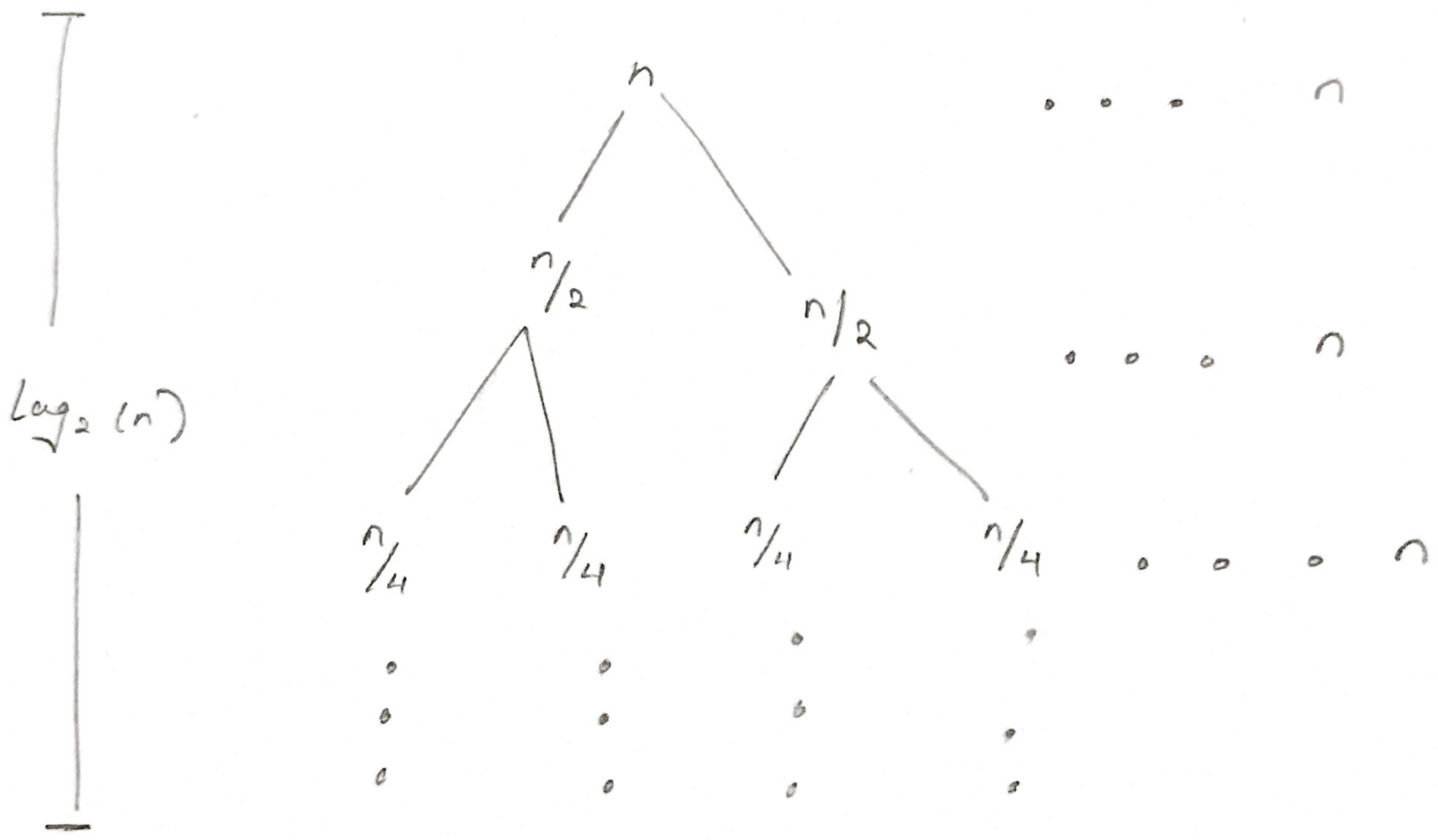
8.1.

