

Let $T(n)$ = running time of MS on n items

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

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

want a "0" solution.

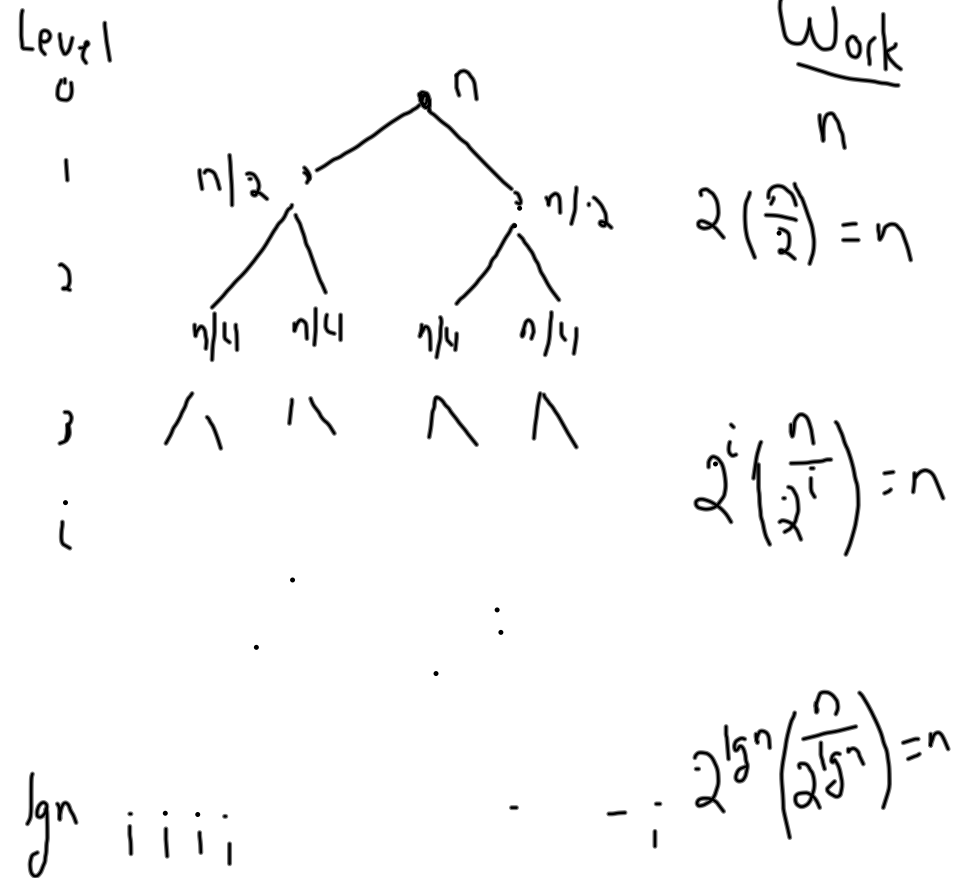
$$T(n) = \begin{cases} 2T\left(\frac{n}{2}\right) + O(n) & n > 1 \\ O(1) & n = 1 \end{cases}$$

slappiness - base case, floors, ceilings

Divide + Conquer Recurrences

$$T(n) = \underline{a} T(\underline{n/b}) + \underline{f(n)}$$

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



Sum work over levels

$$\sum_{l=0}^{\lg n} n = n(\lg n + 1) = O(n \lg n)$$