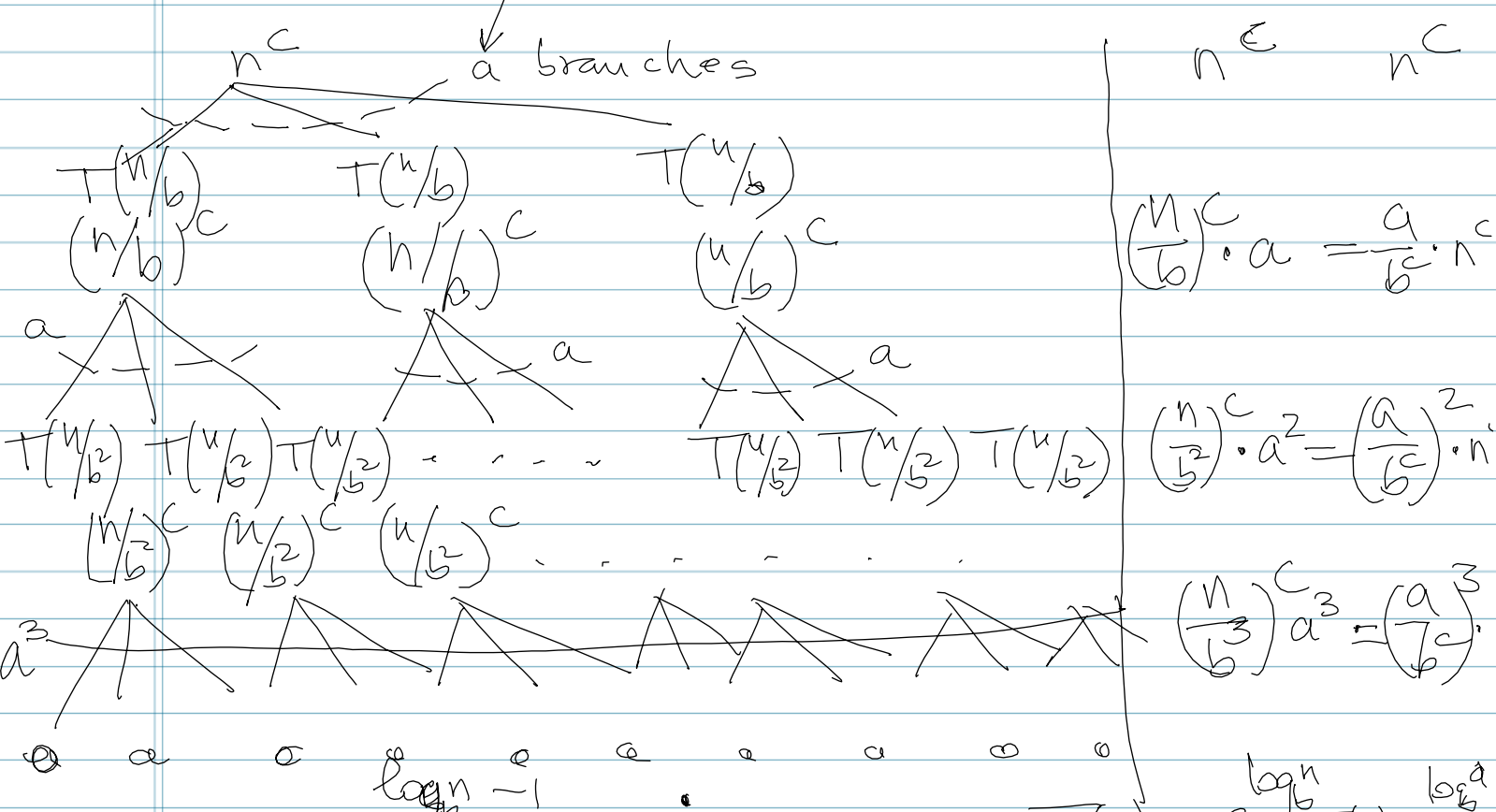


MASTER THEOREM → 3 cases intuition

Simple: $T(n) = aT(n/b) + n^c$ (dropped $\Theta(n^c)$ simplicity)

Build iteration tree:



Total: $n^c \sum_{i=0}^{\log_b n} \left(\frac{a}{b^c}\right)^i + \Theta(n^{\log_b a})$

$\sum_{i=0}^k x^i = \frac{x^{k+1} - 1}{x - 1}$ geometric series with

- $x < 1$ $\lim_{k \rightarrow \infty} \sum_{i=0}^k x^i = \frac{1}{1-x}$ base x
- $x = 1$ $x^i = 1$ $\sum_{i=0}^{\log_b n - 1} 1 = \log_b n$
- $x > 1$ (divergent) $\lim_{k \rightarrow \infty} \sum_{i=0}^k x^i = \infty$

3 CASES on base $x = \frac{a}{b^c}$.