

Representación en Binario

$$5 \rightarrow \begin{array}{|c|} \hline 0 \\ \hline \end{array} \begin{array}{|c|} \hline 1 \\ \hline \end{array} \begin{array}{|c|} \hline 0 \\ \hline \end{array} \begin{array}{|c|} \hline 1 \\ \hline \end{array}$$

$2^3 \quad 2^2 \quad 2^1 \quad 2^0$

$$\rightarrow 0 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$

$$\rightarrow 5$$

bit menos significativo $\rightarrow 0 \ 1 \ 0 \ \boxed{1} \rightarrow 0001$

(más a la derecha y está activo, i.e. 1)

Bit menos significativo:

5 \rightarrow 0101 \rightarrow 0001

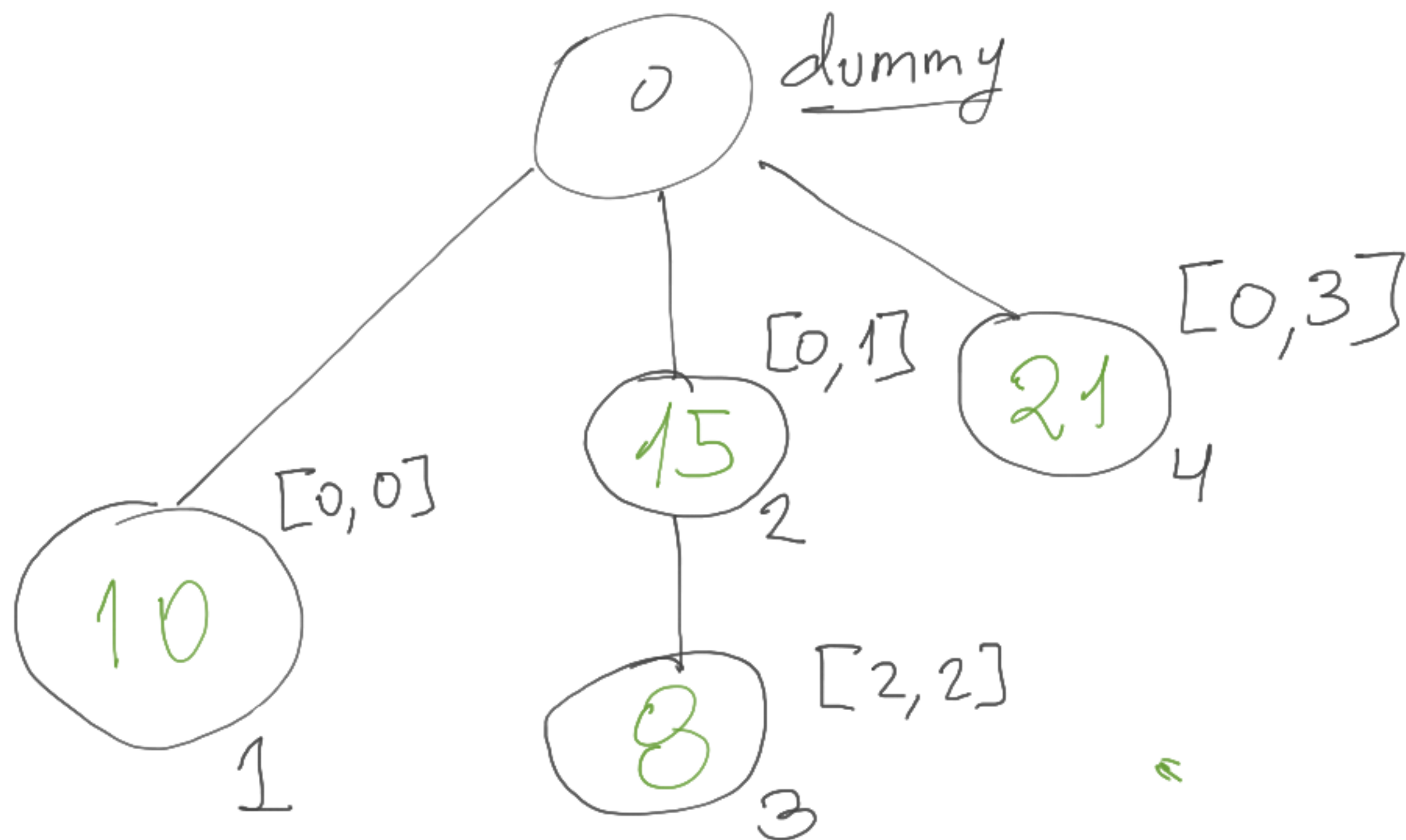
4 \rightarrow 0111 \rightarrow 0001

2 \rightarrow 0010 \rightarrow 0010

1 \rightarrow 0001 \rightarrow 0001

$$A = \{ \underset{0}{10}, \underset{1}{5}, \underset{2}{8}, \underset{3}{-2} \}$$

indices



Explicación de Rangos:

$$1 = \underline{0} + \underline{2^0} \rightarrow [0, 0]$$

$$2 = \underline{0} + \underline{2^1} \rightarrow [0, 1]$$

$$3 = \underline{2^1} + 2^0 \rightarrow [2, 2]$$

$$4 = \underline{0} + 2^2 \rightarrow [0, 3]$$

$$5 = \underline{2^2} + 2^0 \rightarrow [4, 4]$$

$$6 = 2^2 + 2^1 \rightarrow [4, 5]$$

$$7 = \boxed{2^2 + 2^1} + 2^0 \rightarrow [6, 6]$$

$$8 = 0 + 2^3 \rightarrow [0, 7]$$

Creación del Árbol de Fenwick:

- Saber cuál es el NODO Padre
- El nodo dummy vale \emptyset

$$P(u) = u - \text{LSB}(u)$$

Ejemplo: $P(1) = \underbrace{0001} - \underbrace{0001} = 1 - 1 = 0$

→ El padre de 1 es 0.

