CSci 421
Introduction to Algorithms

Homework Assignment 2
Due: Wednesday, 19 Jan 2000

Winter 2000   Handout 2

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Reading Assignment:

3.1 – 3.4; skim rest of 3 (we'll come back to it).

Chapter 4 should be review for you; I won't cover it explicitly, but we'll use most of it before the quarter is over, so review it now if your memory is rusty.

Read Chapter 5. Start reading 6, ...

Homework:

1. 3.1.

2. 3.5. Where possible, show $f(n) = o(g(n))$ or *vice versa*. Justify your answers.

3. 3.10.

4. Show $\sum_{i=1}^{n} i^k \log_2 i = \Theta(n^{k+1} \log n)$.

5. 3.16.

6. 5.3.

7. A *topological ordering* of a directed acyclic graph $G = (V, E)$ is a numbering of its vertices, i.e. a function $t : V \rightarrow \{1, \ldots, |V|\}$, 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.)