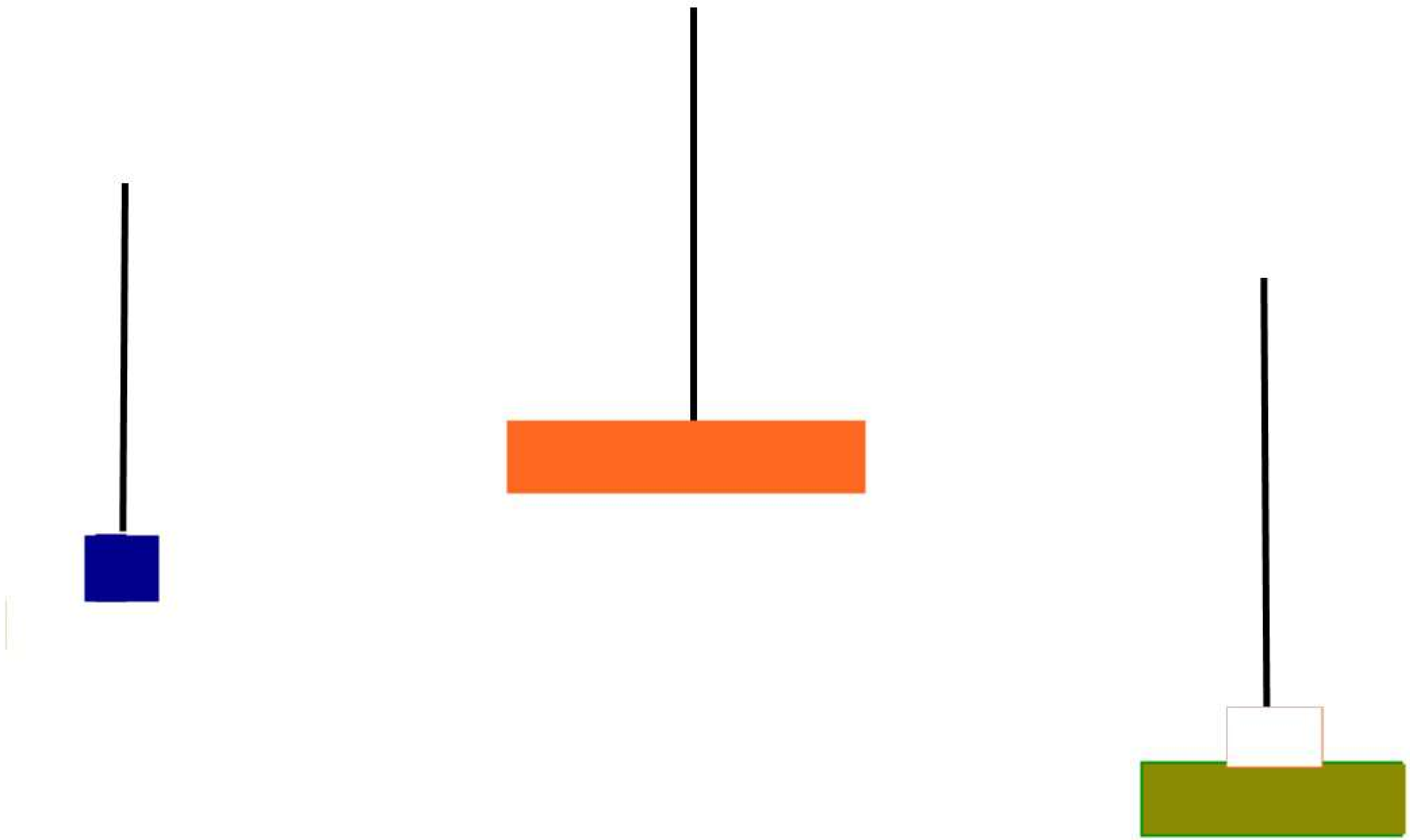

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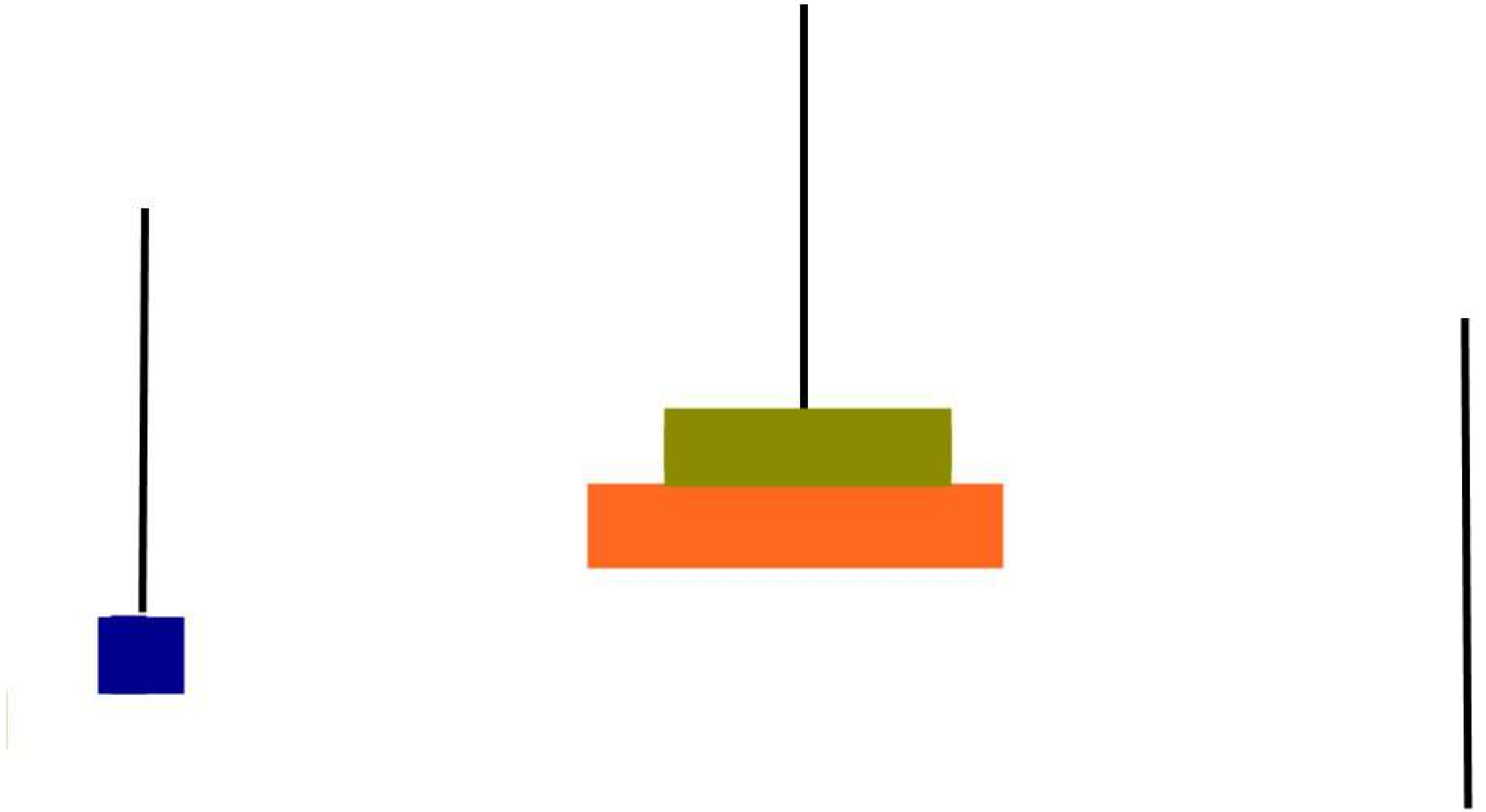

