

EJERCICIO 2e

$$T(n) = 5T \cdot \left(\frac{n}{2}\right) + n^2$$

$$k=1 \quad T(n) = 5T \cdot \left(\frac{n}{2}\right) + n^2$$

$$k=2 \quad T(n) = 5 \cdot \left[5T \cdot \left(\frac{n}{2}\right) + \left(\frac{n}{2}\right)^2 \right] + n^2 = \underbrace{25T \cdot \left(\frac{n}{4}\right) + \frac{5}{4}n^2 + n^2}$$

$$k=3 \quad T(n) = 25 \cdot \left[5T \cdot \left(\frac{n}{4}\right) + \left(\frac{n}{4}\right)^2 \right] + \frac{5}{4}n^2 + n^2 = 125T \cdot \left(\frac{n}{8}\right) + \left(\frac{25}{16}\right)n^2 + \frac{5}{4}n^2 + n^2$$

$$k=4 \quad T(n) = 125 \cdot \left[5T \cdot \left(\frac{n}{8}\right) + \left(\frac{n}{8}\right)^2 \right] + \left(\frac{25}{16}\right) \cdot n^2 + \frac{5}{4}n^2 + n^2$$

$$= 625T \cdot \left(\frac{n}{16}\right) + \underbrace{\frac{125}{64} \cdot n^2}_{i=3} + \underbrace{\left(\frac{25}{16}\right) \cdot n^2}_{i=2} + \underbrace{\frac{5}{4}n^2}_{i=1} + \underbrace{n^2}_{i=0}$$

k=n

$$T(n) = 5^k T \cdot \left(\frac{n}{2^k}\right) + \sum_{i=0}^{k-1} \left(\frac{5}{4}\right)^i \cdot n^2$$

$$T(1) = T\left(\frac{n}{2^k}\right) = 1 \Rightarrow n = 2^k \Rightarrow \log_2 n = k$$

$$k = \log_2 n$$

$$T(n) = 5^{\log_2 n} \cdot T\left(\frac{n}{2^{\log_2 n}}\right) + \sum_{i=0}^{\log_2 n - 1} \left(\frac{5}{4}\right)^i \cdot n^2$$

$$5^{\log_2 n} \cdot T\left(\frac{n}{n^{\log_2 2}}\right)$$

x propiedad de logaritmo de tabla (Exponente)