

CIS 2353 Proj 2 Analysis Q's

3.1 Prove that $4n^2 + 2n + 3$ is $O(n^2)$

$$4n^2 + 2n + 3 \leq 4n^2 + 2n^2 + 3n^2$$

$$4n^2 + 2n + 3 \leq 9n^2, \text{ so let } c = 9$$

$$n_0 = 1: 4(1)^2 + 2(1) + 3 \leq 9(1)^2$$

$$9 \leq 9 \checkmark$$

Therefore, $4n^2 + 2n + 3$ is $O(n^2)$ since

$$4n^2 + 2n + 3 \leq 9n^2 \text{ For } n \geq 1$$

3.2 Find the Big O of $2n^4 + 2n^2 + 7n + 1$

$2n^4 + 2n^2 + 7n + 1$ is $O(n^4)$ because

n^4 is the Fastest growing term.

$$2n^4 + 2n^2 + 7n + 1 \leq 2n^4 + 2n^4 + 7n^4 + n^4$$

$$2n^4 + 2n^2 + 7n + 1 \leq 12n^4, \text{ so let } c = 12$$

$$n_0 = 1: 2(1)^4 + 2(1)^2 + 7(1) + 1 \leq 12(1)^4$$

$$12 \leq 12 \checkmark$$

Therefore, $2n^4 + 2n^2 + 7n + 1$ is $O(n^4)$ since

$$2n^4 + 2n^2 + 7n + 1 \leq 12n^4 \text{ For } n \geq 1$$

3.3 Find the Big O of the nested For loop

In both For-loops, the time requirement increases with respect to n . So, the

big O for both loops is $O(n)$.

$O(n) * O(n) = O(n^2)$. Therefore, the big O of the nested For-loop is $O(n^2)$.