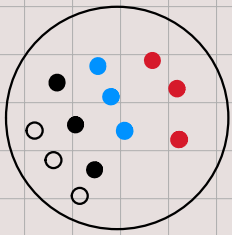


3: ¿De cuántas formas puedo extraer 9 caricas de una bolsa si hay 3 de : rojo, blanco, azul, negro?



$$X_1 + X_2 + X_3 + X_4 = 9$$

$$0 \leq X_i \leq 3$$

$$N = CR_9^4$$

$$C_i: X_i \geq 3 \quad \forall i \in [1, 4] \quad \left\{ \begin{array}{l} X_1 + \dots + X_4 = 9 \Rightarrow X_1 + X_2 + X_3 - 3 + X_4 = 5 \\ X_1 \geq 4 \quad CR_5^4 \end{array} \right.$$

$$S_1 = 4 \cdot CR_5^4$$

$$N(C_1, C_2) = \left\{ \begin{array}{l} X_1 + \dots + X_4 = 9 \Rightarrow X_1 + \dots + X_4 = 1 \quad CR_1^4 \\ X_1 \geq 4 \text{ y } X_2 \geq 4 \end{array} \right.$$

$$S_2 = C_4^2 \cdot CR_1^4$$

$$\bar{N} = CR_9^4 - 4 \cdot CR_5^4 + C_4^2 \cdot CR_1^4$$

se llaman restos.

4: Enteros positivos entre 1 y 9.999.999 inclusive que cumplen que la suma de sus dígitos es igual a 31.

$$X_1 + \dots + X_7 = 31$$

$$9 + 9 + 9 = 27 \text{ mínimo 4 cifras}$$

Caso de 4

$$\left\{ \begin{array}{l} X_1 + X_2 + X_3 + X_4 = 31 \Rightarrow CR_{30}^4 \\ X_i \geq 1 \end{array} \right.$$

Caso de 5

$$\left\{ \begin{array}{l} X_1 + X_2 + X_3 + X_4 + X_5 = 31 \rightarrow X_1 + X_2 + X_3 + X_4 + X_5 = 30 \Rightarrow CR_{30}^5 \\ X_i \geq 1 \text{ (porque sino es de 4)} \end{array} \right.$$

Caso de 6

$$\left\{ \begin{array}{l} X_1 + X_2 + X_3 + X_4 + X_5 + X_6 = 31 \rightarrow X_1 + \dots + X_6 = 30 \Rightarrow CR_{30}^6 \\ X_i \geq 1 \end{array} \right.$$

Caso de 7

$$\left\{ \begin{array}{l} X_1 + \dots + X_7 = 31 \rightarrow X_1 + \dots + X_7 = 30 \Rightarrow CR_{30}^7 \\ X_i \geq 1 \end{array} \right.$$

N

Caso de 4

$$\left\{ \begin{array}{l} X_1 + \dots + X_4 = 31 \rightarrow X_1 + \dots + X_4 = 11 \quad CR_{11}^4 \quad \times 3 \\ X_1 \geq 10 \wedge X_2 \geq 10 \\ \text{otro: } X_1 + \dots + X_4 = 31 \rightarrow X_1 + \dots + X_4 = 10 \quad CR_{10}^4 \quad \times 3 \quad (C_2^3) \\ X_1 \geq 1 \wedge X_2 \geq 10 \wedge X_3 \geq 10 \end{array} \right.$$

Caso de 4

$$\left\{ \begin{array}{l} \text{Caso de } X_i \geq 10 \\ X_1 + \dots + X_4 = 31 \rightarrow X_1 + \dots + X_4 = 21 \Rightarrow CR_{21}^4 \\ X_i \geq 10 \\ \text{otro } (C_2^2) \\ X_1 + \dots + X_4 = 31 \rightarrow X_1 + \dots + X_4 = 20 \Rightarrow CR_{20}^4 \\ X_1 \geq 1 \wedge X_2 \geq 10 \end{array} \right. +$$

Caso de 5

$$\left\{ \begin{array}{l} X_1 + \dots + X_5 = 31 \rightarrow X_1 + \dots + X_5 = 11 \quad CR_{11}^5 \quad \times 4 \\ X_1 \geq 10 \wedge X_2 \geq 10 \\ X_1 + \dots + X_5 = 31 \rightarrow X_1 + \dots + X_5 = 10 \quad CR_{10}^5 \quad \times C_2^4 \\ X_1 \geq 1 \wedge X_2 \geq 10 \wedge X_3 \geq 10 \end{array} \right.$$

Caso de 5

$$\left. \begin{array}{l} CR_{21}^5 \\ CR_{20}^5 \end{array} \right) CR_{21}^5 + 4 \cdot CR_{20}^5$$

Caso de 6

$$\left\{ \begin{array}{l} X_1 + \dots + X_6 = 31 \rightarrow X_1 + \dots + X_6 = 11 \quad CR_{11}^6 \quad \times 5 \\ X_1 \geq 10 \wedge X_2 \geq 10 \\ X_1 + \dots + X_6 = 31 \rightarrow X_1 + \dots + X_6 = 10 \quad CR_{10}^6 \quad \times C_2^5 \\ X_1 \geq 1 \wedge X_2 \geq 10 \wedge X_3 \geq 10 \end{array} \right.$$

Caso de 6

$$\left. \begin{array}{l} CR_{21}^6 \\ CR_{20}^6 \end{array} \right) C_{21}^6 + 5 \cdot CR_{20}^6$$

Caso de 7

$$\left. \begin{array}{l} CR_{21}^7 \\ CR_{20}^7 \end{array} \right) C_{21}^7 + 6 \cdot CR_{20}^7$$

Caso de 7

$$\left. \begin{array}{l} CR_{11}^7 \times 6 \\ CR_{10}^7 \times C_2^6 \end{array} \right)$$

N(C<sub>i</sub>)

N(C<sub>i</sub>, C<sub>j</sub>)