Analysis for algorithm ——— ①

Recursion tree for Alg One



Hence total cost : height * cost per level

= log n * n = n log n * c

= Θ (n log n)

Recurrence :

$T(n) = 2T(n/2) + O(n)$

$a = 2, b = 2, k = 1, p = 0$

$b^k = 2$, so, $a = b^k$ and $p > -1$

↳ case ②

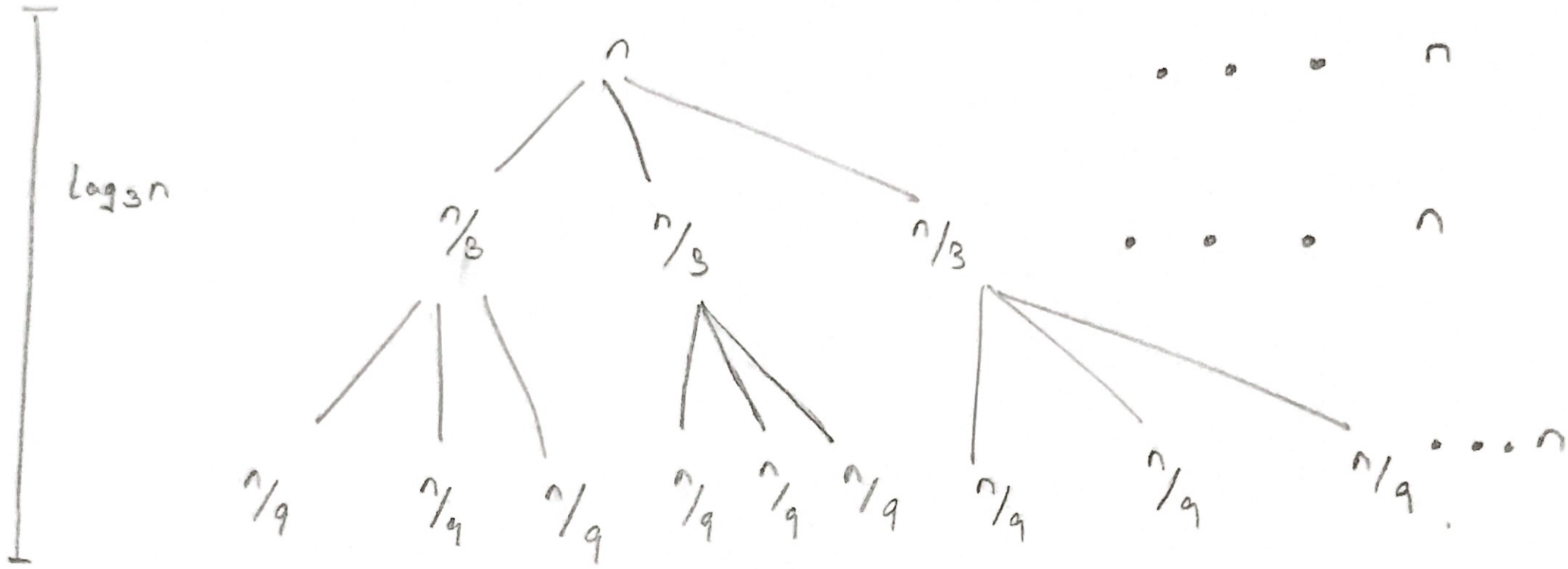
$T(n) = O(n^{\log_b a} \log^{p+1} n)$

$\therefore T(n) = \Theta(n \log n)$

↳ From Master Theorem.

Again with Algorithm — (2)

Recursion tree for AlgTwo.



Now Calculating total cost: height * cost per level

Recurrence:

$T(n) = 3T(n/3) + \Theta(1)$

$= \log_3 n * n$

$= n \log_3 n * c$

$= \Theta(n \log_3 n)$.

So Thus concludes that AlgTwo is better than AlgOne because AlgTwo has better time complexity. Thus, I would choose algorithm two.