$$P(2) = 0010 - 0010 \rightarrow 0$$

$$P(3) = 0011 - 0001 \rightarrow 2$$

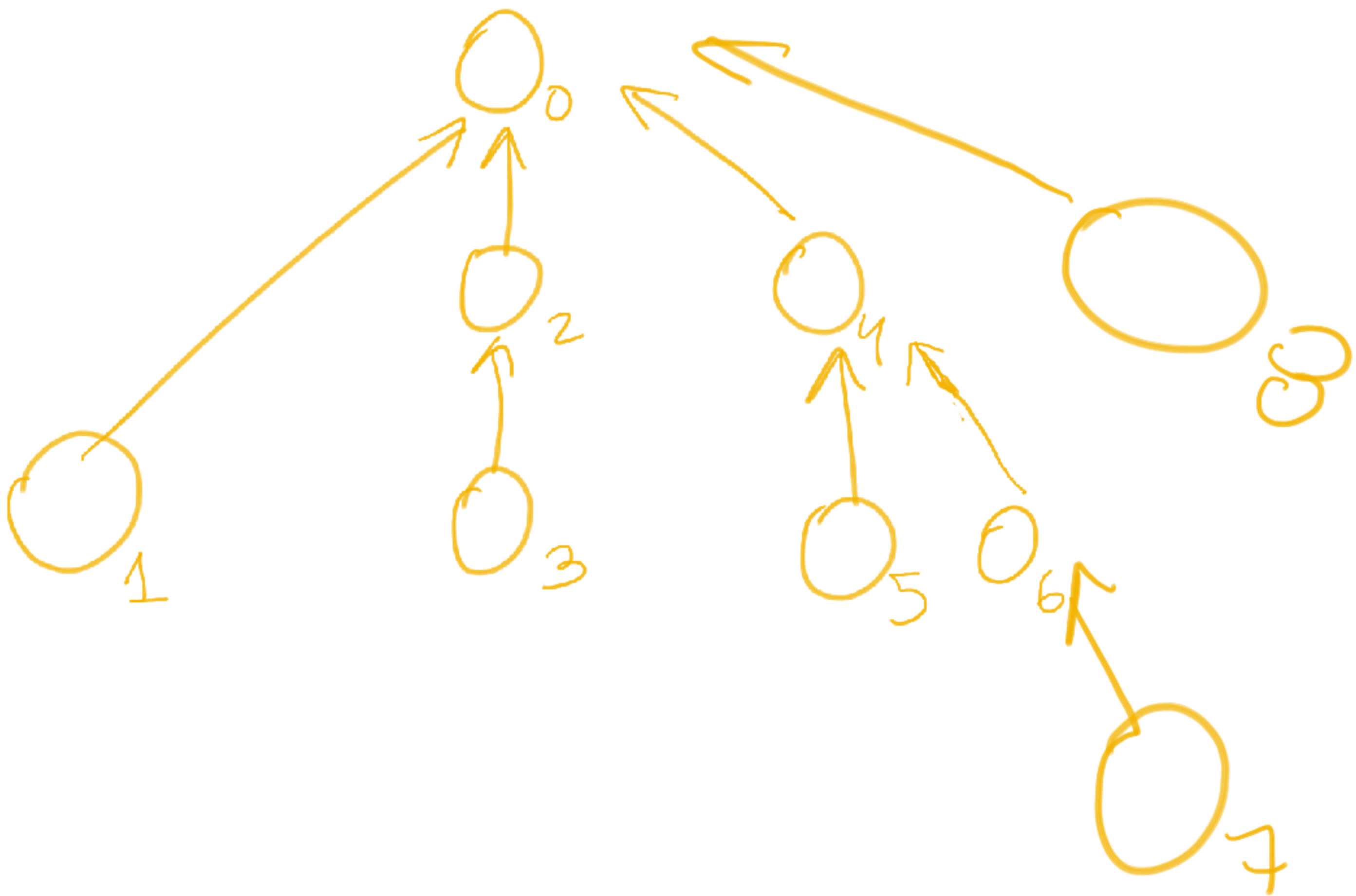
$$P(4) = 0100 - 0100 \rightarrow 0$$

$$P(5) = 0101 - 0001 \rightarrow 4$$

$$P(6) = 0110 - 0010 \rightarrow 4$$

$$P(7) = 0111 - 0001 \rightarrow 6$$

