Análisis en detalle "ordenación fusión"

[... transparencias ...]

$T(k) = 2T(k-1) + n_0 2^k$

$T(k) - 2T(k-1) = n_0 2^k$

$a_1 = -2 \quad k=1$

¡¡n_0 es un valor cte!!

$H(k) = n_0 2^k$

$S_1 = 2$

$p(k)$ de grado $=0$

$C(x) = C_1(x)\, C_2(x)$

$C_1(x) = x^1 - 2$

$C_2(x) = (x-2)^1$

$C(x) = (x-2)^2 \Rightarrow r_1 = 2$ de multiplicidad 2

$B = \{2^k, k2^k\} \Rightarrow T(k) = \lambda_1 2^k + \lambda_2 k 2^k = (\lambda_1 + \lambda_2 k)\cdot 2^k$

λ_2 no es libre $\Rightarrow$ sustitución $\boxed{T(k)}$ por $\boxed{\lambda_2 k \cdot 2^k}$ en ecuación original

$$\lambda_2 k 2^k = 2\cdot(\lambda_2 (k-1)\cdot 2^{n-1}) + n_0 2^k$$

$$\lambda_2 k \cancel{2^k} = \lambda_2 \cdot (k-1) \cancel{2^k} + n_0 \cancel{2^k}$$

$$\lambda_2 k = \lambda_2 k - \lambda_2 + n_0$$

$$\lambda_2 = n_0$$

$T(k) = (\lambda_1 + n_0 k) 2^k$

Deshacemos cambio $n_0 2^k = n \Rightarrow 2^k = \frac{n}{n_0} \Rightarrow k = \log_2 \frac{n}{n_0}$

$t(n) = (\lambda_1 + n_0 \cdot \log_2 \frac{n}{n_0}) \cdot 2^{\log_2 \frac{n}{n_0}} = (\lambda_1 + n_0 \cdot \log_2 \frac{n}{n_0}) \cdot \frac{n}{n_0} \Rightarrow O(n \log n)$

$(\lambda_1 \in \mathbb{R})$

continúa detrás

Calculemos una solución particular: $t(n_0) \Rightarrow$ algoritmo inserción

$$t(n_0) = n_0(n_0-1)/2 \Rightarrow \left(\lambda_1 + n_0 \log_2 \frac{n_0}{n_0}\right)\cdot \frac{n_0}{n_0} = \frac{n_0(n_0-1)}{2}$$

$$\left(\lambda_1 + n_0 \cdot \emptyset \right)\frac{n_0}{n_0} = \frac{n_0(n_0-1)}{2}$$

$$\lambda_1 \cdot 1 = \frac{n_0(n_0-1)}{2}$$

$$t(n) = \left(\lambda_1 + n_0(\log_2 n - \log_2 n_0)\right)\frac{n}{n_0} = \left(\lambda_1 + (n_0 \log_2 n - n_0 \log_2 n_0)\right)\frac{n}{n_0} =$$

$$= \frac{n}{n_0}\lambda_1 + n\log_2 n - n \log_2 n_0 = n\left(\frac{\lambda_1}{n_0} - \log_2 n_0\right) + n \log_2 n$$

Sustituimos $\lambda_1 = \dfrac{n_0(n_0-1)}{2}$

$$t(n) = n\left(\frac{\frac{n_0(n_0-1)}{2}}{n_0} - \log_2 n_0\right) + n\log_2 n = n \underbrace{\boxed{\left(\frac{n_0-1}{2} - \log_2 n_0\right)}}_{u(x)} + n\log_2 n$$

Hallamos el mínimo de $u(x)$

[transparencias...]