

Name : Danijal Saeed
Sop id : 53937
Section : BS Data Science
Course : AOA

Class Activity

Master Theorem Exp:

i) $T(n) = 3T(\frac{n}{2}) + 1$

$$a = 3, b = 2, d = 0$$

$$\begin{aligned} a &= b^d \\ 3 &= 2^0 \\ T(n) &= O(n^{\log_2 3}) \end{aligned}$$

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

$$a = 8, b = 2, d = 2$$

$$\begin{aligned} a &= b^d \\ 8 &= 2^2 \\ 8 &> 4 \end{aligned}$$

$$T(n) = O(n^{\log_2 8})$$

$$\text{ii) } T(n) = 2T\left(\frac{n}{4}\right) + \sqrt{2}$$

$$a = 2, b = 4, d = \frac{1}{2}$$

$$\begin{aligned} a &= b^d \\ 2 &= 4^{1/2} \\ 2 &= \sqrt{4} \end{aligned}$$

$$2 = 2$$

$$T(n) = O(n^{1/2} \log n)$$

$$\text{iv) } T(n) = 4T\left(\frac{n}{2}\right) + n^3$$

$$a = 4, b = 2, d = 3$$

$$\begin{aligned} a &= b^d \\ 4 &= 2^3 \\ 4 &= 8 \\ 4 &< 8 \end{aligned}$$

$$T(n) = O(n^3)$$

$$v) T(n) = 3T(\frac{n}{4}) + n/\log n$$

$$a = 3, b = 4, d = 1$$

$$\log_2 3 = \log_4 3 = 0.792$$

$$d (= 1) > \log_4 3$$

$$T(n) = O(n^{\log_2 3})$$