

**worst case cost**

our cost of the inner loop is:

$$\begin{aligned} & \sum_{i=1}^{N-1} (10i + 3) + 8i + 4i \\ &= \sum_{i=1}^{N-1} 22i + 3 \end{aligned}$$

so our total cost is:

$$\begin{aligned} & 22N - 15 + \sum_{i=1}^{N-1} 22i + 3 \\ &= 22N - 15 + 22 \frac{(n-1)n}{2} + 3(n-1) \\ &= 11n^2 + 14n - 18 \end{aligned}$$

**best case cost**

for the best case, the inner loop runs 0 times, so we have:

$$\begin{aligned} & 22N - 15 + 10(N - 1) \\ &= 32N - 25 \end{aligned}$$