$$P(8) = 1000 - 1000 \rightarrow 0$$

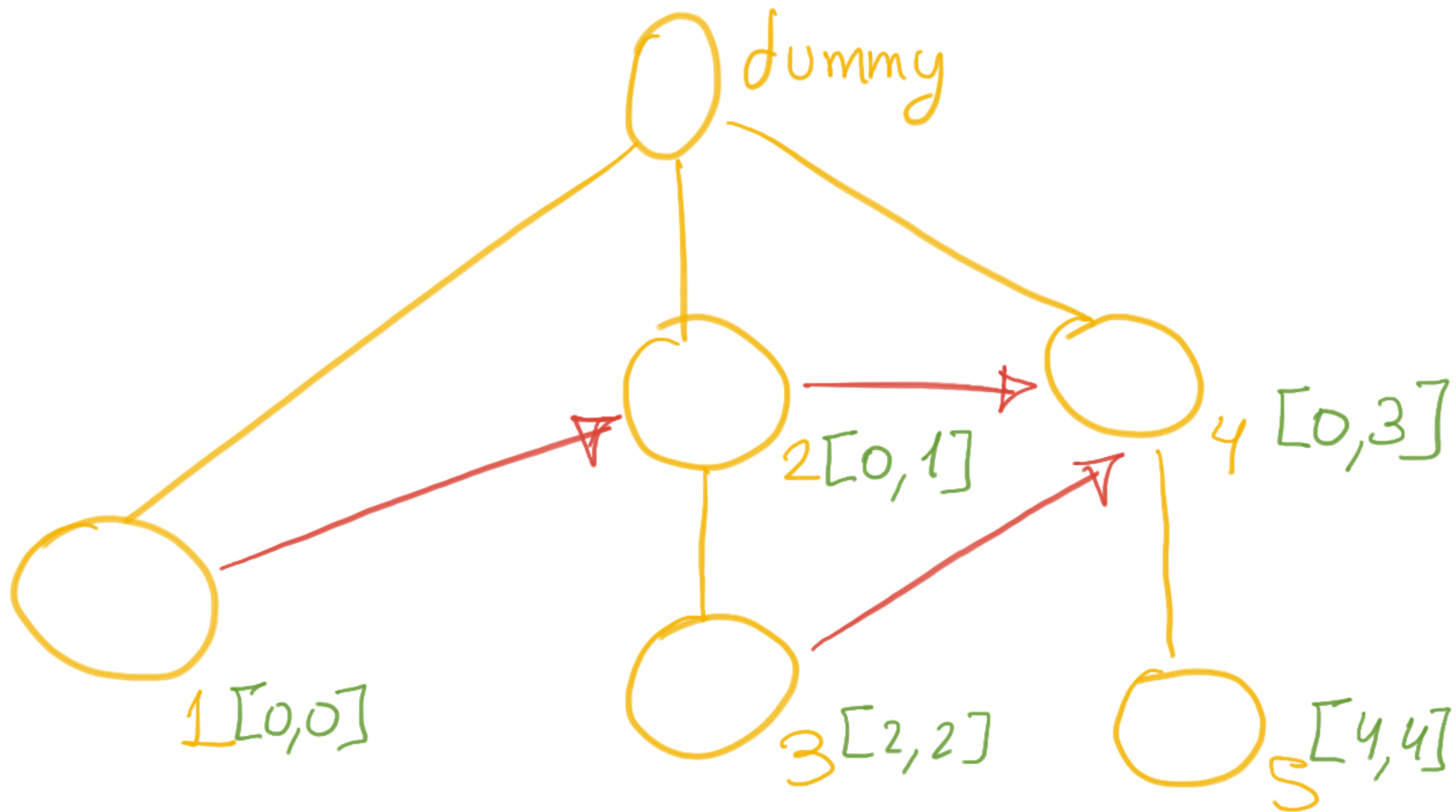


Función de Propagación:

$$N(\mu) = \mu + \text{LSB}(\mu)$$

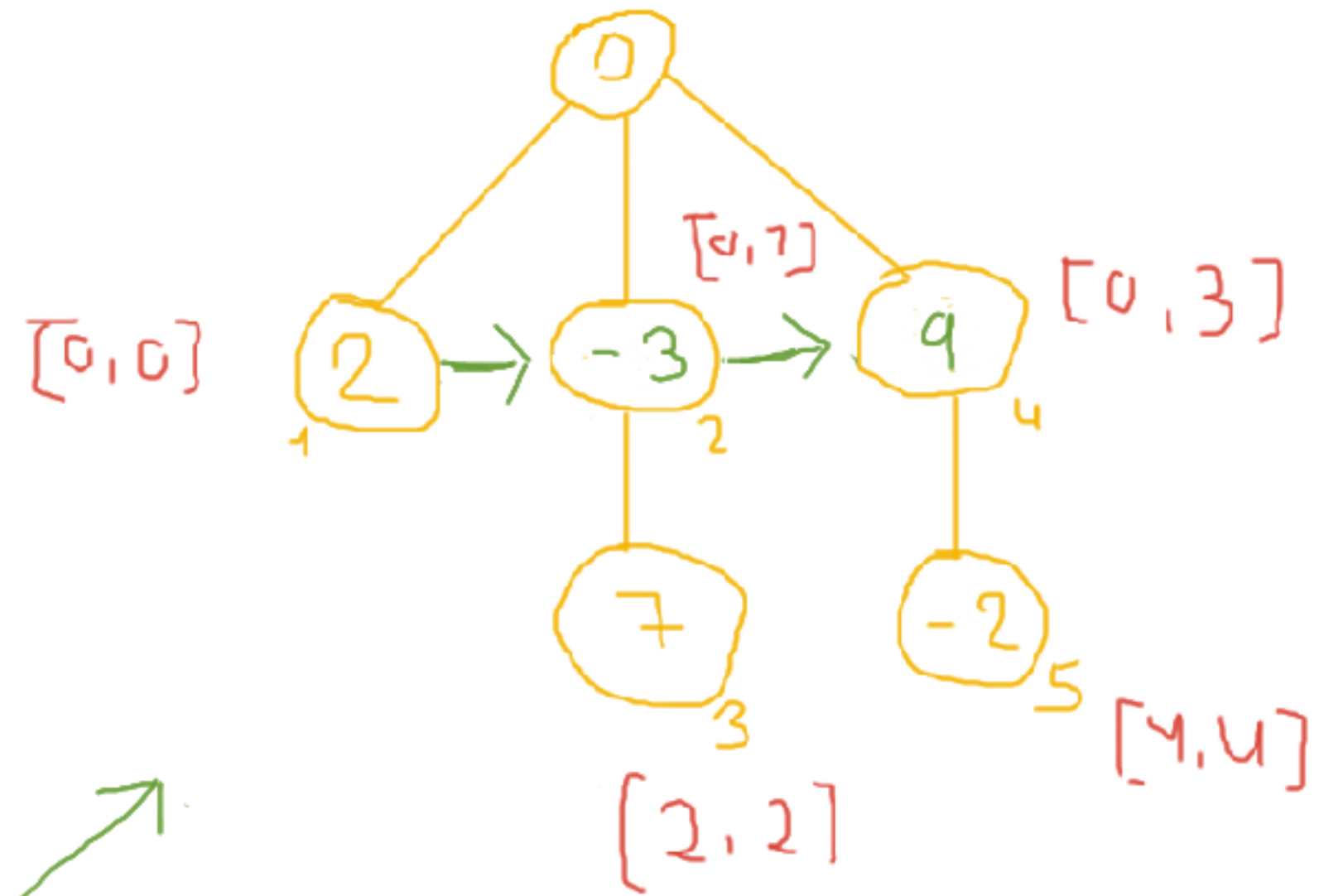
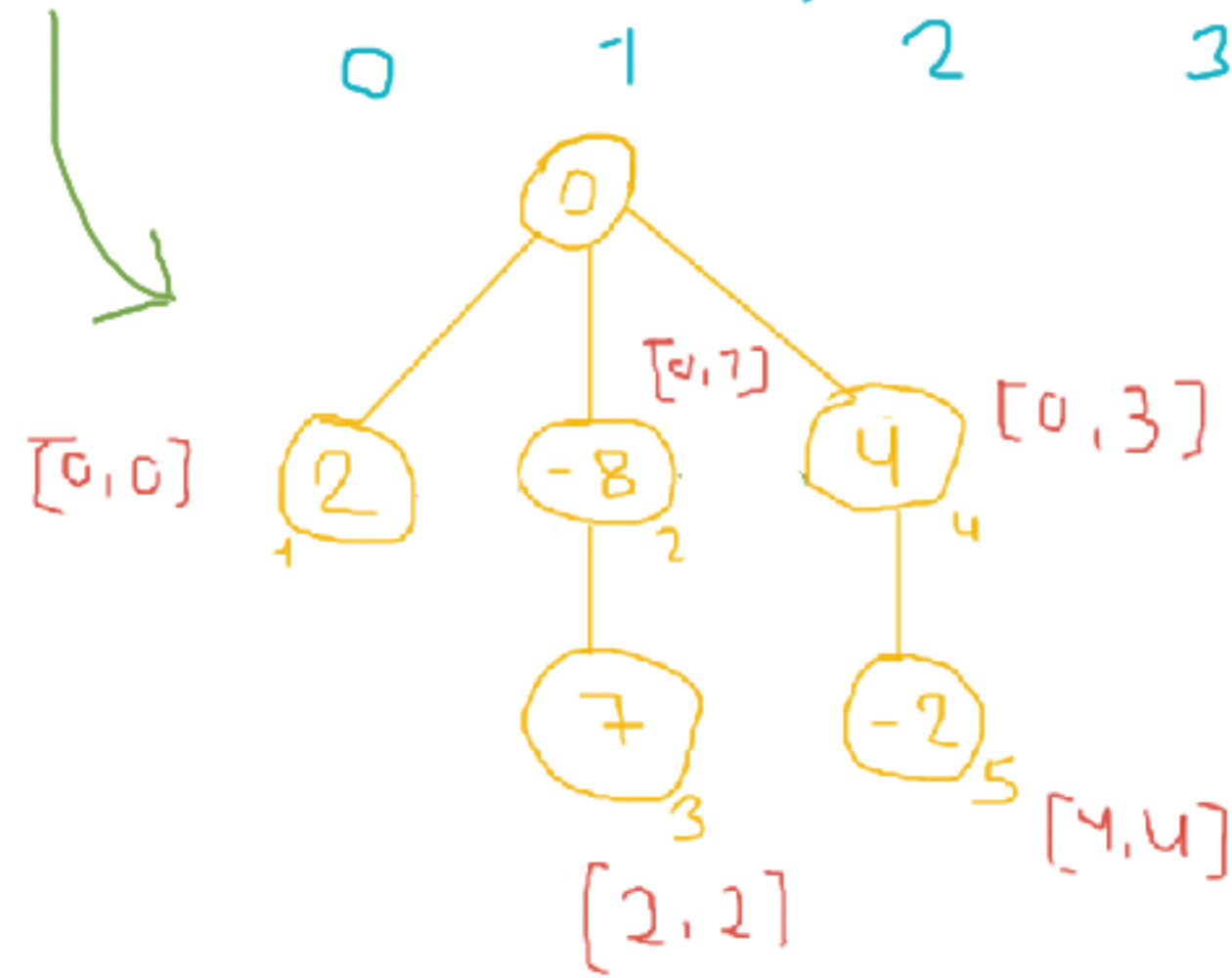
Ejemplo:

