(2)

$$T(n) = 2T(n/2) + n \; ; \quad T(1) = 1$$

$\therefore \; T(n/2) \rightarrow T(n) = 2(2T(n/4) + n/2) + n$

$$T(n) = 4T(n/4) + 2n + n$$

$$T(n) = 4T(n/4) + 3n$$

$\therefore \; T(n/4) \rightarrow T(n) = 4(2T(n/8) + n/4) + 3n$

$$T(n) = 8T\left(\frac{n}{8}\right) + 7n$$

$$\vdots$$

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

Para k: $\quad \frac{n}{2^k} = 1 \rightarrow 2^k = n \rightarrow k = \log_2(n)$

Reemplazo:

$$2^{\log_2(n)} T\left(\frac{n}{2^{\log_2 n}}\right) + \left(2^{\log_2 n} - 1\right) n$$

$$T(n) = n \cdot T(1) + n\log_2 n = n\log_2 n + n$$

$$T(n) = n + n\log_2(n)$$

$$T(n) = O(n \log(n))$$