$$T(n) = \begin{cases} 1 & , \text{se } n = 1 \\ 3T\left(\frac{n}{3}\right) + n + 1 & , \text{se } n > 1 \end{cases}$$

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$$T(n) = 3T\left(\frac{n}{3}\right) + n + 1$$

$$T\left(\frac{n}{3}\right) = 3\left[3T\left(\frac{\frac{n}{3}}{3}\right) + n + 1\right] + n + 1$$

$$T\left(\frac{n}{3}\right) = 3^2 T\left(\frac{n}{3^2}\right) + 3^1 n + 3^1 + 1^0 n + 1^0$$

$$T\left(\frac{n}{3^2}\right) = 3^2\left[3T\left(\frac{\frac{n}{3^2}}{3}\right) + n + 1\right] + 3n + 3 + 1n + 1$$

$$T\left(\frac{n}{3^2}\right) = 3^3 T\left(\frac{n}{3^3}\right) + 3^2 n + 3^2 + 3n + 3 + n + 1$$

$$= 3^k T\left(\frac{n}{3^k}\right) + \underbrace{\sum_{k=0}^{n} 3^k n + 3^k}_{A}$$

$$\frac{n}{3^k} = 1$$

$$n = 3^k$$

$$k = \log_3 n$$

$$= 3^{\log_3 n} T\left(\cancel{\frac{n}{3^{\log_3 n}}}^{1}\right) + \frac{3^{n+1} n - n + 3^{n+1} - 1}{2}$$

Função de custo $= n + \dfrac{3^{n+1} n - n + 3^{n+1} - 1}{2}$

$= O(n)$

$$A = \underbrace{\sum_{k=0}^{n} 3^k n + \overbrace{\sum_{k=0}^{n} 3^k = \frac{3(3^n - 3^{0-1})}{3-1} = \frac{3^{n+1} - 3^{1-1}}{2} = \frac{3^{n+1} - 1}{2}}}_{\frac{3^{n+1} n - n + 3^{n+1} - 1}{2}}$$