

$$\sum_{k=1}^n (\log k)^2 = \Theta(n^b (\log n)^c), \text{ for } b, c$$

for O :

$$\sum_{k=1}^n (\log k)^2 \leq \sum_{k=1}^n (\log n)^2 = n (\log n)^2$$

$$\therefore \sum_{k=1}^n (\log k)^2 = O(n (\log n)^2)$$

for Ω :

$$\sum_{k=1}^n (\log k)^2 \geq \sum_{k=\frac{n}{2}}^n (\log \frac{n}{2})^2 = \frac{n}{2} (\log \frac{n}{2})^2$$

$$\therefore \sum_{k=1}^n (\log k)^2 = \Omega(n (\log n)^2), \text{ ~~b=1, c=2~~}$$

$$\therefore \sum_{k=1}^n (\log k)^2 = \Theta(n (\log n)^2), \text{ } b=1, c=2$$