HOJA N°

FECHA

1) cte $- \log_3(n) - \log_2(n) - \log_2^2(n) - \sqrt{n} - n - n^2 - 2^n - 3^n$

2) 1er For:

- paso 1: $j = 4+2 = 6$
- paso 2: $j = 6+2 = 8$
- paso 3: $j = 8+2 = 10$
- paso k: $j = 4+2k$

$4+2k = n$

$k = \frac{n-4}{2}$

2do For: · paso 1: $i=1$

· paso 2: $i=2$

· paso x: $i = j \longrightarrow j$ veces

3er for: n veces.

$$T(n) = \sum_{j=4}^{\frac{n-4}{2}} \left(c_1 + \sum_{i=1}^{j} \left(c_2 + \sum_{k=1}^{n} c_3 \right) \right)$$

c_1: val = 0 ; c_2: val = val + i×j ; c_3: val++

$$= \sum_{j=4}^{\frac{n-4}{2}} \left(c_1 + \left(\sum_{i=1}^{j} c_2 + nc_3 \right) \right) = \sum_{j=4}^{\frac{n-4}{2}} \left(c_1 + \left(jc_2 + jnc_3 \right) \right)$$

$$= \left(\frac{n-4}{2} - 3\right) c_1 + \left(\frac{\frac{n-4}{2} - 3\left(\left(\frac{n-4}{2} - 3\right)+1\right)}{2} \right) + n \cdot \left(\frac{\frac{n-4}{2} - 3\left(\left(\frac{n-4}{2} - 3\right)+1\right)}{2} \right)$$

$$= \frac{1}{2}n - 5 + \frac{\left(\frac{1}{2}n - 1\right)\left(\frac{1}{2}n - 4\right)}{2} + n\frac{\left(\frac{1}{2}n - 1\right)\left(\frac{1}{2}n - 4\right)}{2}$$

$$= \frac{n^3 - 9n^2 + 10n - 24}{8} \Longrightarrow O(n^3)$$

NOTA

3) $T(n) = n \log(n)$

$\rightarrow T(1024) = 1024 \cdot \log(1024) = 1024 \cdot 10 = 10240$

$\rightarrow \frac{10240}{\text{cant. op/s}} = \frac{10240}{40000} = 1{,}024 \text{ Seg.}$

4) $\sum_{i=3}^{8} n \cdot i = n \sum_{i=3}^{8} i = n\left(\sum_{i=1}^{8} i - \sum_{i=1}^{2} i\right) = n\frac{8 \cdot 9}{2} - n\frac{6}{2}$

$= n36 - 3n = 33n$

5) Correctas: a, b, c

6) $T(n) \begin{cases} \text{cte} & , n < 2 \\ (c_1 + T(n/2) + T(n/4) & , n \geq 2 \end{cases}$

Correcta: (c)

7) i) paso 0: $T(n) = T(n/3) + c$

paso 1: $T(n) = T(n/3/3) + 2c$

Correcta: (d)

ii) paso 1: $T(n) = T(n/3) + c$

paso 2: $T(n) = T(n/9) + 2c$

paso 3: $T(n) = T(n/27) + 3c$

paso k: $T(n) = T\left(\frac{n}{3^k}\right) + kc$

$T(n) = 1$ cuando

$\frac{n}{3^k} = 1 \rightarrow 3^k = n$

$\log_3(n) = k$

$\Rightarrow T(n) = T\left(\frac{3^{\log_3(n)}}{3^{\log_3(n)}}\right) + \log_3(n) \cdot c = T(1) + \log_3(n)c$

$= \log_3(n) \cdot c + 1$

HOJA N°

FECHA

8) $T(n) = C_1 + C_2 + \sum_{i=1}^{\frac{n}{2}} (nC_3)$

$= C_1 + C_2 + 2nC_3$

↳ $O(n)$

↳ $T(n) = n$ → 100000 op./s

$T(1000) = 1000$

$\frac{1000}{\text{cant op/s}} = \frac{1000}{100000} = 0{,}01$ seg.

1er for: pasa 0: $i = 0 + \frac{n}{2}$

pasa 1: $i = \frac{n}{2} + \frac{n}{2}$

pasa 2: $i = n$

→ 2 veces

2do for: n veces

9) $T(n) = \begin{cases} 4, & n == 1 \\ 2T(n/2) + 5n + 1, & n \geq 2 \end{cases}$

$T(4) = 2T(4/2) + 2n + 1 = 2T(2) + 21$

$= 2T(1) + 11$

$= 4$

$= 2 \cdot (2 \cdot 4 + 11) + 21$

$= 59$

10) $C_1 + C_2 + \sum_{j=0}^{\log_2(n)} \left(\left(\frac{1}{3} n^2 \right) C_3 + C_4 \right) =$ Sig. Página

For:

pasa 1: $i = n^2 - 3$

" " 2: $i = n^2 - 6$

" " 3: $i = n^2 - 9$

NOTA " k: $i = n^2 - 3 \cdot k$ ⟶

While: pasa 1: $j = 2$

" " 2: $j = 4$

" " 3: $j = 8$

pasa k: $j = 2^k$

$2^k = n$ → $\log_2(n) = k$

$n^2 - 3k = 1$

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

$= T(n) = \log_2(n) \cdot \frac{1}{3} n^2 + \log_2(n)$

Correcta: (d)

11)
1 $C_1 + C_2$
2 paso 1: $i=0$; paso 2: $i=1$; paso 3: $i=2$; paso k: $i = k-1$; $k = n+1 \rightarrow \sum_{i=0}^{n+1}$
3 paso 1: $j=0$; paso 2: $j=1$; paso 3: $j=2$; paso k: $j = k-1$; $k = n+1$ $\sum_{j=0}^{n+1}$
4 C_3

$$T(n) = C_1 + C_2 + \sum_{i=1}^{n+2}(C_3) + \sum_{j=1}^{n+2}(C_4)$$

Va sumado fuera del for ya que, una vez que j llega a n, j no se reincia.

$$= C_1 + C_2 + (n+2)C_3 + (n+2)C_4$$

$$= C_1 + C_2 + nC_3 + 2C_3 + nC_4 + 2C_4 \rightarrow O(n)$$

13)
1 1er For: $n/2$ veces
2 2do For: $(n/2)$ veces

3 3er For: 1er Paso: $k=1$; $1 \leq 3$ ✓
2do Paso: $k=2$; $2 \leq 3$ ✓
3er Paso: $k=4$; $4 \leq 3$ ✗
i paso: $k = 2^{i-1}$; $2^{i-1} = n$
$= \log_2(n) + 1 = i$

4 C_1

$T(n) = (n/2)(n/2)(\log_2(n) \cdot C_1)$
$= \frac{1}{4} n^2 \log_2(n) C_1$
$\Rightarrow O(n^2)$