Busqueda y ordenación 1

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1

$$t(n) = n + 2 \cdot t(\frac{n}{2}) = n + 2 \cdot (\frac{n}{2} + 2 \cdot t(\frac{n}{4}))$$
$$= 2 \cdot n + 4 \cdot t(\frac{n}{4}) = 2 \cdot n + 4 \cdot (\frac{n}{4} + 2 \cdot t(\frac{n}{8}))$$
$$= 3 \cdot n + 8 \cdot t(\frac{n}{8}) = \cdots$$
$$= k \cdot n + 2^k \cdot t(\frac{n}{2^k})$$

Cuando $k = \log_2 n$:

$$t(n) = \log_2 n \cdot n + 2^{\log_2 n} \cdot t(\frac{n}{2^{\log_2 n}})$$
$$= n \cdot \log_2 n + n \cdot t(1) = n \cdot \log_2 n + n$$

2

$$t(n) = n + t(n-1) = n + n - 1 + t(n-2) = n + n - 1 + n - 2 + t(n-3) =$$
$$\cdots = n + n - 1 + \cdots + n - k + 1 + t(n-k)$$

Cuando $k = n - 1$

$$= n + n - 1 + \cdots + 2 + t(1) = \frac{n^2 + n}{2} = \frac{1}{2}n^2 + \frac{1}{2}n$$