

TCSS 343 - Week 1

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1.

$$\begin{aligned} 2 \cdot \max\{f(n), g(n)\} &\geq f(n) + g(n) \\ \max\{f(n), g(n)\} &\geq \frac{1}{2} \cdot (f(n) + g(n)) \end{aligned}$$

Which allows us to say:

$$\frac{1}{2} \cdot (f(n) + g(n)) \geq \max\{f(n), g(n)\} \geq f(n) + g(n)$$

2. Consider $f(n) + g(n)$ where $g(n) \in O(f(n))$ and let c be a constant such that $0 \leq g(n) < c \cdot f(n)$ for large enough n . Then $f(n) \leq f(n) + g(n) \leq (1 + c)f(n)$ for large enough n .