Name ______________________________

Homework 14 Seating Section: **1 2 3 4 5 6**

CS 336

The important issue is the logic you used to arrive at your answer.

1. Consider the functions f and g defined on $\boldsymbol{N}$ by $f(n) = \begin{cases} n^2 & \textit{for n even} \\ 2n & \textit{for n odd} \end{cases}$ and $g(n) = n^2$. Show that $f = \mathrm{O}(g)$ and $g \neq \mathrm{O}(f)$.

2. Using Theorem 2 and induction, prove that if for $i = 1, 2, \ldots, k$, $f_i = \mathrm{O}(g_i)$, then $\sum_{i=1}^{k} f_i = \mathrm{O}(\sum_{i=1}^{k} |g_i|)$.

3. Construct a simple counter-example such that $f_1 = O(g_1)$ and $f_2 = O(g_2)$ but $f_1 + f_2 \neq O(g_1 + g_2)$.