Problem Set 4

CPSC 629 Analysis of Algorithms

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The assignment is due on Tuesday, 5/3/05, before class.

Q1 Show that the VERTEX COVER problem is polynomially reducible to the SET COVER problem, where

VERTEX COVER
Instance: An undirected graph $G = (V, E)$ and an integer k.
Question: Is there a subset C of V with $|C| = k$ such that each edge in E is incident with some vertex in C?

SET COVER
Instance: A family of sets $S_1, \ldots, S_n$ and an integere k.
Question: Does there exist a family of k sets $S_{i_1}, \ldots, S_{i_k}$ such that

$$\bigcup_{j=1}^{k} S_{i_j} = \bigcup_{i=1}^{n} S_i.$$

Prepare for the exam by proving the NP completeness of as many problems as possible. We will have 1-2 such problems on the exam. Study the graph algorithms that we have discussed.