

CLRS 15.5-3

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$$\sum_{l=1}^n \sum_{i=1}^{n-l+1} \sum_{r=i}^{i+l-1} j - 1 = \sum_{l=1}^n \sum_{i=1}^{n-l+1} \sum_{r=i}^{i+l-1} l - 1 \quad (1)$$

$$= \sum_{l=1}^n (n-l+1-1)(i+l-1-i)(l-1) \quad (2)$$

$$= \sum_{l=0}^n (n-l+1)l^2 \quad (3)$$

$$= \frac{n(n+1)(2n+1)}{6} - \frac{n^2(n+1)^2}{4} + \frac{n(n+1)(2n+1)}{6} \quad (4)$$

$$\in \Theta(n^4) \quad (5)$$