EJERCICIO 7

a. $\sum_{i=1}^{n} cte = n \cdot cte \therefore O(n)$

b. $(K)\ i = 2(K-1)$ → $\sum_{i=1}^{(n+1)/2} cte = cte \cdot (n+1)/2 = cte/2 \cdot n + cte/2 \therefore O(n)$

$2(K-1) = n-1$

$K = (n+1)/2$

c.

Sumatoria externa:

(1) $i = 0$
(2) $i = 1$
(3) $i = 2$
...
$(K)\ i = K-1$

$K-1 = n-1$
$K = n$

Sumatoria interna:

(1) $j = 0$
(2) $j = 1$
(3) $j = 2$
...
$(K)\ j = K-1$

$K-1 = n-1$
$K = n$

→ $\sum_{i=1}^{n} \cdot \sum_{j=1}^{n} cte = \sum_{i=1}^{n} n \cdot cte = n \cdot n \cdot cte = n^2 \cdot cte \therefore O(n^2)$

d.

Sumatoria externa:

(1) $i = 0$
(2) $i = 1$
(3) $i = 2$
...
$(K)\ i = K-1$

$K-1 = n+99$

$K = n+100$

Sumatorias internas:

(1) $j = 0$
(2) $j = 1$
(3) $j = 2$
...
$(K)\ j = K-1$

$K-1 = (i \cdot n)-1$

$K = i \cdot n$

(1) $K = 0$
(2) $K = 1$
(3) $K = 2$
...
$(K)\ K = K-1$

$K-1 = (3 \cdot n)-1$

$K = 3n$

GUAYMAS

$$T(n) = \sum_{i=1}^{n+100} \cdot \left(\sum_{j=1}^{i.n} cte_1 + \sum_{k=1}^{3n} .cte_2 + cte_3 \right) = \quad \text{↑ CONDICIÓN DEL FOR}$$

$$= \sum_{i=1}^{n+100} \cdot \left(i.n.cte_1 + 3n.cte_2 + cte_3 \right)$$

$$= \sum_{i=1}^{n+100} in\, cte_1 + \sum_{i=1}^{n+100} 3n\, cte_2 + \sum_{i=1}^{n+100} cte_3$$

$$= n.cte_1 . \sum_{i=1}^{n+100} i + 3n.cte_2 .(n+100) + (n+100)cte_3$$

$$= n.cte_1 . \left(\frac{(n+100).(n+100+1)}{2} \right) + 3n^2 cte_2 + 300n\, cte_2 + n\, cte_3 + 100\, cte_3$$

$$= n.cte_1 . \left(\frac{n^2 + 201 + 10100}{2} \right) + 3n^2 cte_2 + 300n\, cte_2 + n.cte_3 + 100\, cte_3$$

↳ El primer termino da como resultado $n^3.cte_1 \ldots \therefore O(n^3)$

e. Sumatoria externa:

(1) $i = 0$

...

(K) $i = K-1$

$K = n$

Sumatoria interna:

(1) $j = 0$

...

(K) $j = K-1$

$K = n$

↳ $\sum_{i=1}^{n} \cdot \sum_{j=1}^{n} c_1 + \sum_{i=1}^{n} c_2 = n.n.c_1 + n.c_2 = n^2 c_1 + n.c_2 \therefore O(n^2)$

f. Sumatoria externa:

(1) $i = 0$

(2) $i = 2$

(3) $i = 4$

...

(K) $i = 2(K-1)$

$2.(K-1) = n^2$

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

Sumatoria interna:

(1) $j = N$

(2) $j = 3/4N$

(3) $j = 1/2N$

(4) $j = 1/4N$

(5) $j = 0$

$k = 4$ Itera solo 4 veces el FOR

↳ $T(n) = c_1 + \sum_{i=1}^{n^2/2} \cdot \left(\sum_{j=1}^{4} c_2 \right) = c_1 + \sum_{i=1}^{n^2/2} 4c_2 = c_1 + \frac{n^2}{2} . 4c_2 \therefore O(n^2)$