1) $T(n) = \begin{cases} c & \text{si } n=1 \\ c + T\left(\frac{n}{8}\right) & \text{si } n \geq 2 \end{cases}$

paso 1 $\qquad c + T\left(\frac{n}{8}\right)$

paso 2 $\qquad c + \left[c + T\left(\frac{n}{64}\right)\right] =$

$= 2c + T\left(\frac{n}{64}\right)$

paso i $\qquad ic + T\left(\frac{n}{8^i}\right)$

caso base $\frac{n}{8^i} = 1$

$$n = 8^i$$

$$\log_8(n) = i$$

reemplazo (i)

$$\log_8(n).c + T\left(\frac{n}{8^{\log_8(n)}}\right) =$$

$$= \log_8(n).c + T(1) =$$

$$= \boxed{\log_8(n).c + c = T(n)}$$

$$O\left(\log_8(n)\right)$$ $\boxed{\text{RES} \Rightarrow 1}$

2) $(\sqrt{n} + 2)(n+5) =$

$$\sqrt{n}.n + 5\sqrt{n} + 2n + 10$$

$O\,\boxed{\sqrt{n}.n}$ $\boxed{\text{RES} \Rightarrow 3}$

3) $T(n) = \sum_{i=1}^{n} \left(cte_1 + \sum_{j=i}^{n^3} cte_2 \right) =$

$$= \sum_{i=1}^{n} \left(cte_1 + \left(\sum_{j=1}^{n^3} cte_2 - \sum_{j=1}^{i-1} cte_2 \right) \right) =$$

$$= \sum_{i=1}^{n} \left(cte_1 + n^3 . cte_2 - (i-1) . cte_2 \right) =$$

$$= \sum_{i=1}^{n} cte_1 + \sum_{i=1}^{n} n^3 . cte_2 - \sum_{i=1}^{n} (i-1) . cte_2$$

$$= n\, cte_1 + n^4 . cte_2 - cte_2 . \left(\sum_{i=1}^{n} i - n \right) =$$

$$= n\, cte_1 + n^4 . cte_2 - cte_2 . \left(\frac{(n).(n+1)}{2} - n \right) =$$

$$= n . cte_1 + n^4 . cte_2 - cte_2 . \left(\frac{n^2 + n - 2n}{2} \right) =$$

$$= n . cte_1 + n^4 . cte_2 - cte_2 . \frac{n^2 - n}{2} =$$

$$= n + n^4 - \frac{1}{2} . (n^2 - n) =$$

$= n + n^4 - \frac{1}{2}n^2 + \frac{1}{2}n =$

$= n^4 - \frac{1}{2}n^2 + 1n + \frac{1}{2}n =$

$= \boxed{n^4 - \frac{1}{2}n^2 + \frac{3}{2}n} = T(n)$

$\boxed{\text{RES} \rightarrow 2}$

4) $T(n) = \sum_{i=1}^{n+100} \left(\sum_{k=1}^{3n} cte \right) =$

$= \sum_{i=1}^{n+100} 3n.cte =$

$= (n+100) . 3n.cte =$

$= n.3n.cte + 100\, 3n.cte =$

$= 3n^2\, cte + 300\, n.cte = T(n)$

$O(n^2)$ $\boxed{\text{RES} \rightarrow 4}$

Escaneado con CamScanner

5) algoritmo A $T(n) = \log_2(n)$

PC 1.000 op x seg

Si $n = 1024$

$T(1024) = \log_2(1024) = 10$

1000 —— 1 seg

10 —— 0,01 seg

$\boxed{\text{RES} \longrightarrow 1}$

6) $$T(n) = c + \sum_{i=1}^{\log_2(n)} \sum_{j=1}^{\frac{n}{2}} \sum_{k=1}^{n+1} 1 =$$

$$= c + \sum_{i=1}^{\log_2(n)} \sum_{j=1}^{\frac{n}{2}} n+1 =$$

$$= c + \sum_{i=1}^{\log_2(n)} \frac{n}{2} \cdot (n+1) =$$

$$= c + \log_2 n \cdot \frac{n}{2} \cdot (n+1)$$

$\boxed{\text{RES} \rightarrow 5}$

7) $T(n) = \sum_{j=1}^{\log 2(n)} \sum_{i=1}^{\log 2(n)} 1 =$

$= (\log 2(n))^2$

RES 3 supongo

8) $T(n) = \begin{cases} c & \text{si } n \leq 2 \\ c + T(n-3) & \text{si } n \geq 3 \end{cases}$

paso ① $c + T(n-3)$

paso ② $c + [c + T(n-6)] = 2c + T(n-6)$

paso i $\quad ic + T(n-3i)$

caso base $\quad n-3.i <= 2$

$$n <= 2+3i$$

$$n-2 <= 3i$$

$$\frac{n-2}{3} <= i$$

reemplazo i $\quad \frac{n-2}{3}c + T\left(n-3.\left(\frac{n-2}{3}\right)\right) =$

$$= \frac{n-2}{3}c + c =$$

$$= \left(\frac{n}{3} - \frac{2}{3}\right).c + c =$$

$$= \frac{n}{3}c - \frac{2}{3}c + c$$

$\boxed{O(n)}$ res $\to$ ol