$$\begin{aligned} N(1) &= 0001 + 0001 = 2 \\ N(2) &= 0010 + 0010 = 4 \\ N(3) &= 0011 + 0001 = 4 \\ N(4) &= 0100 + 0100 = 8 \\ N(5) &= 0101 + 0001 = 6 \end{aligned}$$





$$A = \{ \underset{0}{2}, \underset{1}{-10}, \underset{2}{7}, \underset{3}{5}, \underset{4}{-2} \}$$



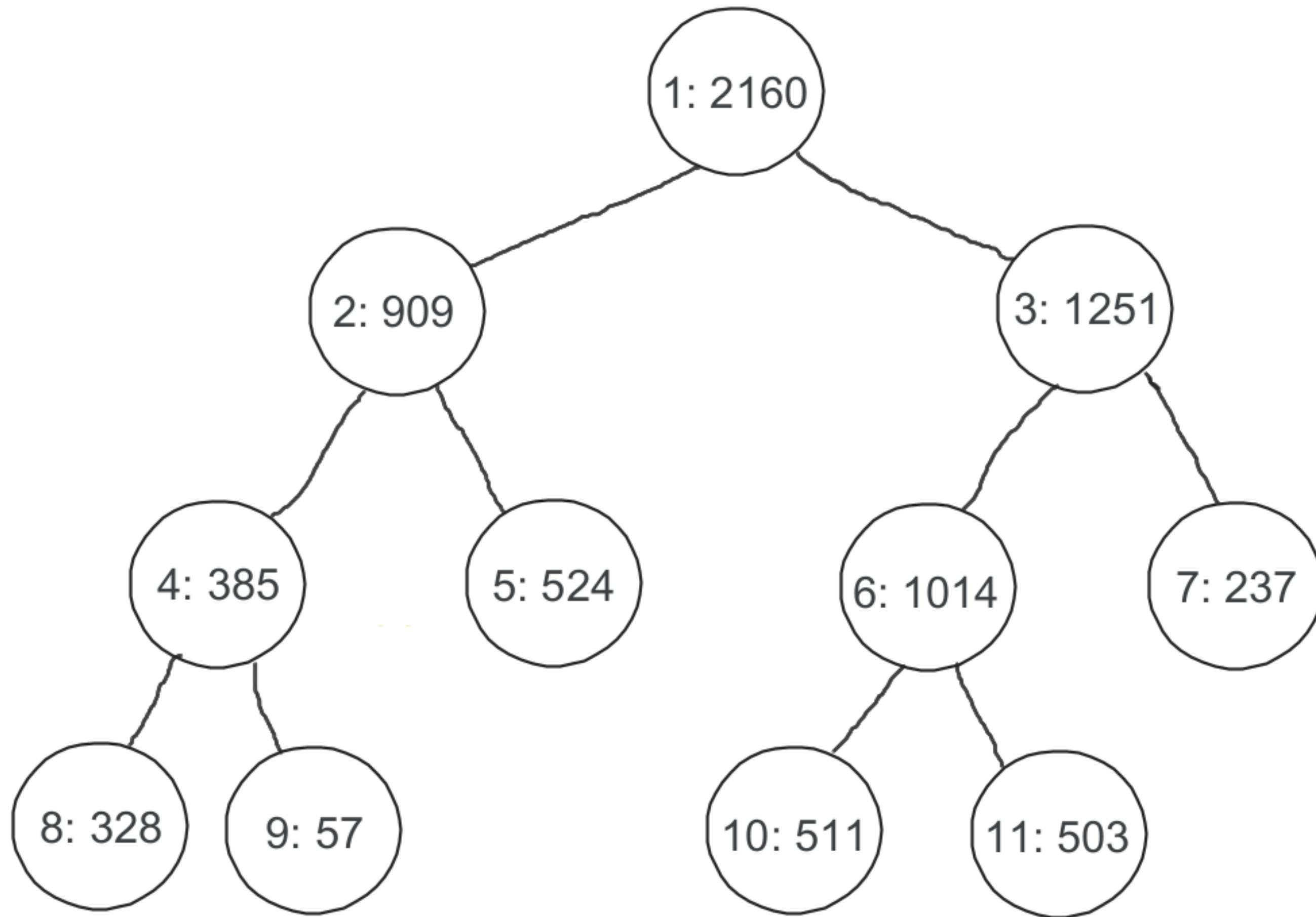
Actualizati A mod 5

$$A = \{ \underset{0}{2}, \underset{1}{\underline{-5}}, \underset{2}{7}, \underset{3}{5}, \underset{4}{-2} \}$$