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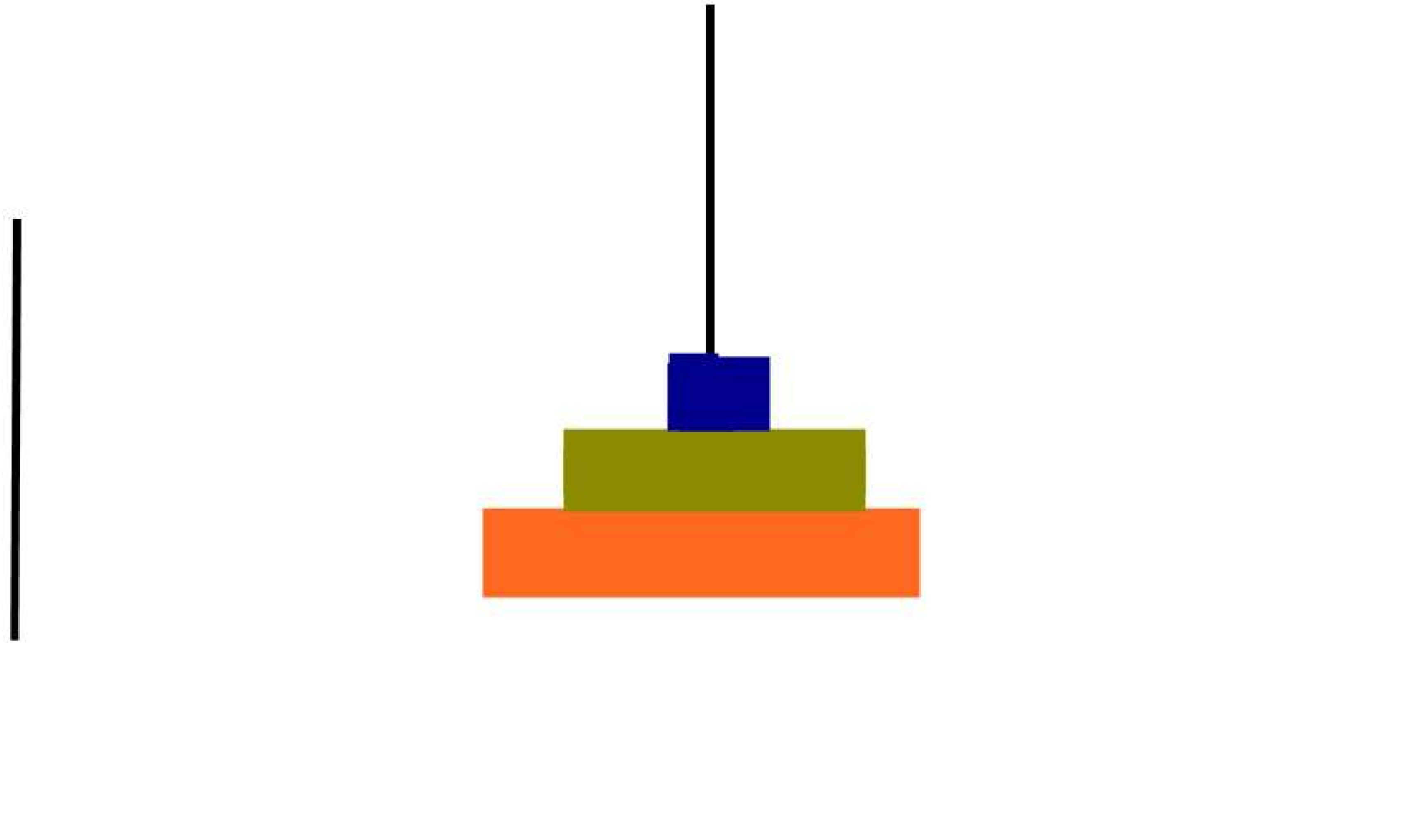
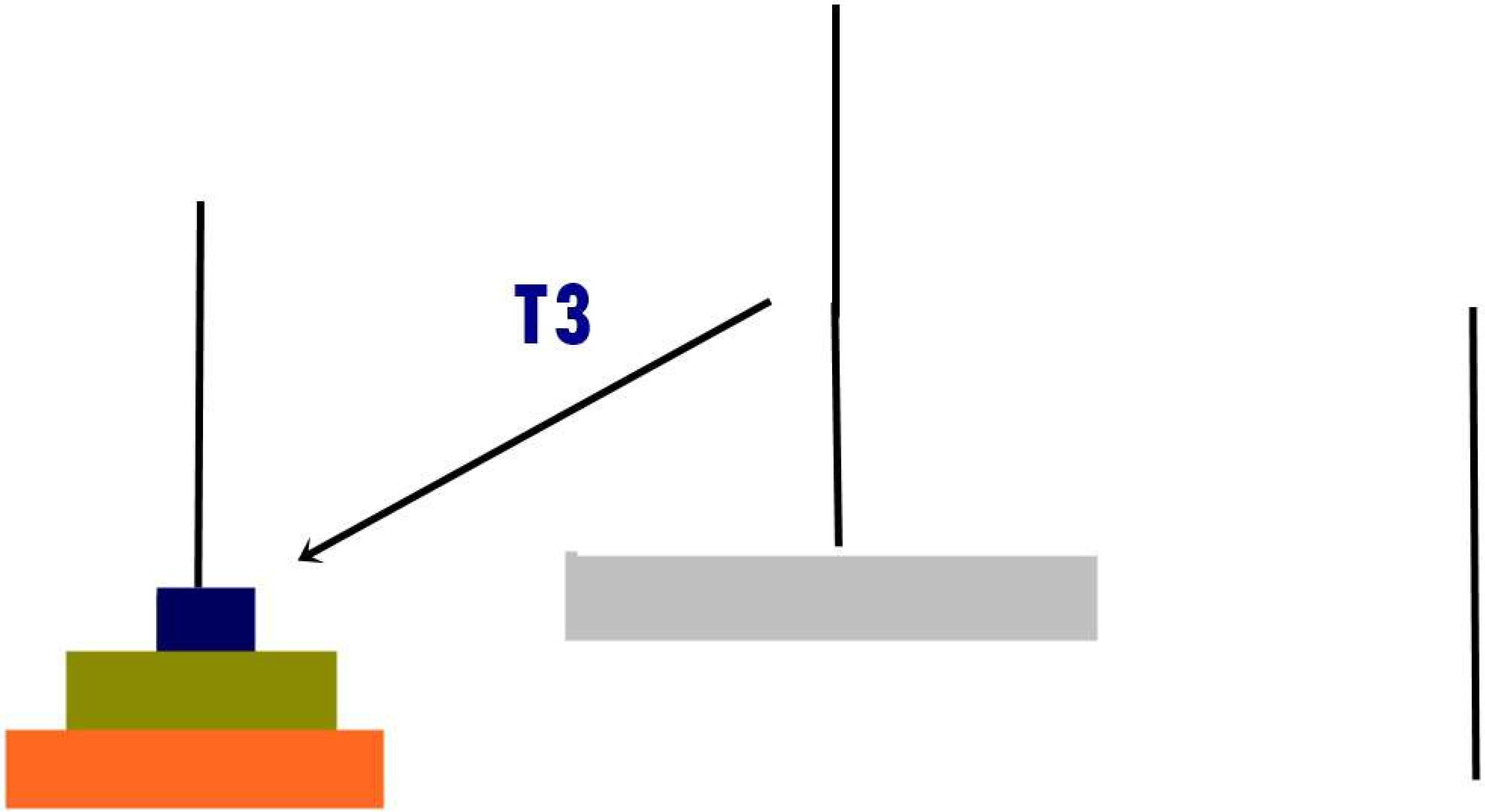


