1 introduction

Man i'm typing words but I need math

$$\begin{aligned} Time &= \frac{n}{k} + \frac{n}{k} = \frac{2n}{k} + \frac{3n}{k} + \cdots + \frac{kn}{k} \\ &= \sum_{i=2}^{k} i\frac{n}{k} \\ &= \frac{n}{k}\sum_{i=2}^{k} i \\ &= \frac{n}{k}\frac{(k+2)(k-1)}{2} \\ &= O(nk) \end{aligned} \tag{1}$$

$$\begin{aligned} Base\ Case : T(1) &= (1)\log(1) + (1) = 1 \\ &= T(1) = 1 \end{aligned}$$

$Induction\ hypothesis : For\ any\ number\ n > 1, n\log n + n\ is\ true$

$$\begin{aligned} Inductive\ Step :\ T(n) &= (n)\log(n) + (n) \\ T(n) &= n\log n + n \\ T(n) &= 2T(\frac{n}{2}) + n \\ &= 2((\frac{n}{2})\log(\frac{n}{2}) + (\frac{n}{2})) + n \\ &= n\log(\frac{n}{2}) + n + n \\ &= n\log n - n + n + n \\ &= n\log n + n \end{aligned} \tag{2}$$