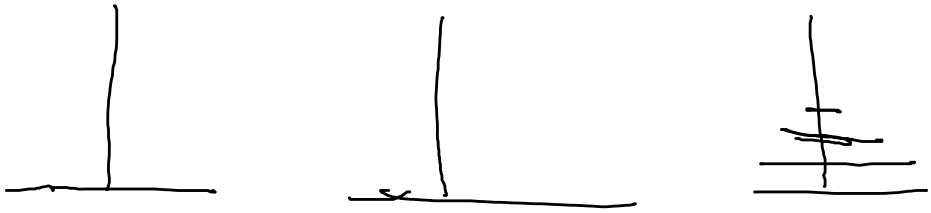
Özyineleme seans 3

10 Mart 2022 Perşembe 15:24



$$T(n) = 2T(n-1) + 1, \quad T(1) = 1$$

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

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

$$= 4T(n-2) + 2 + 1$$

$$T(n-2) = 2T(n-3) + 1$$

$$= 4(2T(n-3) + 1) + 2 + 1$$

$$1 + 2 + 4 + \dots$$

$$= 8\cdot T(n-3) + 4 + 2 + 1$$

$$2^0 + 2^1 + 2^2 + \dots + 2^{i-1}$$

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

$$\sum_{k=0}^{i-1} 2^i = 2^i - 1$$

$$n - i = 1$$

$$i = n - 1$$

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

$$= 2^{n-1} + 2^{n-1} - 1 = 2^n - 1$$

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

$$T\left(\frac{n}{2}\right) = T\left(\frac{n}{4}\right) + 1$$

$$= T\left(\frac{n}{4}\right) + 1 + 1$$

$$T\left(\frac{n}{4}\right) = T\left(\frac{n}{8}\right) + 1$$

$$= T\left(\frac{n}{8}\right) + 1 + 1 + 1$$

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

$$\frac{n}{2^i} = 1, \quad 2^i = n$$

$= \cancel{T(1)} + \log_2 n$

$= \log_2 n \in \Theta(\log n)$

i

$\log_2 2^i = \log_2 n$

$i \cdot \cancel{\log_2 2} = \log_2 n$
1

$i = \log_2 n$

$T(n) = 2T(\sqrt{n}) + 1$ $T(2) = 0$

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

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

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

$= 2 \cdot T(n^{\frac{1}{4}}) + 1$

$= 4 \cdot T(n^{\frac{1}{4}}) + 2 + 1$

$T(n^{\frac{1}{4}}) = 2T(n^{\frac{1}{8}}) + 1$

$= 4(2T(n^{\frac{1}{8}}) + 1) + 2 + 1$

$= 8T(n^{\frac{1}{8}}) + 4 + 2 + 1 \rightarrow \sum_{k=0}^{i-1} 2^i = 2^i - 1$

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

$= \cancel{\log_2 n \cdot T(2)} + \log_2 n - 1$

$= \log_2 n - 1 \in \Theta(\log n)$

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

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

$\frac{1}{2^i} = \log_n 2$

$2^i = \frac{1}{\log_n 2}$

$$2^i = \log_2 n$$

$$\log_2 2^i = \log_2 \log_2 n$$

$$i = \log_2 \log_2 n$$