

Universidad de San Buenaventura

Facultad ingeniería de sistemas



**UNIVERSIDAD DE
SAN BUENAVENTURA
CALI**

Taller 2 Corte 2

Análisis de algoritmos

Presenta:

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METODO DE ITERACIÓN:

PUNTO 1:

$$\begin{aligned}
 1) \quad T(n) &= 3T(n/4) + n \\
 T(n) &= n + 3T(n/4) \\
 T(n) &= n + 3(n/4 + 3T(n/16)) \\
 T(n) &= n + \frac{3n}{4} + 9T(n/16) \\
 T(n) &= n + \frac{3n}{4} + 9(n/16 + 3T(n/64)) \\
 T(n) &= n + \frac{3n}{4} + \frac{9n}{16} + \frac{27n}{64} \dots + \frac{3^k \cdot n}{4^k} \cdot T(n/4^k)
 \end{aligned}$$

$$\begin{aligned}
 &\sum_{i=0}^{\log_4(n)-1} \frac{3^i}{4^i} \cdot n + \frac{3^{\log_4(n)} \cdot n}{4^{\log_4(n)}} \cdot T(n/4^{\log_4(n)}) \\
 &\sum_{i=0}^{\log_4(n)-1} \left[\frac{3}{4} \right]^i \cdot n + \frac{3^{\log_4(n)} \cdot n}{4^{\log_4(n)}} \cdot T(1)
 \end{aligned}$$

$$\begin{aligned}
 a &= n \quad r = 3/4 \\
 k &= i \quad n = \log_4(n) - 1
 \end{aligned}$$

$$\left\{ \frac{n \left(\frac{3}{4} \right)^{\log_4(n)} - n}{\frac{3}{4} - 1} \right.$$

$$\begin{aligned}
 &\frac{n \left(\frac{3}{4} \right)^{\log_4(n)} - n}{\frac{3}{4} - 1} + 3^{\log_4(n)} \cdot T_1 \\
 &- 4 \cdot \left(n \cdot \left(\frac{3}{4} \right)^{\log_4(n)} - n \right) + 3^{\log_4(n)} \cdot T_1 \\
 &- 4n \left(n^{\log_4(3/4)} \right) + 4n + 3^{\log_4(n)} \cdot 12 \\
 &- 4n \left(n^{\log_4(3/4)} \right) + 4n + 12 \cdot n^{\log_4(n)}
 \end{aligned}$$

PUNTO 2.

2) $T(n) = n + 1 + 4T(n/8)$

$T(n) = n + 1 + 4(n/8 + 1 + 4T(n/8))$

$T(n) = n + 1 + n/2 + 4 + 16T(n/8)$

$T(n) = n + 1 + n/2 + 4 + 16(n/8^2 + 1 + 4T(n/8^2))$

$T(n) = n + 1 + n/2 + 4 + n/4 + 16 + 64T(n/8^3)$

$T(n) = n + 1 + n/2 + 4 + n/4 + 16 + 64(n/8^3 + 1 + 4T(n/8^4))$

$T(n) = n + 1 + n/2 + 4 + n/4 + 16 + n/8 + 64 + 256T(n/8^4)$

...

$T(n) = \left[\frac{n}{2^0} + \frac{n}{2^1} + \frac{n}{2^2} + \dots + \frac{n}{2^k} \right] + [4^0 + 4^1 + 4^2 + \dots + 4^k] + 4^k T(n/8^k)$

$T(n) = \sum_{i=0}^{\log_8(n)-1} \frac{n}{2^i} + \sum_{i=0}^{\log_8(n)-1} 4^i + 4^{\log_8(n)} \cdot T(1)$

$T(n) = n(2^{\log_8(n)} - 1) + \frac{n(4^{\log_8(n)} - 1)}{3} + 14 \cdot n^{2/3}$

