

# 1/9 Syllabus Week, Big O Notation Review

Thursday, January 9, 2020 9:40 AM

O notation:  $f(n) \in O(g(n))$  if  $\exists c, n_0$  s.t.  $0 \leq f(n) \leq C \cdot g(n) \quad \forall n > n_0$

Proof:

$$f(n) = 13n^2 + 10n + 1000$$

$$13n^2 + 10n + 1000 \leq C \cdot n^2 \quad \forall n > n_0$$

$$13 + \frac{10}{n} + \frac{1000}{n^2} \leq C \quad \forall n > n_0$$

$$\text{Let } n_0 = 32$$

$$\frac{1000}{n^2} < 1 \quad \forall n > n_0$$

$$\frac{10}{n} < 1 \quad \forall n > n_0$$

$$\text{So } 13 + \frac{10}{n} + \frac{1000}{n^2} < 15 \quad \forall n > n_0$$

$$C = 15$$

$$f(n) \in O(n^2)$$