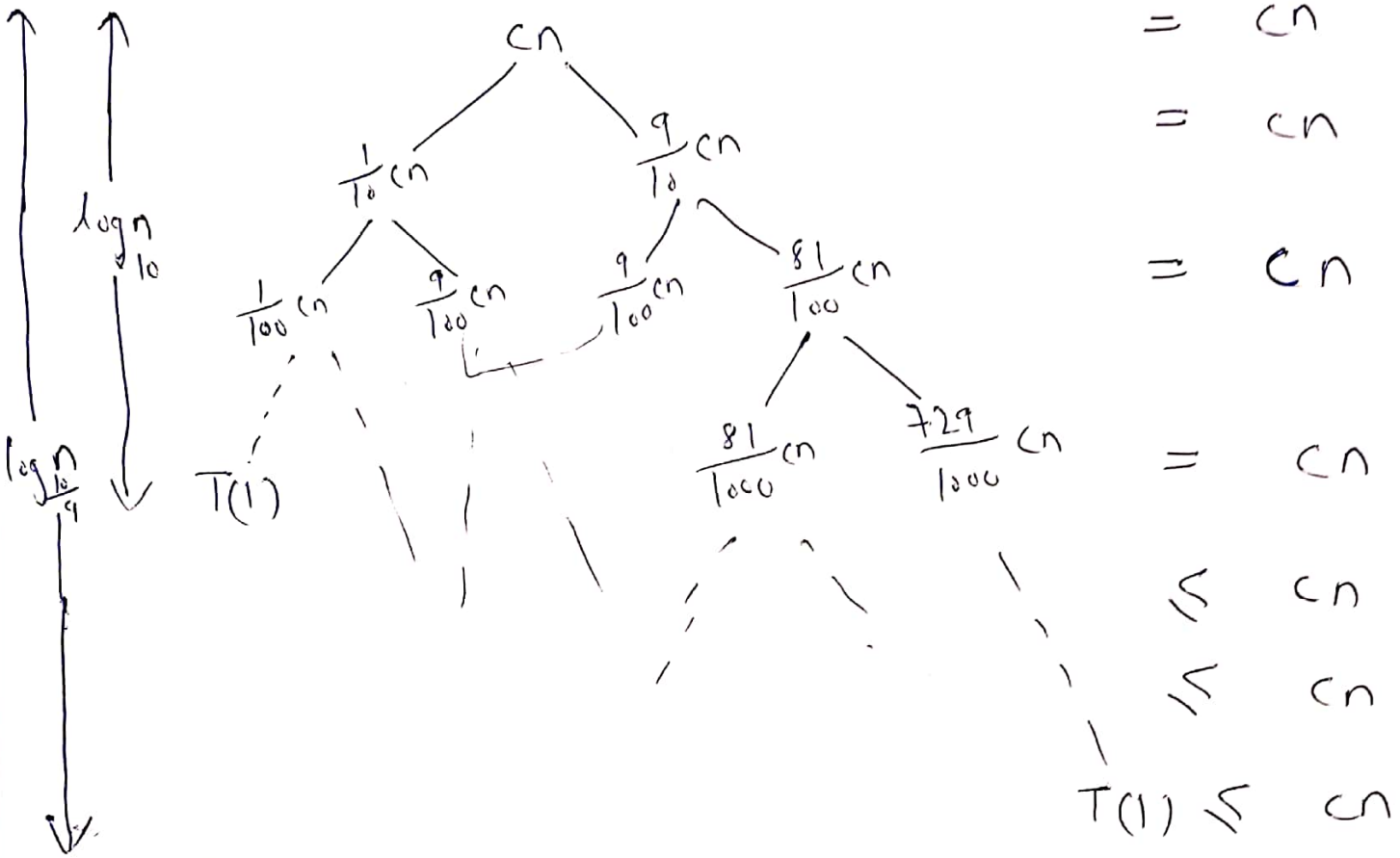
$$T(n) = T\left(\frac{9n}{10}\right) + T\left(\frac{n}{10}\right) + cn$$



Work done

$= cn$

$= cn$

$= cn$

$= cn$

$\leq cn$

$\leq cn$

$T(1) \leq cn$

$h = \log_{\frac{10}{9}} n$ (longest path from root to the leaf node)

$$T(n) \leq \sum_{i=0}^{h} cn$$

$$= cn \sum_{i=0}^{h} 1$$

$$= cn(h+1)$$

$$= cnh + cn$$

$$= cn \log_{\frac{10}{9}} n + cn$$

$\therefore T(n) \leq cn \log_{\frac{10}{9}} n + cn$ $\therefore$ $\boxed{T(n) = O\left(n \log_{\frac{10}{9}} n\right)}$