CSC165 Tutorial #6

Exercises

Winter 2015

Work on these exercises *before* the tutorial. You don't have to come up with a complete solution, but you should be prepared to discuss them with your TA.

IMPORTANT: You **must** use the proof structures and format of this course.

- Prove or disprove each of the following bounds.
  In all questions assume that $f : \mathbb{N} \to \mathbb{R}^{\geq 0}$ and $g : \mathbb{N} \to \mathbb{R}^{\geq 0}$.

  1. Let $f(n) = \frac{1}{5}n^2 - 30n - 5$, and $g(n) = n^2$.
     Then $f \in \Omega(g)$.

  2. Let $f(n) = \sqrt{n}(40n^3 + 6)$, and $g(n) = n^{7/2}$.
     Then $f \in \mathcal{O}(g)$.

  3. Let $f(n) = max(n^2, 100)(3n + 1) - 5$, and $g(n) = n^3$.
     Then $f \in \Theta(g)$.

  4. Let $f(n) =\mid n^2 - n^5 - 2n + 6 \mid$, and $g(n) = n^2$.
     Then $f \in \mathcal{O}(g)$.