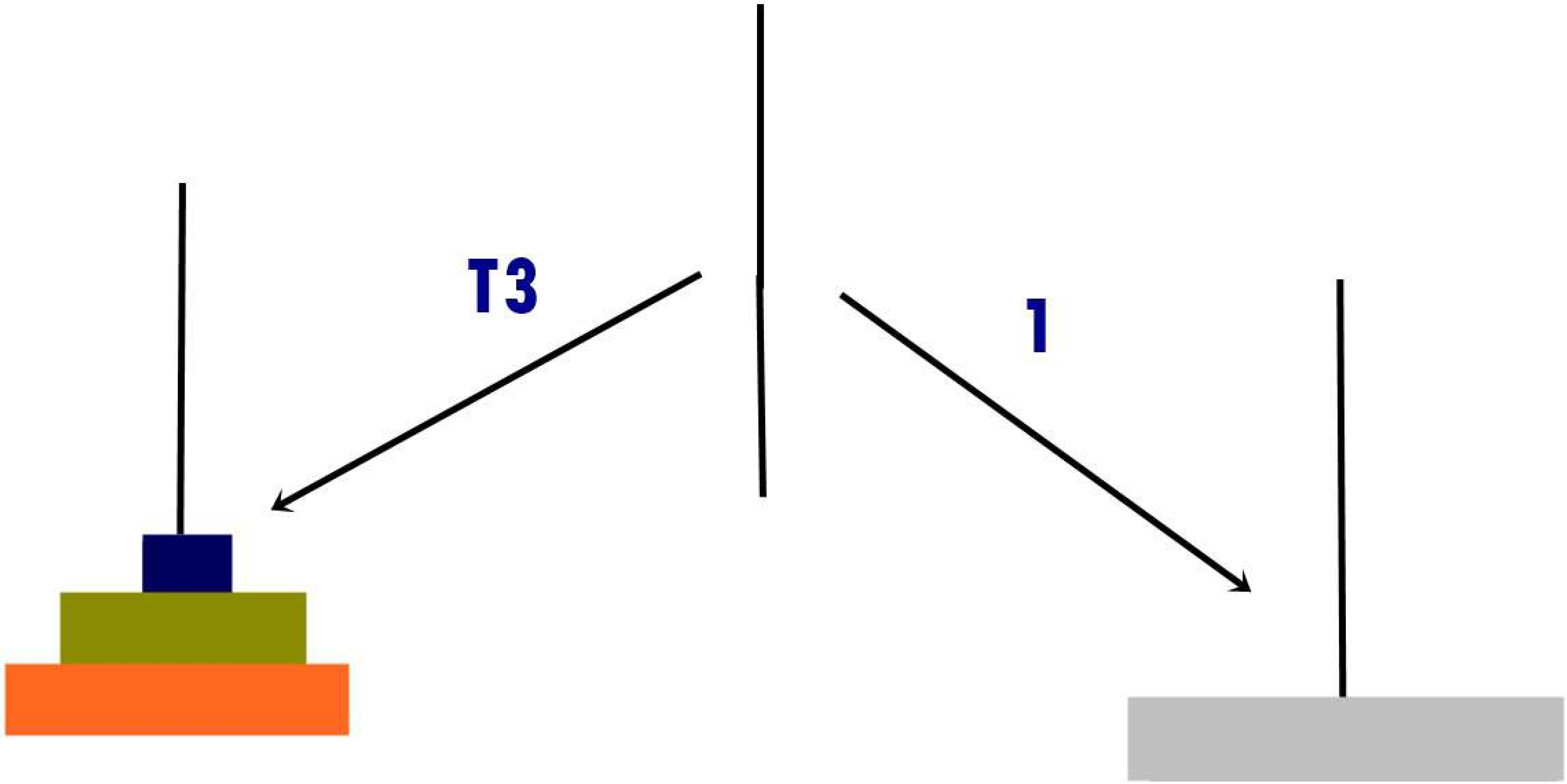
T3=7

T4=?



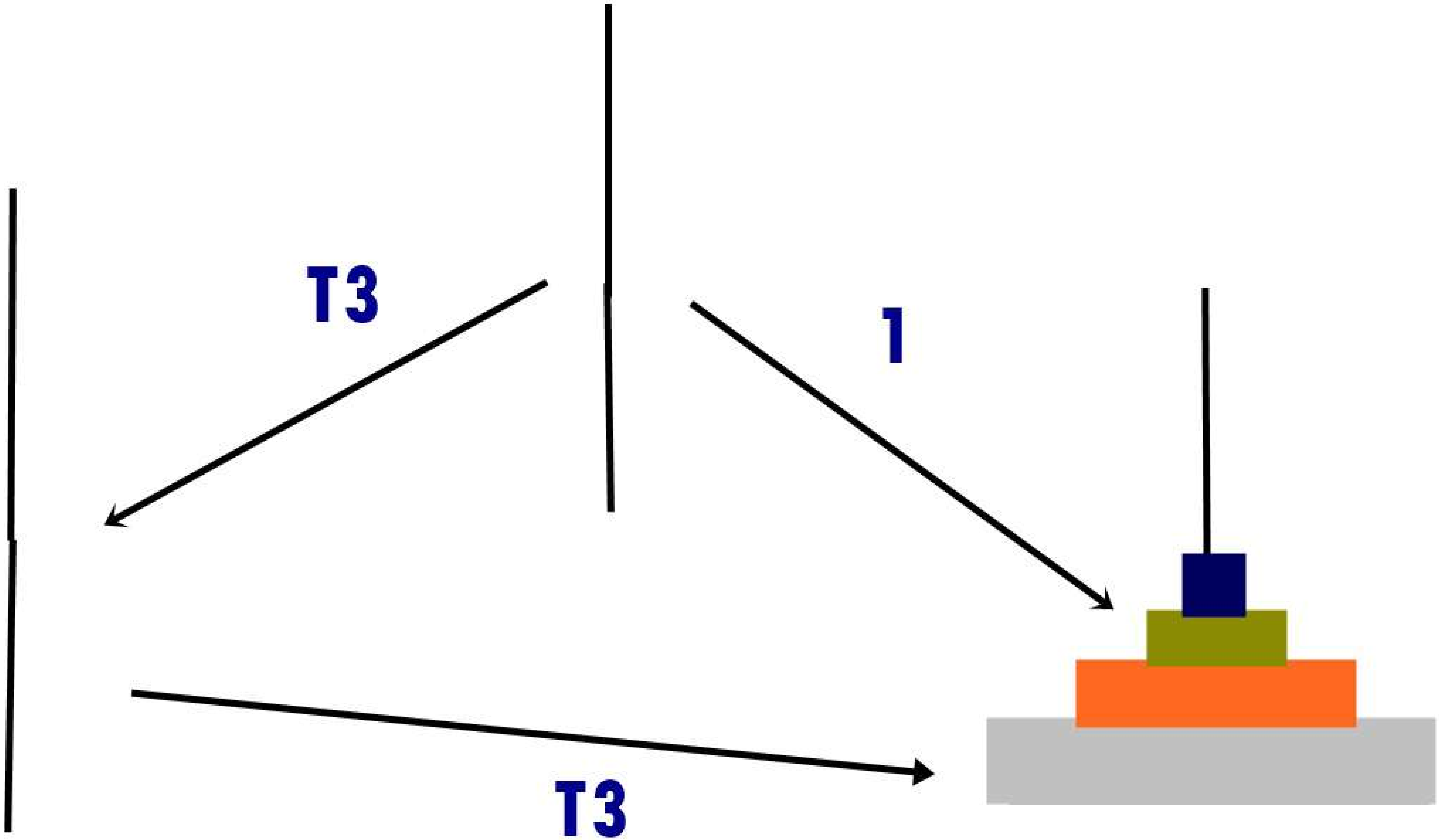
T3=7

T4=?

