Clase 10- Algoritmos recursivos

miércoles, 10 de mayo de 2023 17:10

Máximo en un arreglo

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

1 $T(n) = 2T\left(\frac{n}{2}\right) + n$ → pq al llamar llamo con $n/2$

2 $2\left[2T\left(\frac{n}{4}\right) + \boxed{\frac{n}{2}}\right] + n$

3 $4\left[2T\left(\frac{n}{8}\right) + \frac{n}{4}\right] + 2n$

4 $8\left[2T\left(\frac{n}{16}\right) + \frac{n}{8}\right] + \boxed{3n}$

$2^k\ T\left(\frac{n}{2^k}\right) + kn \rightarrow k^{n-1}$

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

$\frac{n}{2^k} = 1$

$n = 2^k$

$k = \log_2(n)$

$$T(n)\begin{cases} c & n <= 1 \\ c_3 + m + m * T(n-1) & n > 1 \end{cases}$$

$T(n)_1 = m\,T(n-1) + c_3 m + c_2$

2 $\quad m\left[m\,T(n-2) + c_3 m + c_2\right] + c_3 m + c_2$?

$\quad m^2\,T(n-2) + c_3 m T + m c_2 + c_3 m + c_2$

3

$$T(n)\begin{cases} 2 & N < 1 \\ T(N-1) + n & N \geq 2 \end{cases}$$

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

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

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

$T(n-3) \quad T(n-2) + n - 1 + n$

$3n - \sum_{j=0}^{3-1} j$

paso i $= T(n-i) + \left(-\sum_{j=0}^{i-1} j\right) + i n$

$\sum_{j=0}^{i-1} j = \sum_{j=1}^{i-1} j = \frac{(i-1)\cdot(i-1+1)}{2} = \frac{(i-1)\cdot i}{2}$

Paso $i = T(n-1) - \frac{(i-1)i}{2} + in$

$n-1=1$

$n-1=i$

$$T(n-(n-1)) - \frac{(n-1-1).(n-1)}{2} + (n-1).n$$

$$T(1) - \frac{(n-2).(n-1)}{2} + (n^2-n)$$

$$T(1) - \frac{1}{2}.(n^2-n-2n+2) + (n^2-n)$$

$$T(1) - \frac{1}{2}(n^2-3n+2) + (n^2-n)$$

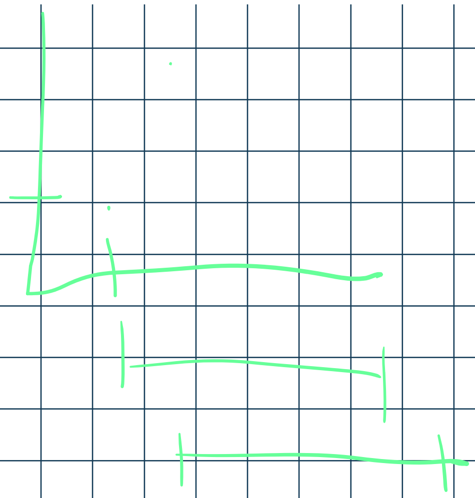
$$2 - \frac{n^2}{2} + \frac{3}{2}n - 1 + n^2 - n$$

$$\frac{n^2}{2} + \frac{n}{2} + 1$$

$$T(n) = \begin{array}{ll} 2 & n=1 \\ \frac{n^2}{2} + \frac{n}{2} + 1 & n \geq 2 \end{array}$$

$$T(n) = \begin{cases} 2 & n=1 \\ \frac{n^2}{2} + \frac{n}{2} + 1 & n > 1 \end{cases}$$

$T(n)$ es $O(n^2) \Longleftrightarrow T(n) \leq C.n^2 \quad \forall \ n > n^0$



no definida p. 0

n0 es desde donde me fijo

$n0 = 2$

$$\frac{n^2}{2} + \frac{n}{2} + 1 \leq c \cdot n^2$$

$$\frac{n^2}{2} \leq c_1 \cdot n^2 \qquad c1 = \frac{1}{2}$$

$$\frac{n}{2} \leq c_2 \cdot n^2 \qquad c2 = 1$$

$$1 \leq c_3 \cdot n^2 \qquad c_3 = 1$$