if(n=1){..}
else {rec}.

$$T(n) = \begin{cases} 4T(\frac{n}{2}) + 3n, & n > 1 \\ 3 \text{ Base Case}, & n = 1 \end{cases}$$

$$T(n) = 4T(\tfrac{n}{2^1}) + 3n \quad | \text{ expand}$$

$$= 4\left(4T(\tfrac{n}{2^2}) + 3\tfrac{n}{2}\right) + 3n \quad | \text{ simplify}$$

$$= 4^2 T(\tfrac{n}{2^2}) + 4^1 \cdot 3 \tfrac{n}{2^1} + 3n \quad | \text{ exp.}$$

$$= 4^2\left(4T(\tfrac{n}{2^3}) + 3\tfrac{n}{2^2}\right) + 2^1 3n + 3n \quad | \text{ smpl.}$$

$$= 4^3 T(\tfrac{n}{2^3}) + 3 \cdot 2^2 n + 3 \cdot 2^1 n + 3 \cdot 2^0 n$$ || TREND CLEAR

$\vdots$ down to $\frac{n}{2^{\log_2(n)}}$

$\log_2(n)$

$$= 4^{\log_2(n)} T\left(\underbrace{\frac{n}{2^{\log_2(n)}}}_{\frac{n}{n}=1}\right) + 3n \sum_{i=0}^{\log_2(n)-1} 2^i$$

$$= \underbrace{4^{\log_2(n)}} \cdot \underbrace{T(1)} + 3n\left(\underline{2^{\log_2(n)}} - 1\right)$$

$$= \underbrace{n^2 \cdot \boxed{3}} + 3n(n-1)$$

$$= 3n^2 + 3n^2 - 3n$$

$$= 6n^2 - 3n \in \Theta(n^2)$$