$$\text{Prop}(1) = 0001 + 0001 = 2$$

$$\text{Prop}(2) = 0010 + 0010 = 4$$

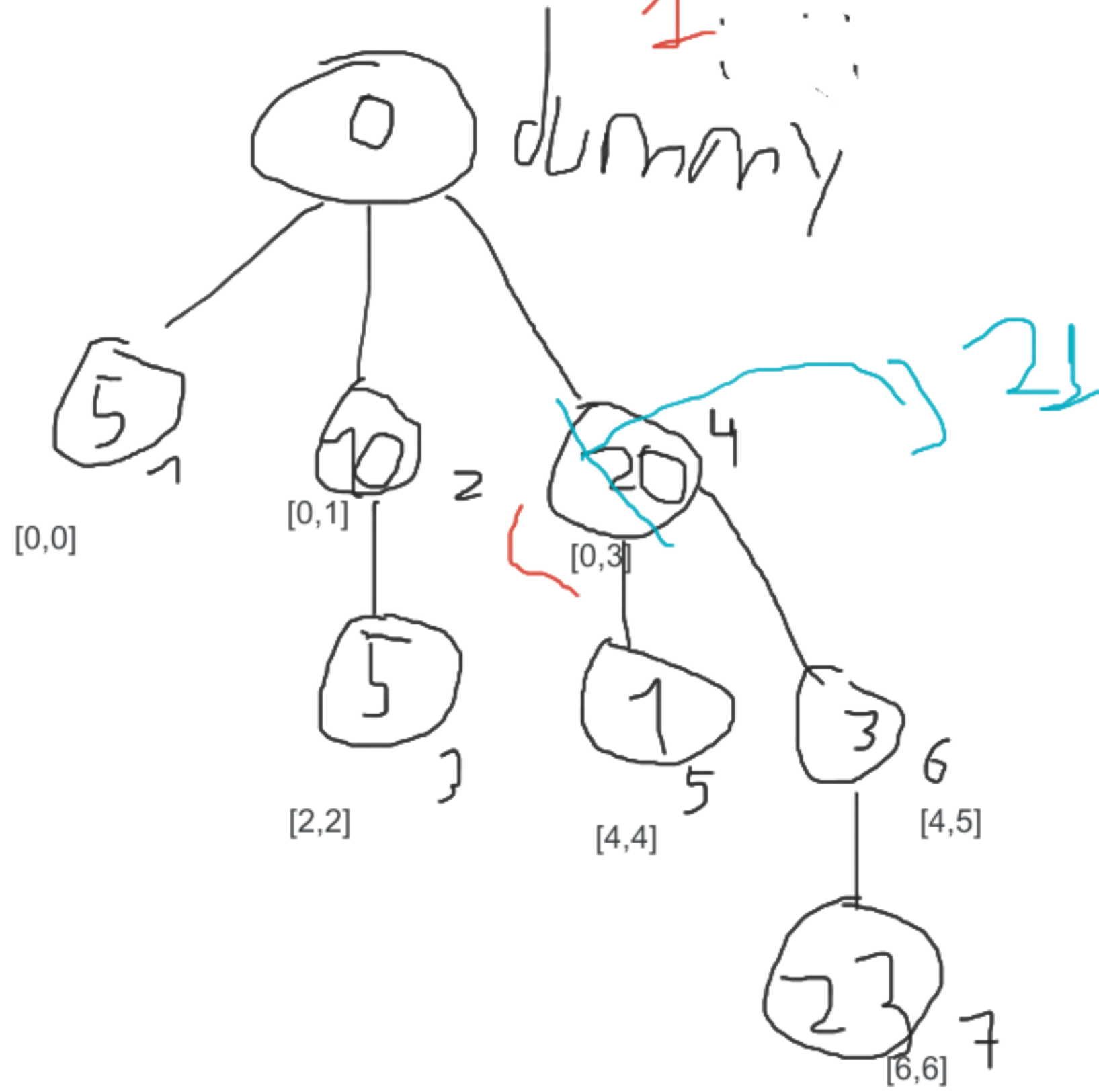
$$\text{Prop}(4) = 0100 + 0100 = 8$$



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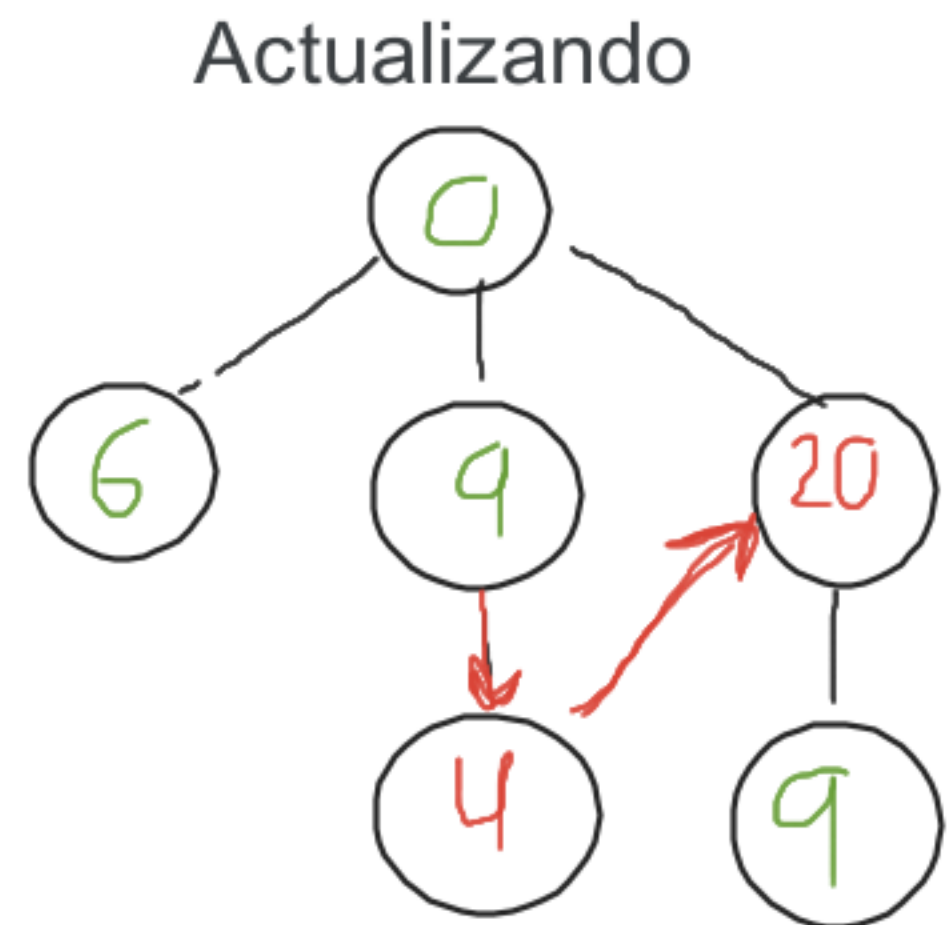