$R// \frac{n(2^{\log_8(n)} - 1) + n(4^{\log_8(n)} - 1)}{3} + 14 \cdot n^{2/3}$

$T(1) = 14$

$\frac{n}{8^k} = 1$

$k = \log_8(n)$

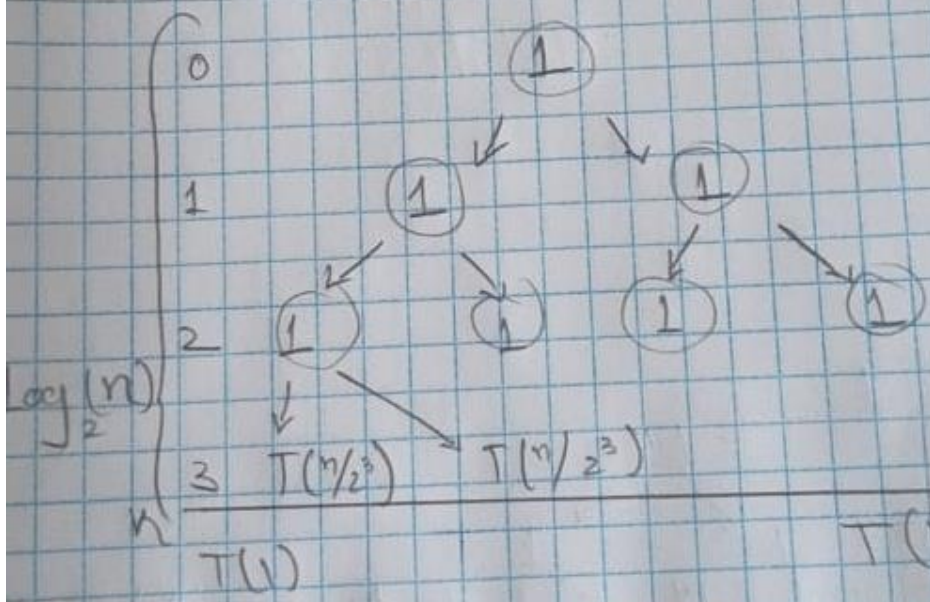
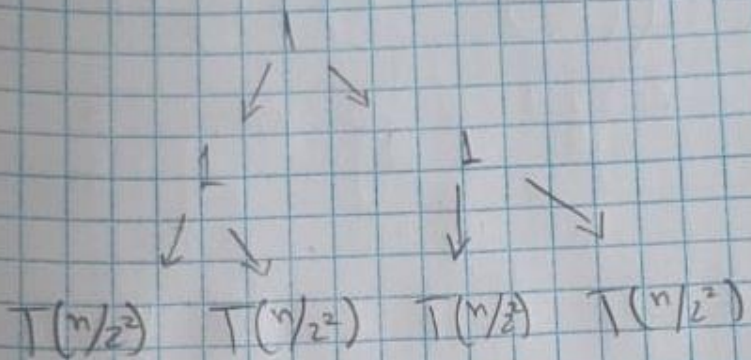
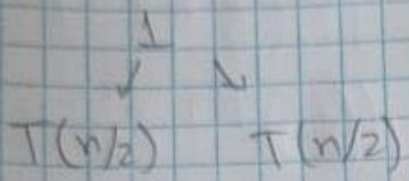
PUNTO 3.

$$\sum_{i=0}^{\log_8(n)-1} \frac{n}{2^i} = \sum_{i=0}^{\log_8(n)-1} n \cdot 2^{-i}$$
$$a = n$$
$$r = 2$$
$$K = -1$$
$$n = \log_8(n) - 1$$
$$= \frac{n \cdot 2^{\log_8(n)}}{2-1} - n = n(2^{\log_8(n)} - 1)$$

$$\sum_{i=0}^{\log_8(n)-1} 4^i =$$
$$a = n$$
$$r = 4$$
$$K = -1$$
$$n = \log_8(n) - 1$$
$$\frac{n \cdot 4^{\log_8(n)} - n}{4-1} = \frac{n(4^{\log_8(n)} - 1)}{3}$$

PUNTO 4:

$$T(n) = T(n/2) + 1 \quad T(1) = 1$$



$$\Rightarrow \log_2(n) \cdot T(1)$$

$$T(n/2^h) \rightarrow 1$$

$$1 = n/2^h$$

$$h = \log_2(n)$$

$$\Rightarrow \log_2(n) * 1$$

PUNTO 5:

