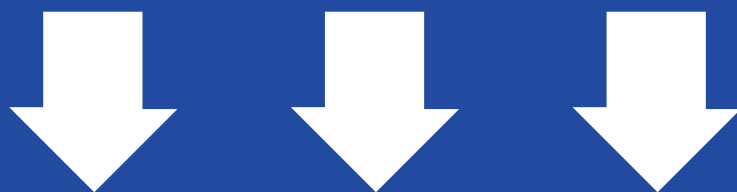


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TLE

Technologique Mathématiques

Triangle de **Pascal**



MINI COURS

A. Factorielle d'un entier naturel n :

$$n! = n \cdot (n-1) \cdot (n-2) \cdot (n-3) \dots (3) \cdot (2) \cdot (1).$$

B. Coefficients binomiaux:

1. Formule:

$$\binom{n}{k} = \frac{n!}{k!(n-k)!}, \text{ avec: } 0 \leq k \leq n.$$

2. Propriétés:

$$\bullet \binom{n}{n} = 1$$

$$\bullet \binom{n}{0} = 1$$

$$\bullet \binom{n}{1} = n$$

$$\bullet \binom{n}{k} = \binom{n}{n-k}$$

$$\bullet \binom{n+1}{k+1} = \binom{n}{k} + \binom{n}{k+1}$$

$$\bullet \binom{n}{k} = \frac{n}{k} \cdot \binom{n-1}{k-1}.$$

3. Remarques:

- $0! = 1$
- $1! = 1.$

C. Triangle de Pascal:

1. Formule 1:

$$\binom{n}{k} = \binom{n-1}{k-1} + \binom{n-1}{k}.$$

2. Représentation:

$n \backslash k$	0	1	2	3	4	5	6	7	8	9	10
0	1										
1	1	1									
2	1	2	1								
3	1	3	3	1							
4	1	4	6	4	1						
5	1	5	10	10	5	1					
6	1	6	15	20	15	6	1				
7	1	7	21	35	35	21	7	1			
8	1	8	28	56	70	56	28	8	1		
9	1	9	36	84	126	126	84	36	9	1	
10	1	10	45	120	210	252	210	120	45	10	1

3. Formule 2:

$$\sum_{p=0}^n \binom{n}{p} = \binom{n}{0} + \binom{n}{1} + \binom{n}{2} + \dots + \binom{n}{n} = 2^n.$$