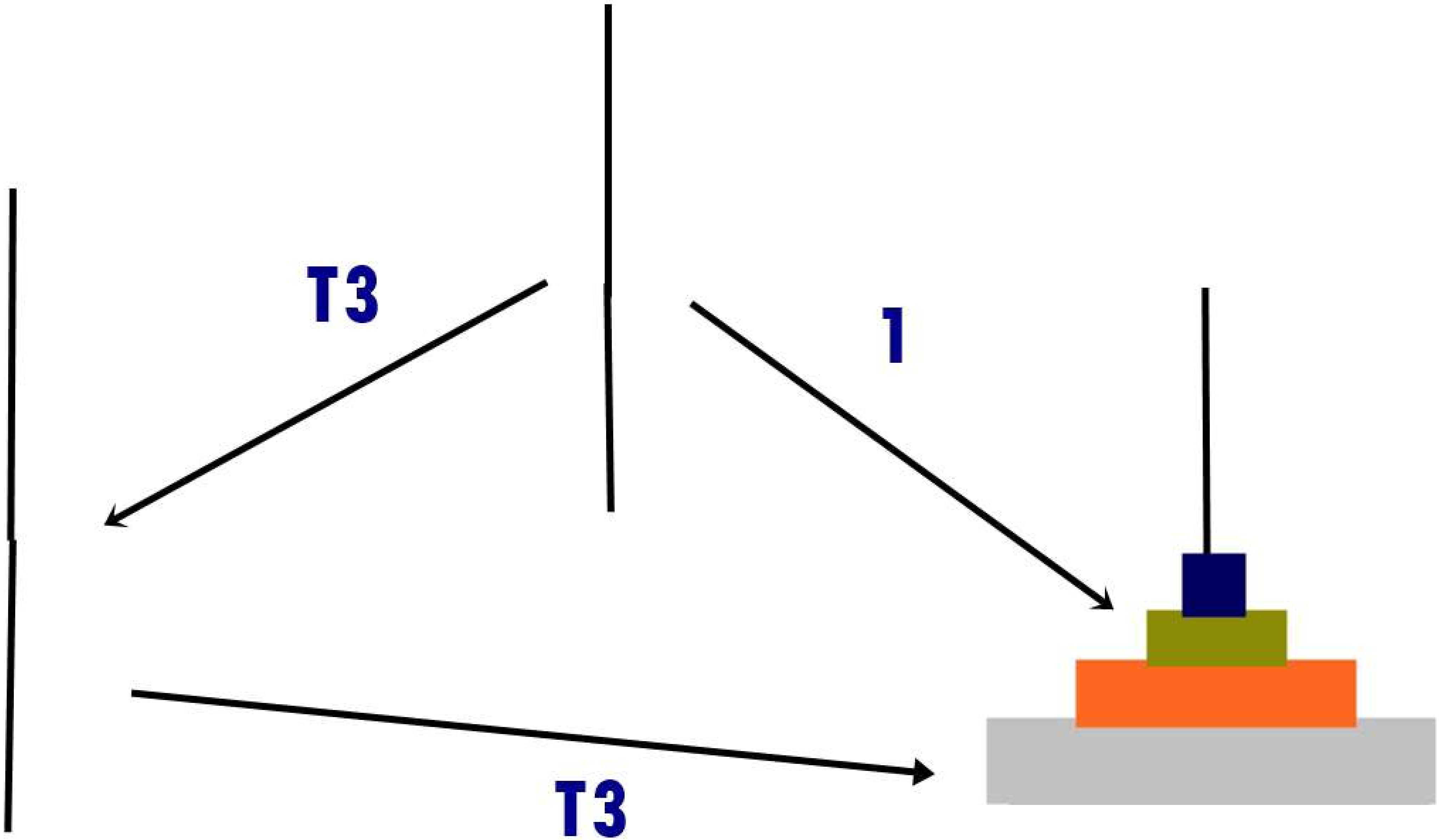


T3=7

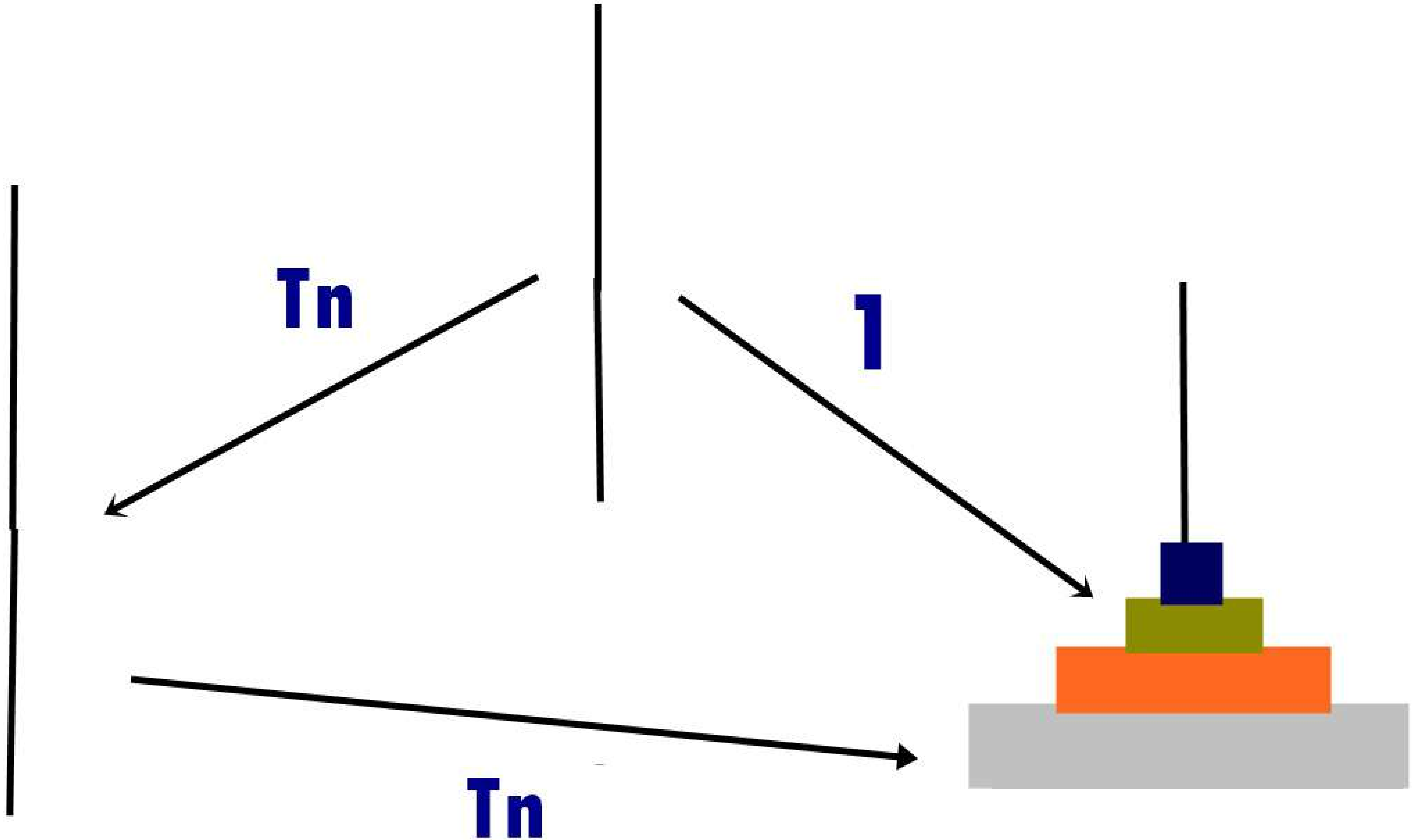
T4=?

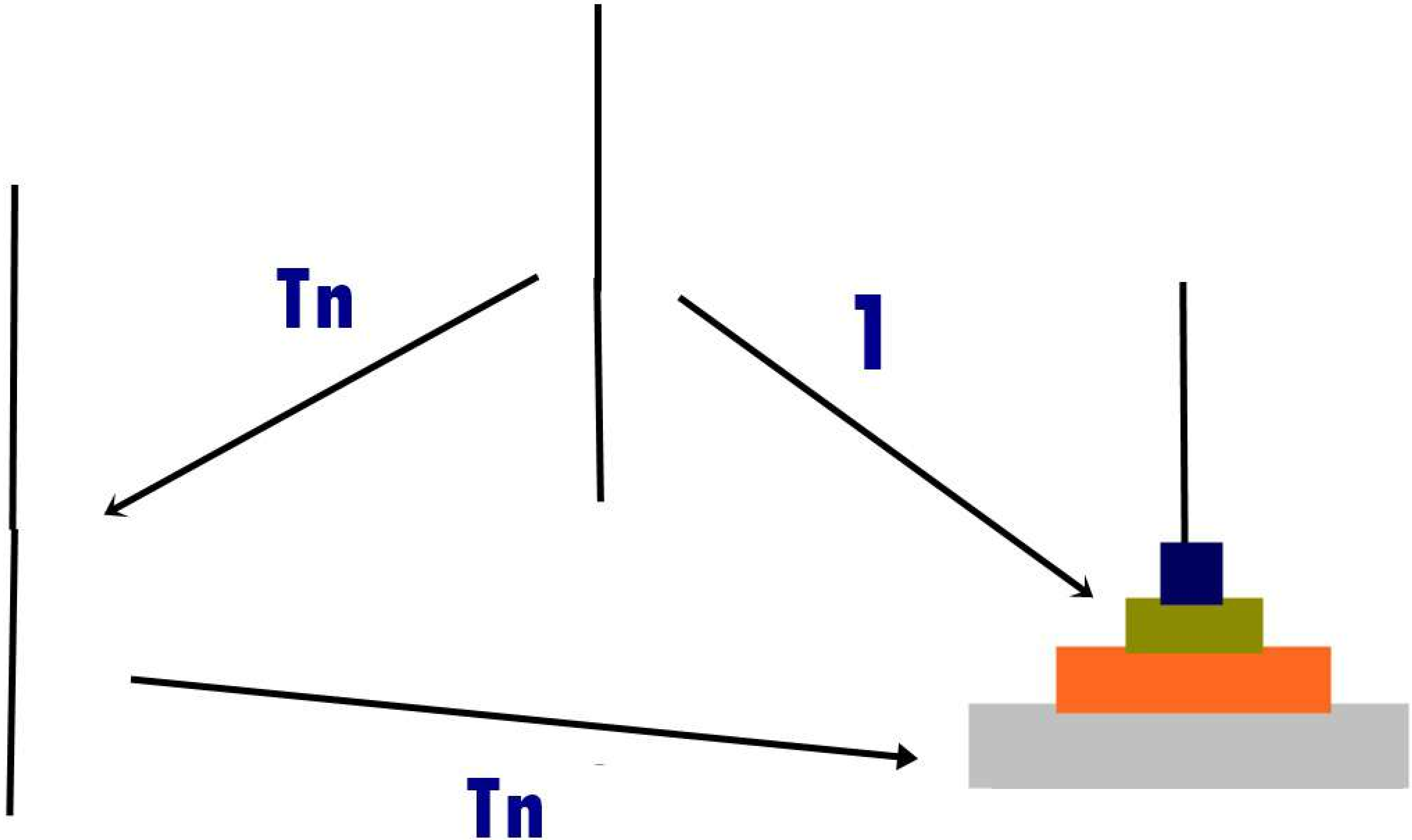


T3=7




$$T4 = 2\,T3 + 1 \longrightarrow 15$$


Tn
1
Tn




$$T(n+1) = 2\,T(n) + 1$$

# Formulas de recorrência

$$T(n+1) = 2\ T(n) + 1$$

# Formulas de recorrência

a^(n+1)= 2 a^n + 1

T(n+1) = 2 T(n) +1

# Formulas de recorrência

a^(n+1)= 2 a^n + 1

cria problemas

T(n+1) = 2 T(n) +1

# Formulas de recorrência

$$T(n) = S(n) + b$$

$$T(n+1) = 2\ T(n) + 1$$

# Formulas de recorrência

$$S(n+1) + b = 2\,S(n) + 2\,b + 1$$

$$T(n) = S(n) + b$$

$$T(n+1) = 2\,T(n) + 1$$

# Formulas de recorrência

$$S(n+1) = 2\,S(n) + b + 1$$

$$S(n+1) + b = 2\,S(n) + 2\,b + 1$$

↑

$$T(n) = S(n) + b$$

↑

$$T(n+1) = 2\,T(n) + 1$$

# Formulas de recorrência

$$S(n+1) = 2\,S(n) + b + 1$$

$$b = -1$$

$$S(n+1) + b = 2\,S(n) + 2\,b + 1$$

↑

$$T(n) = S(n) + b$$

↑

$$T(n+1) = 2\,T(n) + 1$$

# Formulas de recorrência

$a^{(n+1)} = 2\,a^{n}$ ........ $a = 2$

$S(n+1) = 2\,S(n)$

$T(n) = S(n) - 1$

$T(n+1) = 2\,T(n) + 1$

# Formulas de recorrência

$a^{(n+1)} = 2\, a^n$ ........ $a = 2$

$S(n) = c\, 2^n$

$S(n+1) = 2\, S(n)$

$T(n) = S(n) - 1$

$T(n+1) = 2\, T(n) + 1$

# Formulas de recorrência

$a^{(n+1)} = 2\,a^n$ ........ $a = 2$

$S(n) = c\,2^n$

$S(n+1) = 2\,S(n)$

$T(n) = S(n) - 1$

$T(n+1) = 2\,T(n) + 1$

# Formulas de recorrência

$a^{(n+1)} = 2\,a^n$ ........ $a = 2$

$S(n) = c\,2^n$

$S(n+1) = 2\,S(n)$

$T(n) = S(n) - 1$

$T(n) = c\,2^n - 1$

$T(n+1) = 2\,T(n) + 1$

# Formulas de recorrência

$$T(n) = c\, 2^n - 1$$

$$c = ?$$

$$T(n+1) = 2\, T(n) + 1$$

# Formulas de recorrência

$7 = c\ 2^3 - 1$ ......$8c = 8$ ...... $c = 1$

Sabemos pr exemplo que $T(3)=7$

$$T(n) = c\ 2^n - 1$$

$c = ?$

$$T(n+1) = 2\ T(n) + 1$$

# Formulas de recorrência

**Número de soluções Torre de Hanoi : $2^n - 1$**

$7 = c\ 2^3 - 1$ ......$8c = 8$ ...... $c = 1$

↑

Sabemos pr exemplo que $T(3)=7$

$T(n) = c\ 2^n - 1$

**$c = ?$**

↑

$T(n+1) = 2\ T(n) + 1$

Blocos de comprimento 1cm laranjas

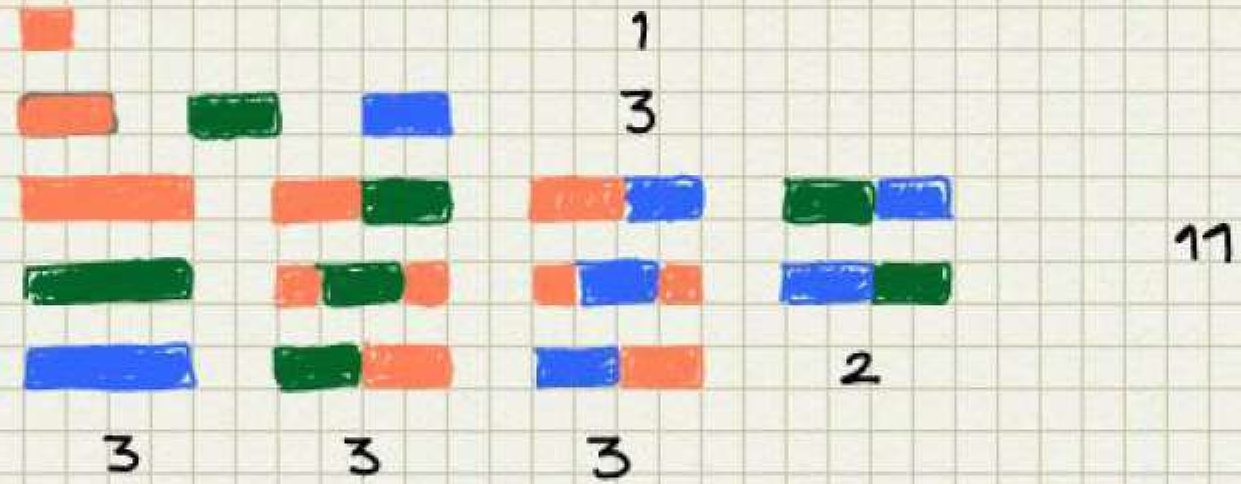
Blocos de comprimentos 2 cm verdes azuis

Quantos blocos de n cm podemos fazer?

$n = 1$ simples

$n = 2$

$n = 4$

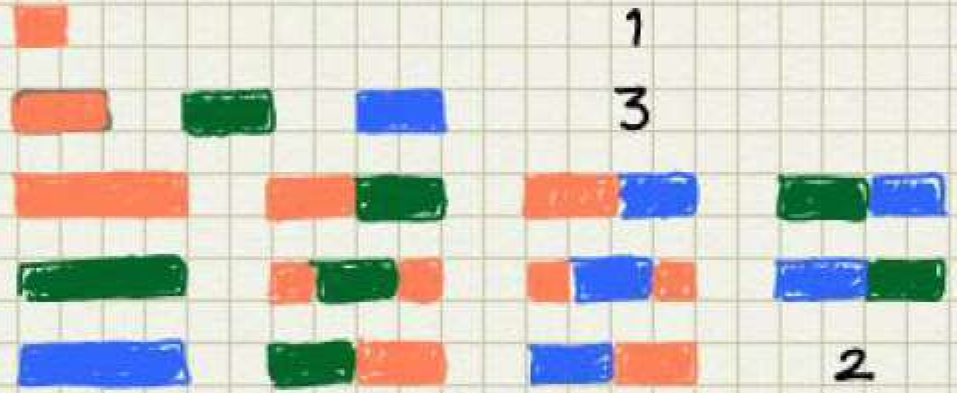


Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos f azer?

