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ADA - Práctica 4 ej.: 2.

El algoritmo dado no tiene caso mejor ni peor.

$$C_e(n) = T(n) = \begin{cases} \sum_{i=1}^{n-2} 1 + \sum_{i=0}^{3} T\left(\frac{n}{2}\right) & n > 1 \\ 1 & \leq 1 \end{cases}$$

$$T(n) = n-2 + 4 \cdot T\left(\frac{n}{2}\right) = n-2 + 4 \cdot \left(\frac{n}{2} - 2 + 4 \cdot T\left(\frac{n}{4}\right)\right.$$

$$= \underbrace{n-2} + \underbrace{2n-8} + 16\,T\left(\frac{n}{4}\right) =$$

$$= n-2 + 2n-8 + 16\left(\frac{n}{4} - 2 + 4\,T\left(\frac{n}{8}\right)\right) =$$

$$= \underbrace{n-2} + \underbrace{2n-8} + \underbrace{4 \cdot n - 32} + 64\,T\left(\frac{n}{8}\right)$$

General: (K)

$$\sum_{i=1}^{K-1} \left(2^{i-1} \cdot n - 2 \cdot 4^{i-1}\right) + 4^K T\left(\frac{n}{2^K}\right) \rightarrow$$

$$\longrightarrow \sum_{i=1}^{K-1} 2^{i-1} \cdot n - \sum_{i=1}^{K-1} 2 \cdot 4^{i-1} + 4^K T\left(\frac{n}{2^K}\right) \rightarrow$$

$$\rightarrow n \cdot \frac{2^{(K-1)} - 1}{2-1} - 2 \cdot \frac{4^{(K-1)} - 1}{4-1} + 4^K T\left(\frac{n}{2^K}\right)$$

$$\frac{n}{2^K} = 1 \quad n = 2^K \quad \boxed{\log_2 n = K} \quad \Theta(1)$$

$$\rightarrow n \cdot \left(\frac{2^{\log_2 n}}{2} - 1\right) - 2\,\frac{\frac{4^{\log_2 n}}{4} - 1}{3} + 4^{\log_2 n} \cdot \cancel{T(1)} \Rightarrow$$

$$\Rightarrow n \cdot \left(\frac{n}{2} - 1\right) - \frac{n^2 - 4}{6} + n^2 \in \Theta(n^2)$$

Coste exacto $\Rightarrow \Theta(n^2)$.