Universidad de San Buenaventura

Facultad ingeniería de sistemas

Taller 2 Corte 2

Análisis de algoritmos

Presenta:

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METODO DE ITERACIÓN:

PUNTO 1:

1) $T(n) = 3T(n/4) + n$

$$T(n) = n + 3T(n/4)$$

$$T(n) = n + 3\left(n/4 + 3T(n/16)\right)$$

$$T(n) = n + \frac{3n}{4} + 9T(n/16)$$

$$T(n) = n + \frac{3n}{4} + 9\left(n/16 + T(n/4^3)\right)$$

$$\cdots$$

$$T(n) = \underbrace{n + \frac{3n}{4} + \frac{9n}{16} + \frac{27n}{64} \cdots}_{} + \frac{3^k \cdot n}{4^k} \cdot T(n/4^k)$$

$$\frac{n}{4^k} = 1 \qquad k = \log_4(n)$$

$$\sum_{i=0}^{\log_4(n)-1} \frac{3^i}{4^i} \times n + \frac{3^{\log_4(n)} \cdot n}{4^{\log_4(n)}} \cdot T(n/4^{\log_4 k})$$

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

$$a = n \quad r = 3/4$$

$$k = i \quad n = \log_4(n) - 1$$

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

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

$$-4\cdot\left(n\cdot(3/4)^{\log_4(n)} - n\right) + 3^{\log_4(n)} \cdot T_1$$

$$-4n\left(n^{\log(3/4)}\right) + 4n + 3^{\log_4(n)} \cdot 12$$

$$-4n\left(n^{\log(3/4)}\right) + 4n + 12 \cdot n^{\log_4(3)}$$

PUNTO 2.

2)

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

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

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

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

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

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

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

$$\cdots$$

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

$T(1) = 14$

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

$K = \log_8(n)$

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

$$14\cdot n^{\log_8(4)}$$

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

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

PUNTO 3.

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

$a = n$
$r = 2$
$K = -i$
$n = \log_8(n) - 1$

$$= \frac{n \cdot 2^{\log_8(n)} - n}{2-1} = n(2^{\log_8(n)} - 1)$$

$$\sum_{i=0}^{\log_8(n)-1} 4^i =$$

$a = n$
$r = 4$
$K = -i$
$n = \log_8(n) - 1$

$$\frac{n \cdot 4^{\log_8(n)} - n}{4-1} = \frac{n(4^{\log_8(n)} - 1)}{3}$$

PUNTO 4:

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

1

$T(n/2) \qquad T(n/2)$

1

1 $\qquad$ 1

$T(n/2^2) \quad T(n/2^2) \quad T(n/2^2) \quad T(n/2^2)$

0 $\qquad$ 1

1 $\qquad$ 1 $\qquad$ 1

2 $\qquad$ 1 $\qquad$ 1 $\qquad$ 1 $\qquad$ 1

$\log_2(n)$

3 $\qquad T(n/2^3) \quad T(n/2^3)$

k

$T(1) \qquad\qquad T(n/2^k)$

$\hookrightarrow 1$

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

$1 = n/2^k$

$k = \log_2(n)$

$\Rightarrow \log_2(n) * 1$

PUNTO 5: