CS 3383 A1

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

Depth is $\log_3 n$ because $\dfrac{n}{3^{depth}} = 1$

Total cost $= \displaystyle\sum_{i=0}^{\log_3 n} \left(\frac{4}{3}\right)^i n$

Master Theorem: $T(n) = bT\left(\frac{n}{s}\right) + \Theta(n^d)$

$$T(n) \begin{cases} \Theta(n^d), & b < s^d \\ \Theta(n^d \log_s n), & b = s^d \\ \Theta(n^{\log_s b}), & b > s^d \end{cases}$$

$b = 4, \quad s = 3, \quad d = 1$

$4 > 3^1, \qquad b > s^d$

Therefore, $\Theta(n^{\log_s b})$.

$\Theta(n^{\log_3 4})$