Tema:

1º $T(n) = nT\left(\frac{n}{2}\right) + n$

- $T(n) = nT\left(\frac{n}{2}\right) + n$ $\qquad T\left(\frac{n}{2}\right) = \frac{n}{2}T\left(\frac{n}{4}\right) + \frac{n}{2}$
- $T(n) = n\left(\frac{n}{2}T\left(\frac{n}{4}\right) + \frac{n}{2}\right) + n$ $\qquad T\left(\frac{n}{4}\right) = \frac{n}{4}T\left(\frac{n}{8}\right) + \frac{n}{4}$
- $T(n) = n\left(\frac{n}{2}\left[\frac{n}{4}T\left(\frac{n}{8}\right) + \frac{n}{4}\right] + \frac{n}{2}\right) + n$

Operando.

$$T(n) = \frac{n^3}{2^3}T\left(\frac{n}{2^3}\right) + \frac{n^3}{2^3} + \frac{n^2}{2^1} + \frac{n^1}{2^0}$$

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

NO RESOLVIBLE.

2º ~~$T(n) = T(\sqrt{n}) + n$~~

$$T(n) = nT\left(\frac{n}{2}\right) + 1$$

$$T(n) = \frac{n^i}{2^i} + \left(\frac{n}{2^i}\right) + i$$

Cambio de Variable:

$$\frac{n}{2^i} = 1 \rightarrow n = 2^i \rightarrow 2n = 2^i$$

$$\rightarrow \log_2 2n = i$$

Reemplazando:

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

$\rightarrow n^2$, $\rightarrow 1$, $\rightarrow n$

$O(n^2) \rightarrow$ complejidad.

Tema:

2) $T(n) = T(\sqrt{n}) + n$.

- $T(n) = T(\sqrt{n}) + n \rightarrow T(n) = T(n^{1/2}) + n$
- $T(n) = T(n^{1/4}) + n^{1/2} + n$
- $T(n) = T(n^{1/8}) + n^{1/4} + n^{1/2} + n$

Factorizando.

$T(n) = T(n^{1/2^3}) + n^{1/2^2} + n^{1/2^1} + n^{1/2^0}$

$T(n) = T(n^{1/2^i}) + \sum_{k=1}^{i} n^{1/2^{k-1}}$

Cambio de Variable:

$n^{1/2^i} = 1$

$n = 1^{1/2^i}$

$\log_1 n = i$

Reemplazando:

$T(n) = T(1) + \sum_{k=1}^{\log_1 n} n^{1/2^{k-1}}$ → n

$O(1 + n)$

$O(n)$ → complejidad.

Tema:

3) $T(n) = T\left(\frac{n}{4\log(n)}\right) + 2n$

- $T(n) = T\left(\frac{n}{4\log n}\right) + 2n$ $\quad T\left(\frac{n}{4\log n}\right) = T\left(\frac{\frac{n}{4\log n}}{4\log\left(\frac{n}{4\log n}\right)}\right) + 2\cdot\frac{n}{4\log n}$
- $T(n) = T\left(\frac{\frac{n}{4\log n}}{\log\left(\frac{n}{\log n}\right)}\right) + \frac{2n}{\log(n)} + 2n$

$O(?)$

4) $T(n) = T(\sqrt{n}) + 1$

- $T(n) = T(n^{1/2}) + 1$
- $T(n) = T(n^{1/4}) + 2$
- $T(n) = T(n^{1/8}) + 3$

Reemplazamos

$T(n) = T(n^{\frac{1}{2}\log_2 n}) + \log_2 n$ (1, c)

$T(n) = 1$

$O(1)$

Factorizamos

$T(n) = T(n^{1/2^i}) + i$

$\log_2 n = i$

5) $T(n) = n \cdot T(\sqrt{n}) + 1$

- $T(n) = n \cdot T(n^{1/2}) + 1$
- $T(n) = n^{1/2} \cdot T(n^{1/4}) + 2$
- $T(n) = n^{1/4} \cdot T(n^{1/8}) + 3$

Factorizamos.

$T(n) = n^{1/2^{i-1}} \cdot T(n^{1/2^i}) + i$

$2\log n = 2^i$

Reemplazamos. (n, 1, n)

$T(n) = n^{\frac{1}{2}\log n - 1} \cdot T(2^{\log n}) + 2\log(n)$

$T(n) = n \cdot 1 + n^2$

$O(n^2)$