$n = 1$ simples 1

$n = 2$ 3

$n = 4$ 11



2

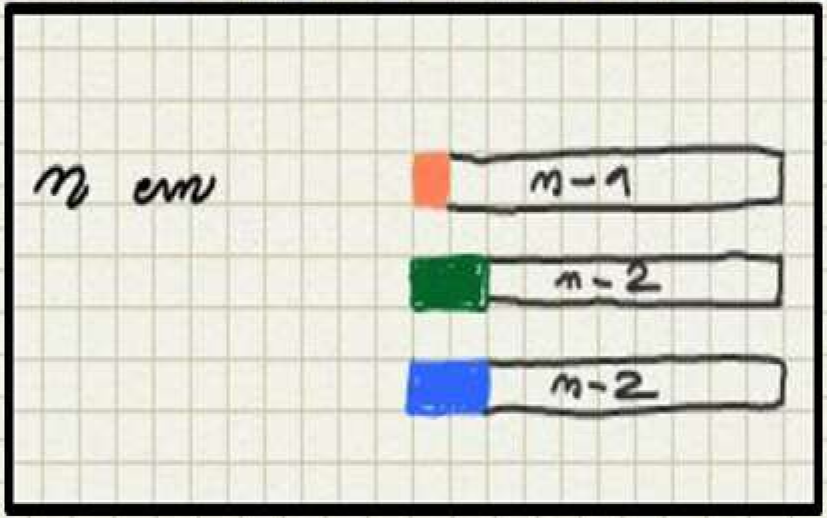
3 3 3

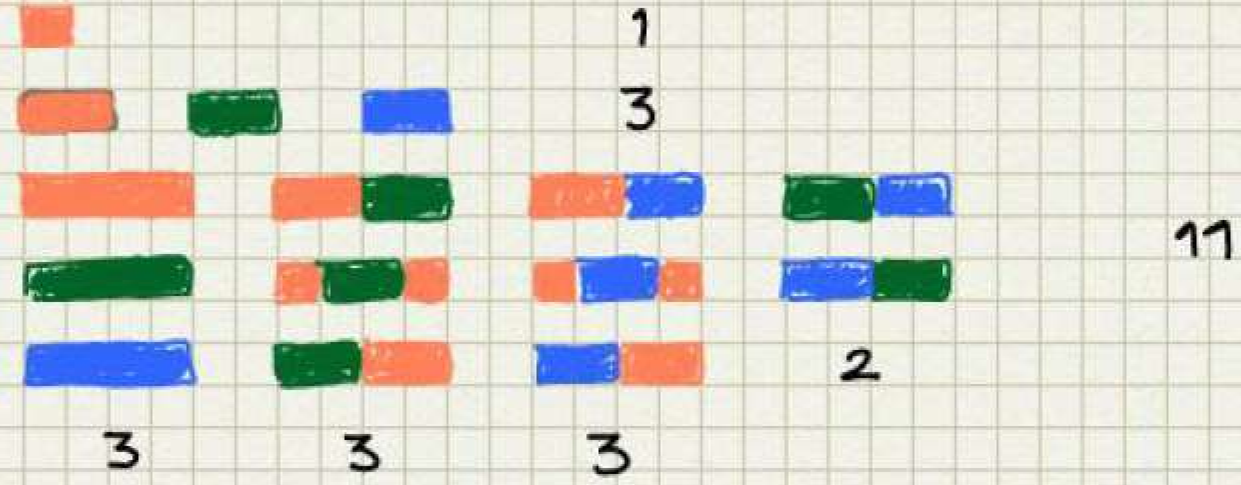
**Queremos a formula de recorrência**

Blocos de comprimento 1cm laranjas

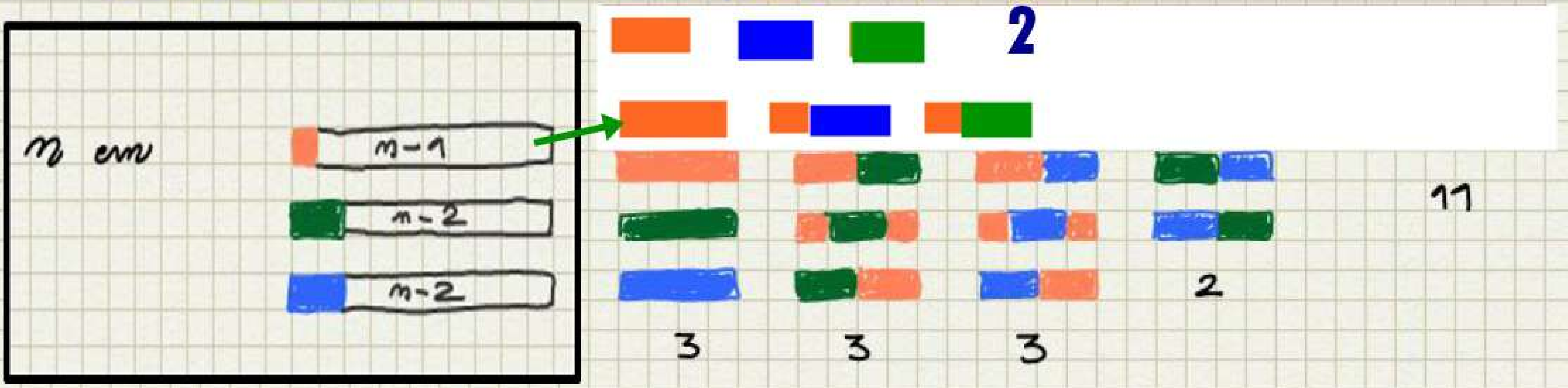
Blocos de comprimentos 2 cm verdes azuis

Quantos blocos de n cm podemos fazer?

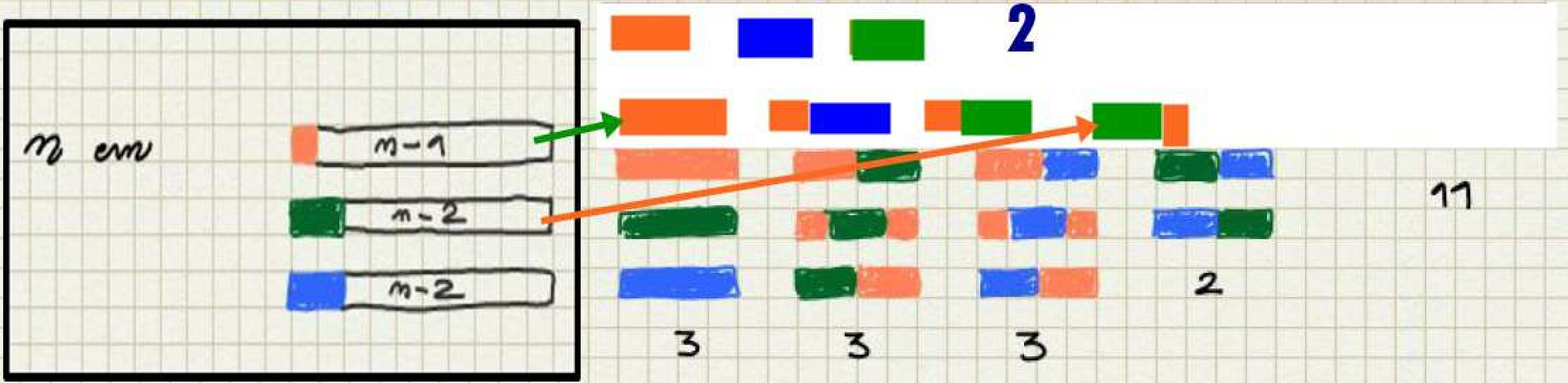


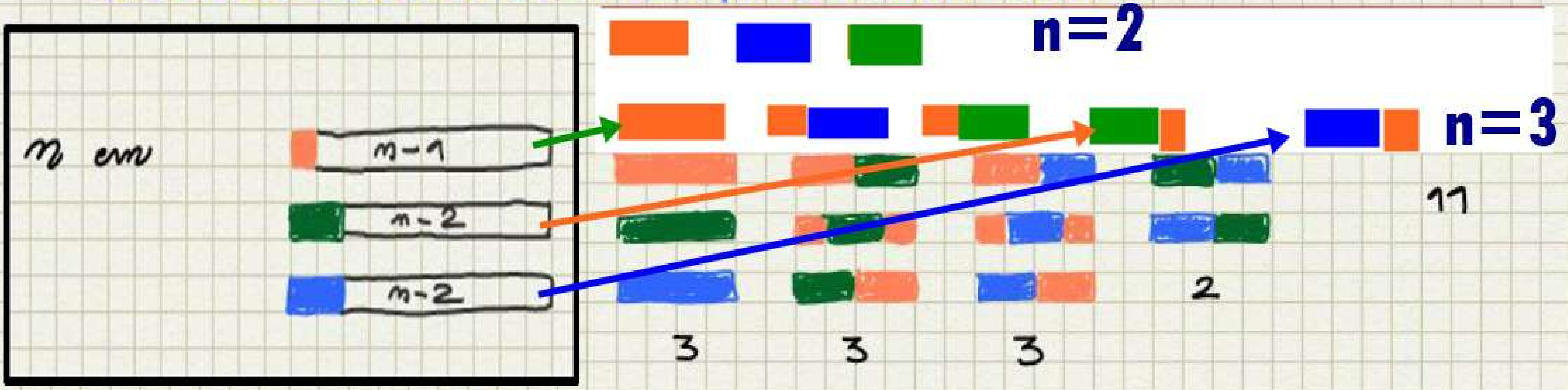
Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos f azer?



Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos fazer?

