Parcial 8

Ejercicio 1.

$$T(n) = \begin{cases} c_1 & , n \leq 1 \\ 2T(n/2) + c_2 & , n > 1 \end{cases}$$

Paso 1: $2T(n/2) + C2$

Paso 2: $2[2T(n/2^2) + C_2] + C_2 =$

$= 2^2T(n/2^2) + 3C_2$

Paso 3: $2^2[2T(n/2^3) + C_2] + 3C_2 =$

$= 2^3 T(n/2^3) + 7C_2$

Paso i: $2^i T(n/2^i) + (2^i - 1).C_2$

$n/2^i = 1$ Reemplazo i y n:

$n = 2^i$ $2^{\log_2 n} T(2^i/2^i) + (2^{\log_2 n} - 1).C_2 = n.T(1) + (n-1).C_2 = n.C_1 + n.C_2 - C_2 \therefore O(n)$

$\log_2 n = i$

3. $T(n) = \log_{10}(n)$

1 HORA $- \log_{10}(100) = 2$ operaciones

3 HORAS $- 3.2/1 = 6$ operaciones

$\log_{10}(n) = 6 \Rightarrow$ Propiedad $\log_a b = c \Rightarrow b = a^c$

$n = 10^6$

Rta. el tamaño de entrada va a ser $n = 1000000$

4. 1) $T(n) = 1$ $n = 1$

$T(n) = 5 * T(n/4) + n$ $n \geq 2$

$n = 16$

$T(16) = 5 * T(16/4) + 16 \Rightarrow 5 * 9 + 16 = 61 \Rightarrow$ Opción (d)

$T(4) = 5 * T(4/4) + 4$

$= 5 * T(1) + 4 = 5 * 1 + 4 = 9$

2) $T(n) = c_1 + \sum_{i=1}^{2^n} . \sum_{j=1}^{\log_2 n^2} . cte_1 = c_1 + 2^n . \log_2 n^2 . c_1 \therefore O(2^n . \log_2 n^2)$

3) Opción (f)

4) $T(n) = 1$ $, n = 1$ ... Paso i: $4^i T(n/4^i) + i.n$

$T(n) = 4T(n/4) + n$ $, n \geq 2$ $\rightarrow 4^{\log_4 n} T(1) + \log_4(n).n = n + n.\log_4(n)$