\[ f(x) \in O(g(x)) \]
means \( |f(x)| \leq c |g(x)| \) for \( x > k \), \( c, k > 0 \).

\[ f(x) \in \Omega(g(x)) \]
means \( |f(x)| \geq c |g(x)| \) for \( x > k \), \( c, k > 0 \).

Example: showing Big-O does not hold.

E.g. show \( n^2 \) is not \( O(n) \)

* Must show no witnesses \((c, k)\) exist s.t. \( n^2 \leq cn \) for \( x > k \).

Wanted: \( n^2 \leq cn \)

Dividing both sides by \( n \)

But \( c \) is a constant and \( n \to \infty \).

So in the limit \( n \to \infty \), \( n > c \).

(i.e. \( c \) would have to be a function for \( c \geq n \), but \( c \) is restricted to being a constant.)