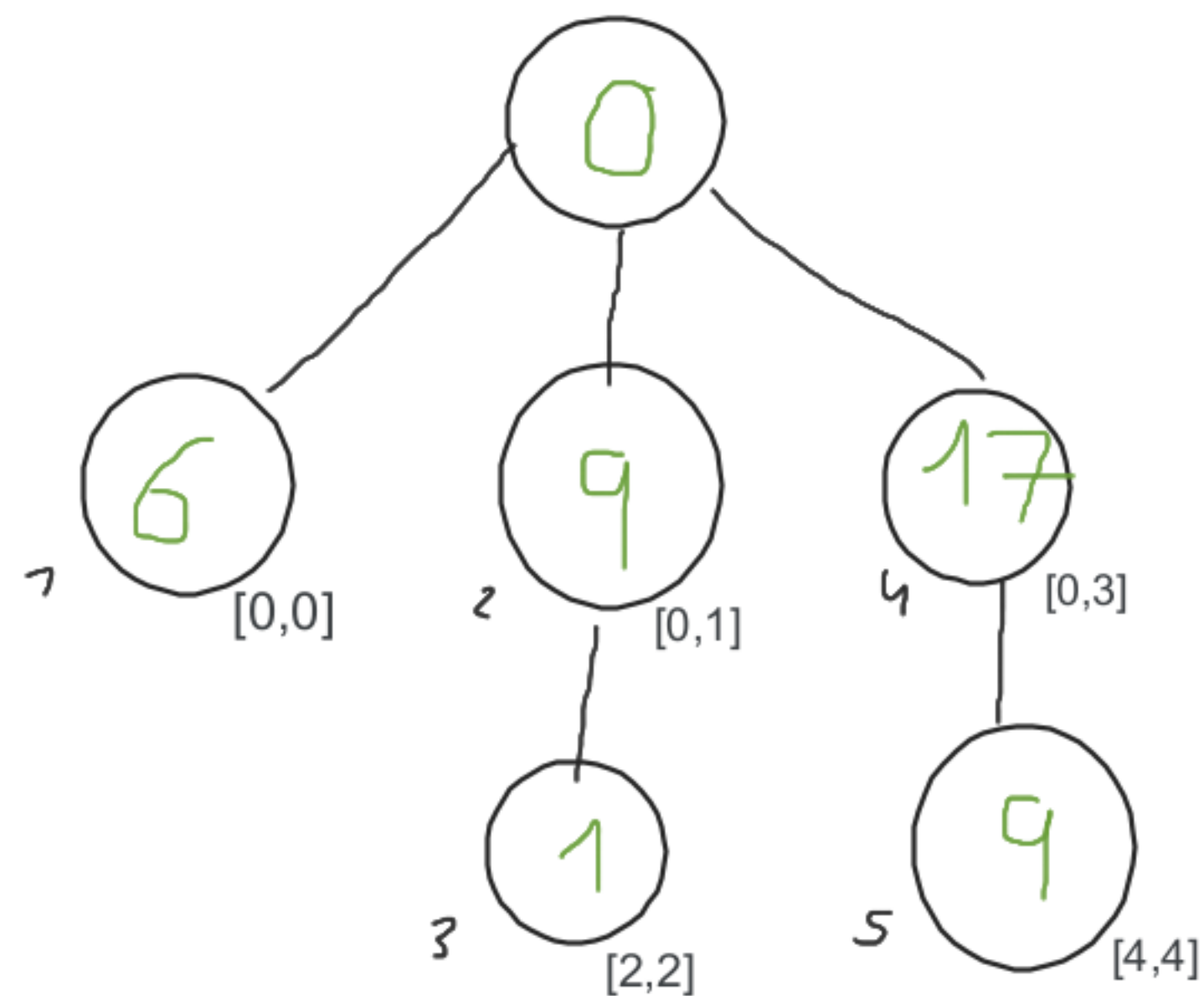
{ 5, 5, 5, 5, 1, 2, 23 }

Índice a actualizar: 3
Nuevo valor: 6



Se altera solo el nodo 4
porque su rango $[0,3]$ incluye 3
la diferencia $\text{dif}(5,6)=1$
 $\text{nodo4}=20 \rightarrow \text{nodo4}+=\text{dif}(5,6)::$
 $\text{nodo4}=21$

