

CSci 421
Introduction to Algorithms
Homework Assignment 2
Due: Tuesday, 6 July 2004

Summer 2004
W. L. Ruzzo

Handout 2
June 28, 2004

Reading Assignment: Chapter 5.

Homework:

1. Show that if $f(n) = o(g(n))$ then $f(n) = O(g(n))$ but not $f(n) = \Omega(g(n))$ and not $f(n) = \Theta(g(n))$.
2. 3.5. Where possible, show $f(n) = o(g(n))$ or *vice versa*. Justify your answers.
3. Show $\sum_{i=2}^n i^2 / \log_2 i = \Theta(n^3 / \log n)$.
4. 5.3.
5. A *topological ordering* of a directed acyclic graph $G = (V, E)$ is a numbering of its vertices, i.e. a function $t : V \rightarrow \{1, \dots, |V|\}$, with the property that $t(u) < t(v)$ for all edges $(u, v) \in E$. Give an algorithm that will construct such a numbering for an arbitrary directed acyclic graph. Try to make your description of the algorithm reflect the “inductive approach” to algorithm design stressed in chapter 5. Analyze the running time of your algorithm. (Time $O(|V| + |E|)$ is possible.)