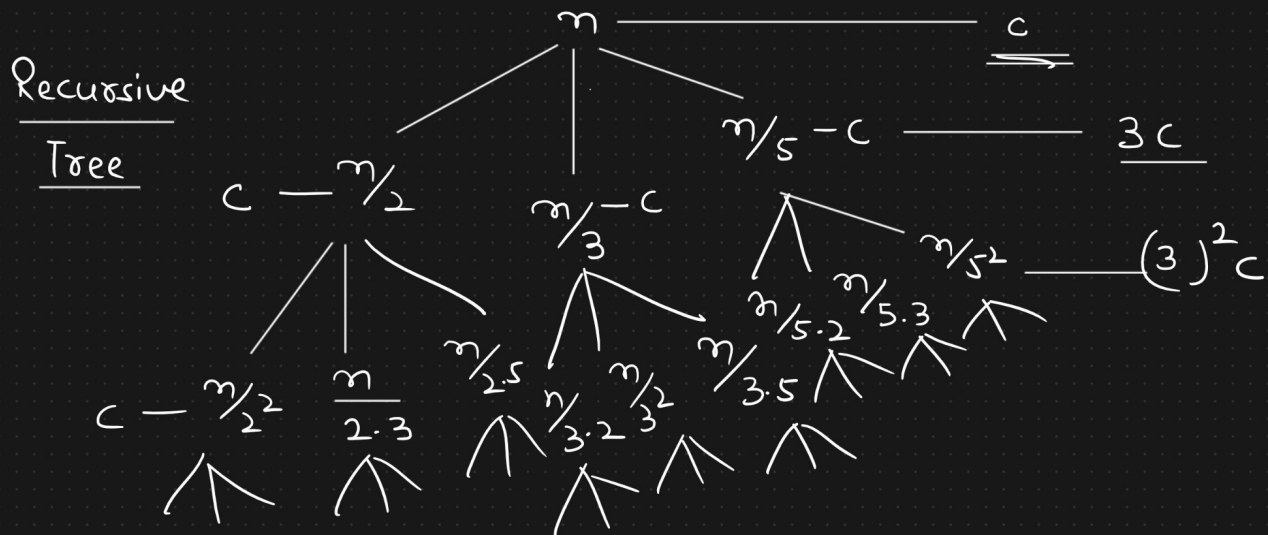


## Recurrence Relation

$$T(n) = \begin{cases} 1 & n=1 \\ T(\tilde{n/2}) + T(\tilde{n/3}) + T(\tilde{n/5}) + c & n>1 \end{cases}$$

Recursive Tree



Left side  $\rightarrow \frac{n}{2^k} = 1$

$n = 2^k \rightarrow k = \log_2 n$  Higher value

Middle side  $\rightarrow \frac{n}{3^k} = 1$

$k = \log_3 n$

Right side  $\rightarrow \frac{n}{5^k} = 1$

$k = \log_5 n$

$$c \left( (3)^0 + (3)^1 + (3)^2 + (3)^3 + \dots + (3)^{\log_2 n} \right)$$

$$\underline{a=1, \quad r=3}$$

$$r > 1$$

GP Series

$$\Rightarrow \frac{a(r^n - 1)}{r - 1}$$

$$\Rightarrow \left( \frac{3^{\log_2 n} - 1}{3 - 1} \right) \cdot c$$

$$\Rightarrow \left( \frac{n^{\log_2 3} - 1}{2} \right) \cdot c$$

$$\Rightarrow \underline{\underline{O(n^{1.5})}} \approx \underline{\underline{O(n^2)}}$$