

Assignment 06 - P1 Runtime Analysis

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1.

$$\begin{aligned}T(n) &= c * (n - 1) \\ &= O(n)\end{aligned}$$

2.

$$\begin{aligned}T(n) &= c * (n - 1) * (n - 1) \\ &= c * (n^2 - 2n + 1) \\ &= O(n^2)\end{aligned}$$

3.

$$\begin{aligned}T(n) &= c * (n - 1) * (n^2 - 1) \\ &= c * (n^3 - n^2 - n + 1) \\ &= O(n^3)\end{aligned}$$

4.

$$\begin{aligned}T(n) &= \sum_{j=0}^n jc \\ &= c + 2c + 3c + \dots + c(n - 1) \\ &= \frac{c * n * (n - 1)}{2} \\ &= \frac{cn^2}{2} - \frac{cn}{2} \\ &= O(n^2)\end{aligned}$$

5.

$$\begin{aligned}T(n) &= \sum_{j=0}^{n^2} \sum_{k=0}^{n^2} kc \\ &= O_i(n) * O_j(n^2) * O_k(n^2) \\ &= O(n^5)\end{aligned}$$