

Dealing with hard problems I

AVA Fall 2005, week 5

September 26

Content Introduction to hard problems: Complexity classes P and NP, polynomial time reductions, certificates, decision problems and optimization problems.

Literature

- Chapter 8: NP and Computational Intractability in *Algorithm Design* by Kleinberg and Tardos. (Denoted by KT below.) Pages 451-466. (Handed out at lecture 5.)
- Chapter 34 in CLRS introduce the same concepts, and can also be used. Pages 966-983.

Exercises

- Show the reduction Independent Set \leq_p Set Packing.
- Exercise 1 and 2 (You only need to show the reduction from a problem we have seen in the lecture, and not do the full NP-C proof) from KT (handed out).
- Exercise 34.1-1 and 34.2-6 from CLRS.

Hand-ins

1. Exercise 7 from KT (handed out).
2. Exercise 34.2-1 from CLRS. (Definition of isomorphic on page 1082 in CLRS.)