0 1 2 3 4
 {0, 3, 1, 7, 9}



Indice: 2

Valor nuevo: 4

$$n(2)=1 \rightarrow n(2)4-1=3$$

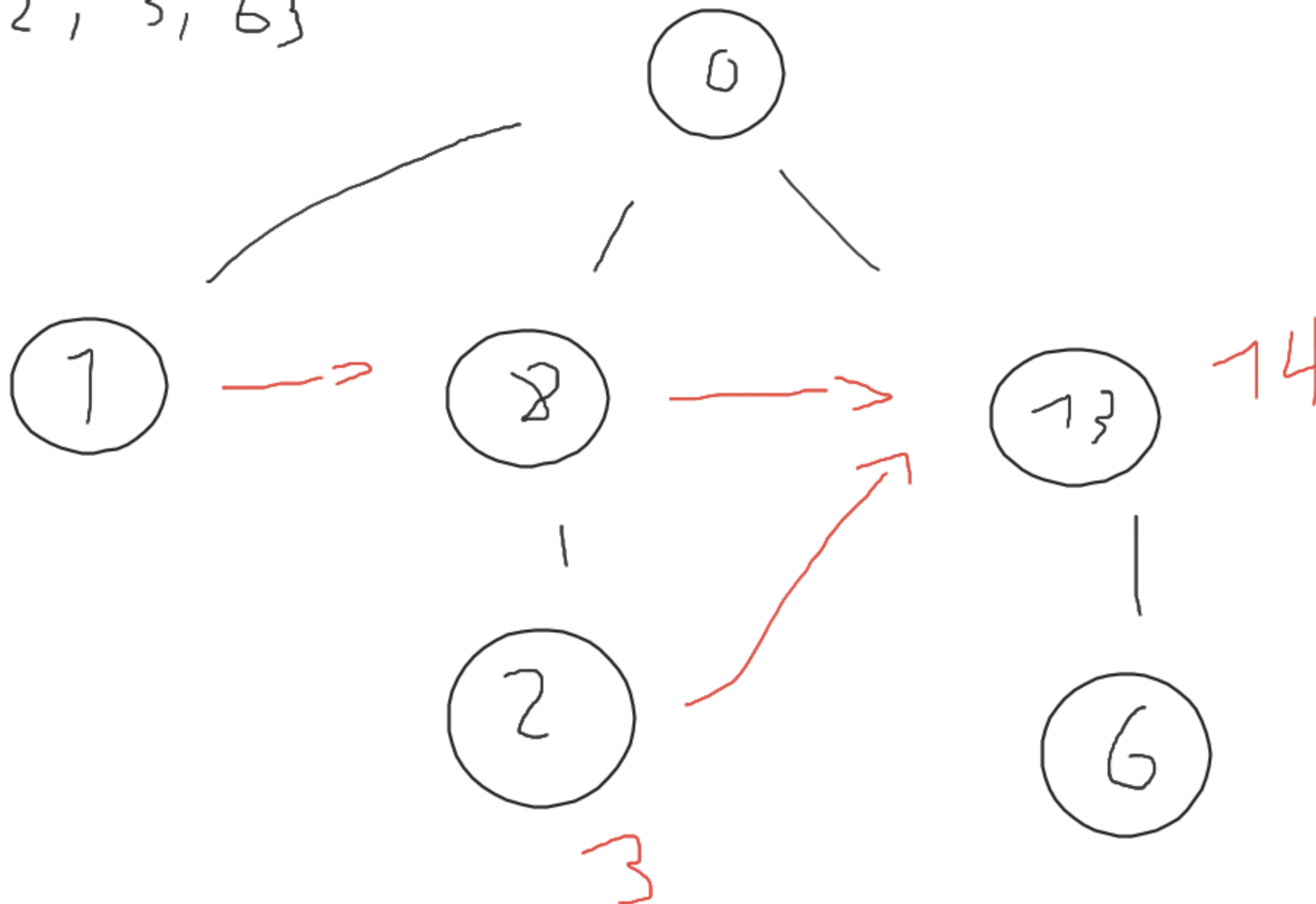
$$\text{nodo } 2 + 3 = 1 + 3 = 4$$

$$\text{nodo } 4 + 3 = 17 + 3 = 20$$

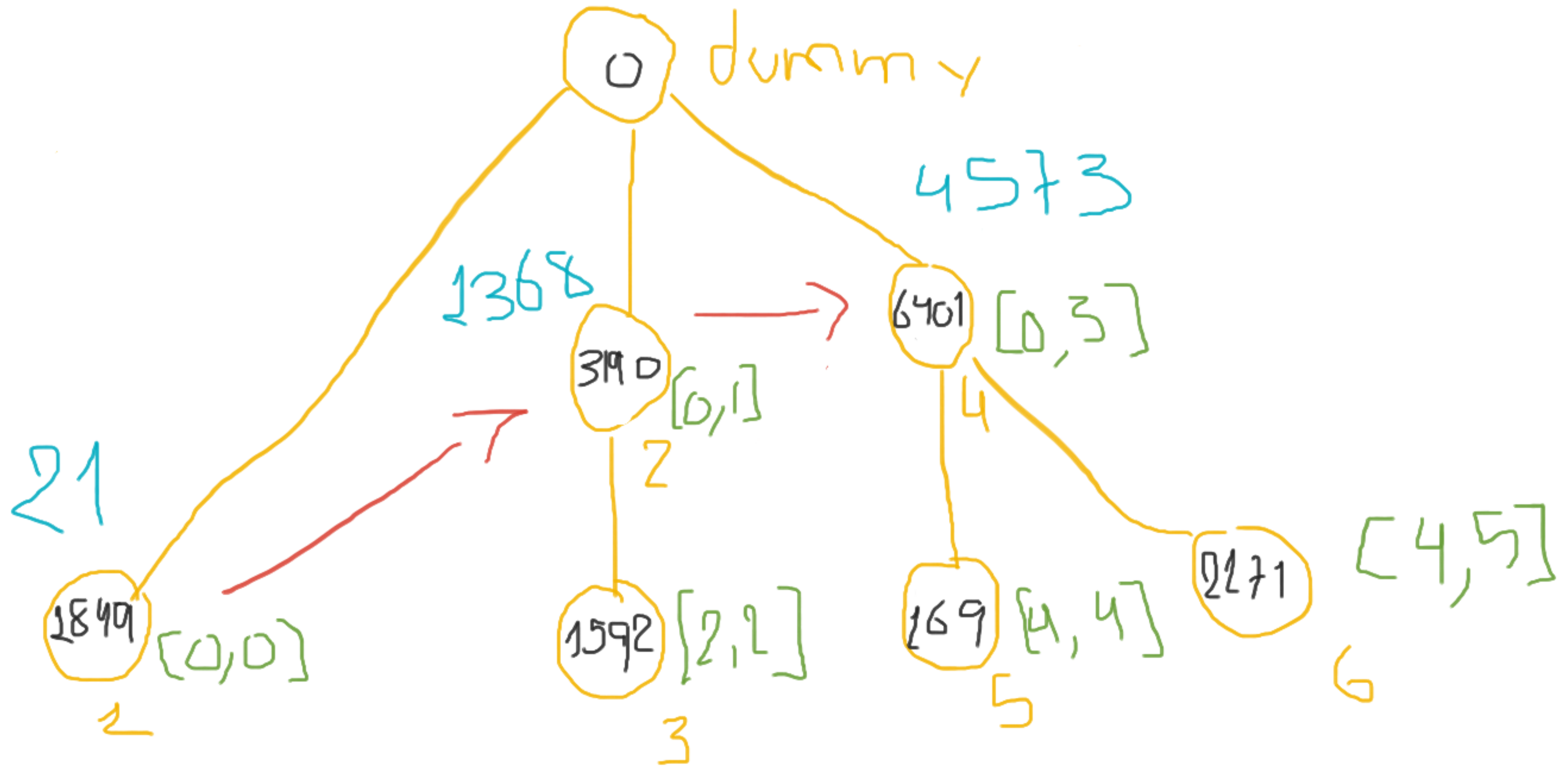
{1, 7, 2, 3, 6}

$n = 3$

