1) i

$$T(n) = \begin{cases} cte_1 & n <= 1 \\ cte_2 + T(n-1) & n > 1 \end{cases}$$

suponiendo que $n > 1$

Paso ①

$$cte_2 + T(n-1)$$

Paso ②

$$cte_2 + [cte_2 + T(n-2)] =$$

$$= 2cte_2 + T(n-2)$$

Paso ③

$$2\,cte_2 + (cte_2 + T(n-3)] =$$

$$= 3cte_2 + T(n-3)$$

Paso i (paso general)

$$T(n) = i.cte_2 + T(n-i)$$

caso base

$$\boxed{n - i <= 1}$$

$$-i <= 1 - n$$

$$i >= n - 1$$

reemplazo i

$$(n-1).cte_2 + T(n-(n-1)) =$$

$$= (n-1)\,cte_2 + cte_1 = T(n)$$

$$O(n)$$

ii.

$$T(n) \begin{cases} cte_1 & , n <= 1 \\ 2 * T(n-1) + cte_2 & , n > 1 \end{cases}$$

suponiendo que $n > 1$

Paso (1)

$$2 * T(n-1) + cte_2$$

Paso (2)

$$2 * [2 * T(n-2) + cte_2] + cte_2 =$$

$$= 4 T(n-2) + 3 cte_2$$

Paso (3)

$$4 [2 * T(n-3) + cte_2] + 3 cte_2 =$$

$$= 8 T(n-3) + 7 cte_2$$

Paso (4)

$$8 [2 * T(n-4) + cte_2] + 7 cte_2 =$$

$$= 16 T(n-4) + 15 cte_2$$

Paso i (paso general)

$$2^i . T(n-i) + (2^i - 1) . cte_2$$

Caso base

$$n - i <= 1$$

$$-i <= 1 - n$$

$$i >= n - 1$$

reemplazo i

$$2^{n-1} . T(n-(n-1)) + (2^{n-1} - 1) cte_2 =$$

$= (2^{n-1}) \cdot cte_1 + (2^{n-1} - 1)\, cte_2 = T(n)$

$\frac{2^n}{2} \cdot cte_1 + \left(\frac{2^n}{2} - 1\right) \cdot cte_2 = 2^n \cdot \frac{cte_1}{2} + \left(\frac{2^n}{2} - 1\right) \cdot cte_2$

$\downarrow$

$O(2^n)$?

Escaneado con CamScanner