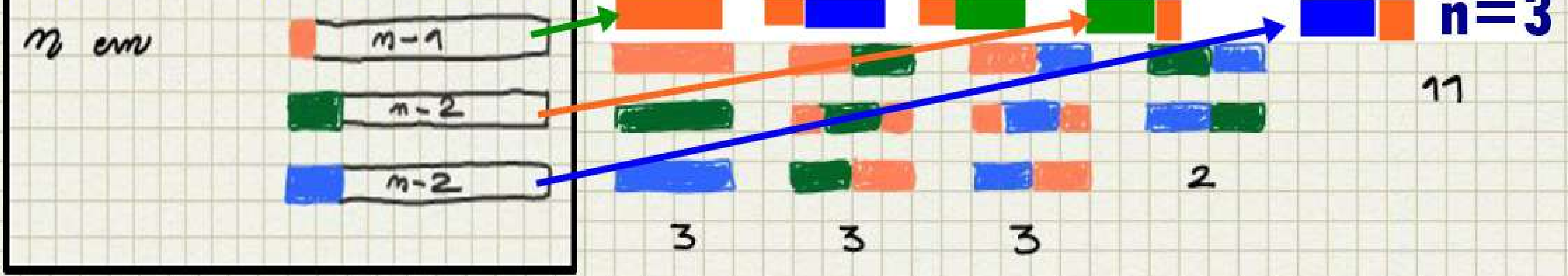


Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos fazer?



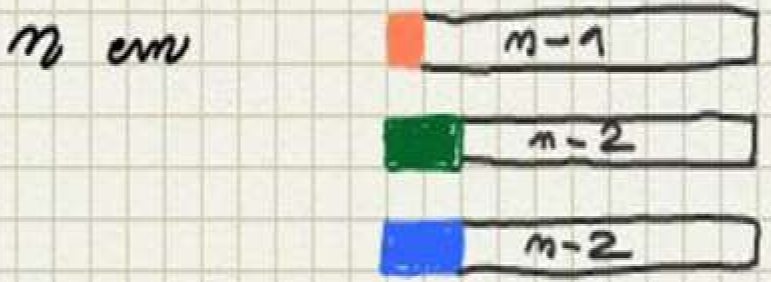
Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos fazer?

$$C(n) = 2\,C(n-2) + C(n-1)$$

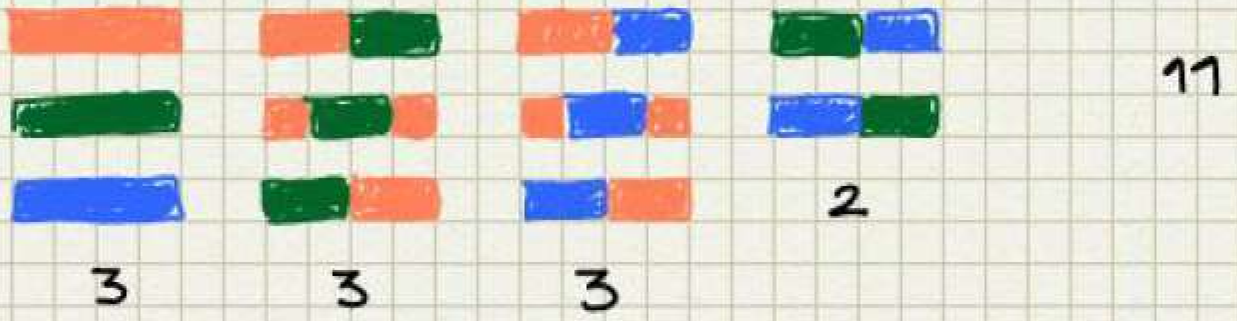


Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos f azer?

$$C(n) = 2\,C(n-2) + C(n-1)$$

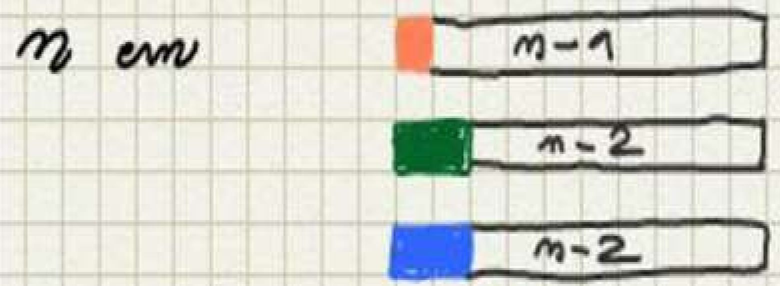



$C(1)=1,\ C(2)=3,\ C(3)=5$



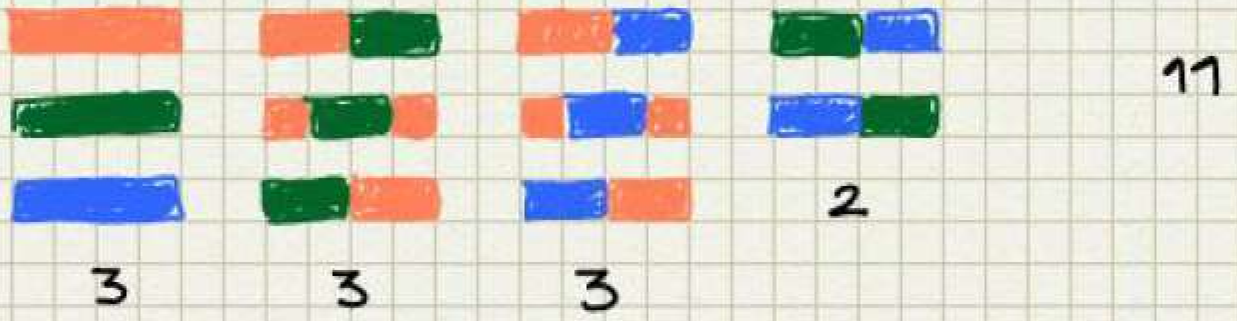
Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos f azer?

$$C(n) = 2\,C(n-2) + C(n-1)$$



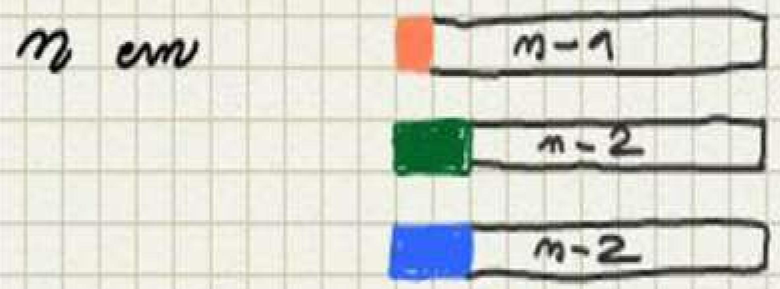

$C(1)=1,\ C(2)=3,\ C(3)=5$

$C(4) = 2\,C(2) + C(3) = 6 + 5 = 11$



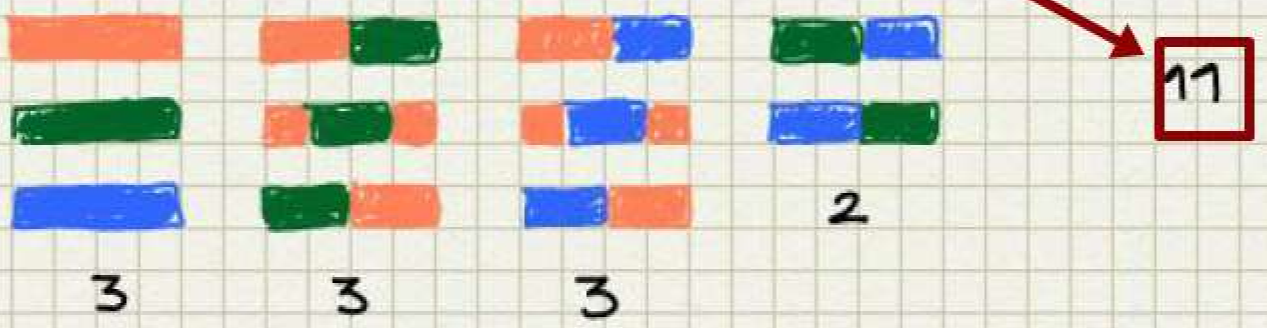
Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos fazer?