$l = 2$

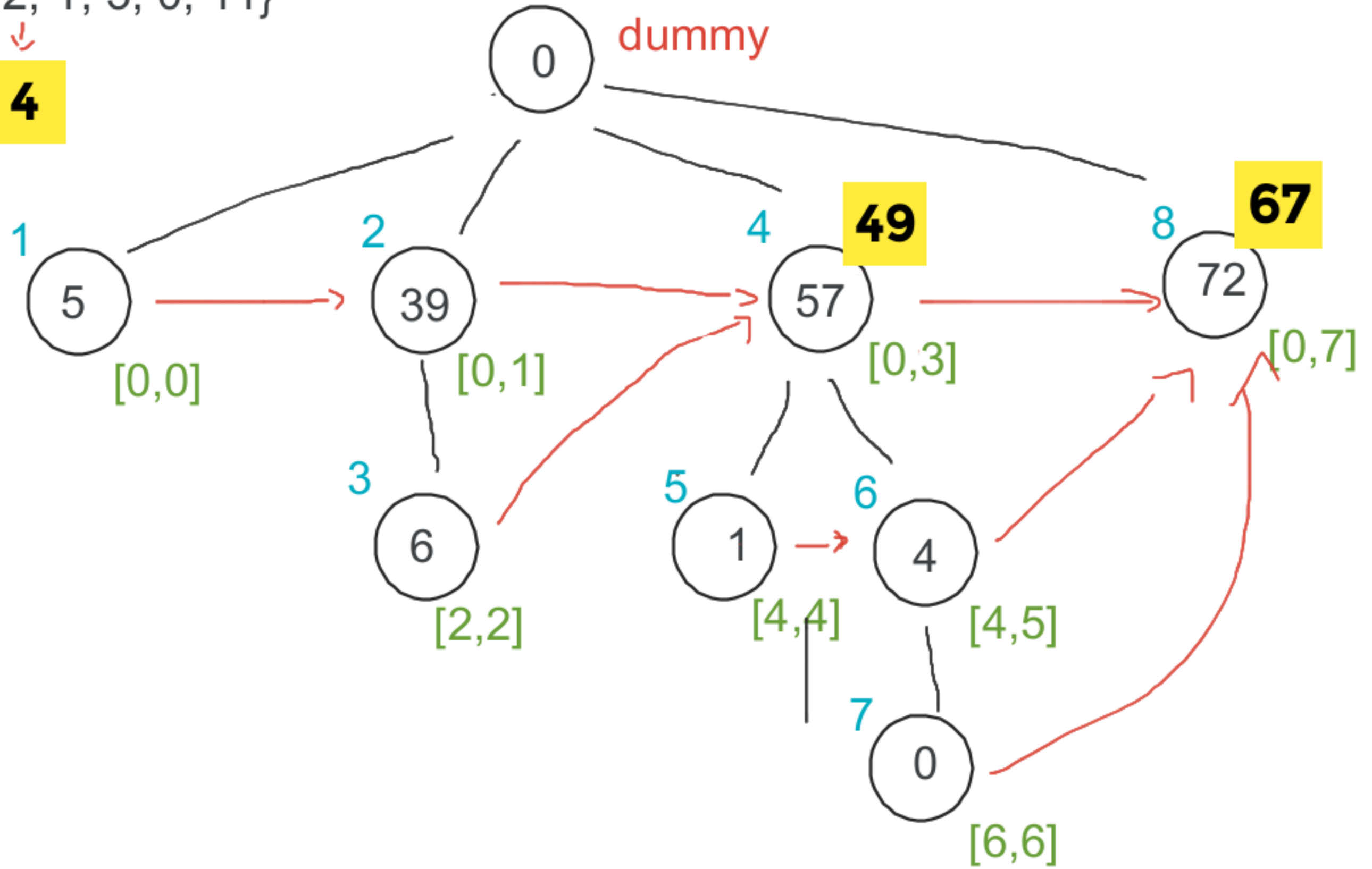


arreglo = { 1849, 3190, 1592, 6401, 169, 2171};



$A = \{5, 34, 6, 12, 1, 3, 0, 11\}$

↓
4



Actualizamos:
índice = 3
valor = 7

diferencia = valor - $A[\text{índice}] = 7 - 12 = -5$

Arreglo={ 4, 2, 1, -5, 8}