$$C(n) = 2\,C(n-2) + C(n-1)$$



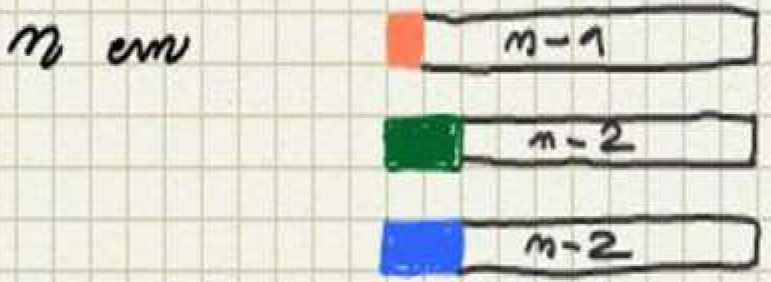

$$C(1)=1,\ C(2)=3,\ C(3)=5$$

$$C(4) = 2\,C(2) + C(3) = 6 + 5 = 11$$

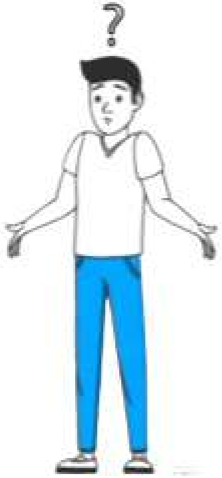


Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos fazer?

$$C(n) = 2\,C(n-2) + C(n-1)$$

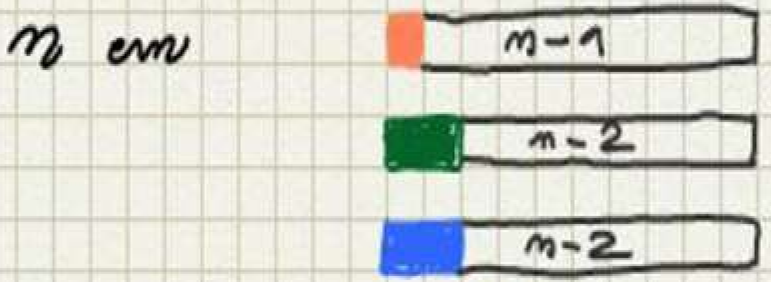


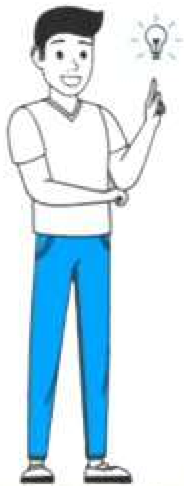

**Como melhorar ?**



Blocos de comprimento 1cm laranjas
Blocos de comprimentos 2 cm verdes azuis
Quantos blocos de n cm podemos fazer?

$$C(n) = 2\,C(n-2) + C(n-1)$$



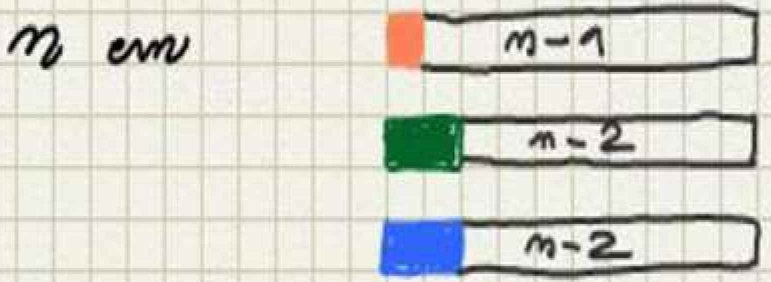
## Formulas de recorrência

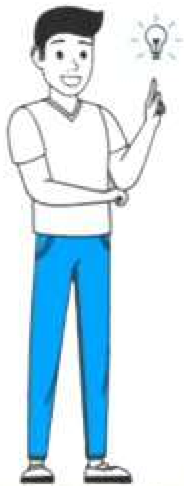
Blocos de comprimento 1cm laranjas

Blocos de comprimentos 2 cm verdes azuis

Quantos blocos de n cm podemos fazer?

$$C(n) = 2\,C(n-2) + C(n-1)$$



**Formulas de recorrência**

$$a^n = 2\,a^{(n-2)} + a^{(n-1)}$$

↓

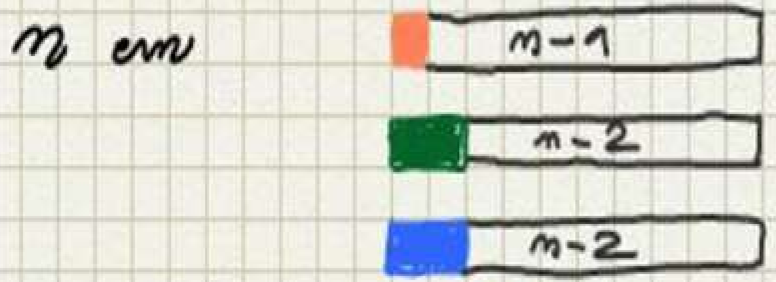
$$a^2 = 2 + a$$

Blocos de comprimento 1cm laranjas

Blocos de comprimentos 2 cm verdes azuis

Quantos blocos de n cm podemos f azer?

$$C(n) = 2\,C(n-2) + C(n-1)$$




**Formulas de recorrência**

$$a^n = 2\,a^{(n-2)} + a^{(n-1)}$$

$(-1,2)$

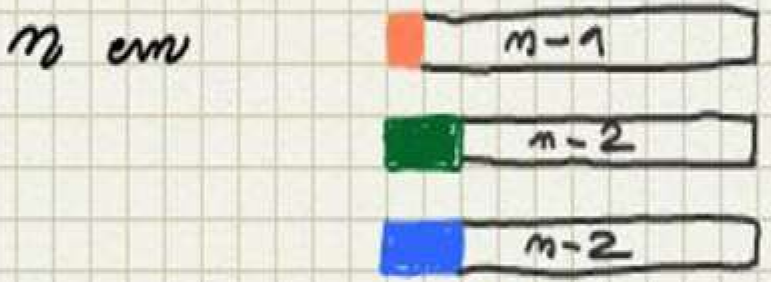
$$a^2 = 2 + a$$

Blocos de comprimento 1cm laranjas

Blocos de comprimentos 2 cm verdes azuis

Quantos blocos de n cm podemos fazer?

**$C(n) = 2\,C(n-2) + C(n-1)$**




Solução $A(-1)^n + B(2)^n$

$n=1$ $\quad -A + 2B = 1$

$n=2$ $\quad A + 4B = 3$ $\quad \rightarrow 6B = 4 \rightarrow B = \frac{2}{3}$ $\quad A = 2B - 1 = \frac{1}{3}$

$$\frac{1}{3}(-1)^n + \frac{2}{3}(2)^n$$

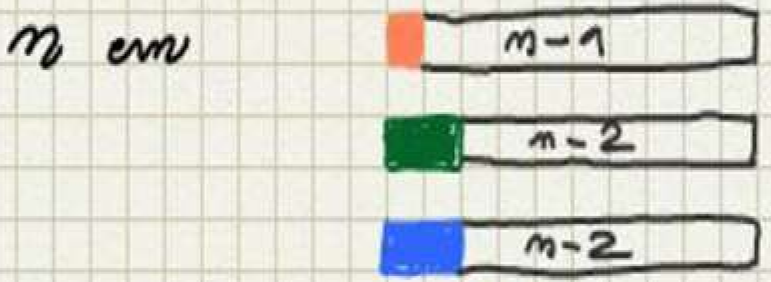
controle $n=4$ $\quad \frac{1}{3} + \frac{32}{3} = 11$

Blocos de comprimento 1cm laranjas

Blocos de comprimentos 2 cm verdes azuis

Quantos blocos de n cm podemos fazer?

$$C(n) = 2\,C(n-2) + C(n-1)$$




**Bloco de 6 cm?**

$$\frac{1}{3}(-1)^n + \frac{2}{3}(2)^n$$

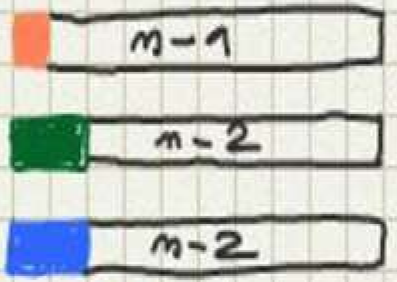
Blocos de comprimento 1cm laranjas

Blocos de comprimentos 2 cm verdes azuis

Quantos blocos de n cm podemos fazer?

**$C(n) = 2\,C(n-2) + C(n-1)$**

n cm




**Bloco de 6 cm?**

**(1 + 128) / 3 = 43 possibilidades**

$$\frac{1}{3}(-1)^n + \frac{2}{3}(2)^n$$