

Problem Set 5, Part a

Due: Wednesday, May 3, 2006

Problem sets will be collected in class. Please hand in each problem on a separate page, with your name on it.

Reading

Global infrastructures Elkin: Distributed approximations—a survey
Kuhn, Wattenhofer: Distributed dominating set approximation
Kuhn, Moscibroda, Wattenhofer: What cannot be computed locally!

Reading for next week

Location services Awerbuch, Peleg: Concurrent online tracking of mobile users
Li, Janotti, et al.: GRID location service
Abraham, Dolev, Malkhi. LLS paper

Clustering Mittal, Demirbas, Arora: Local clustering in wireless networks

Middleware services Malpani, Welch, Vaidya: Leader election algorithms
Walter, Welch, Vaidya: Mutual exclusion for ad-hoc mobile networks
Walter, Cao, Mohandy: k -mutual exclusion for wireless ad hoc networks

Problems

1. Prove Lemma 1 in the Kuhn, Wattenhofer dominating set paper *without* using LP duality. (You can look at the proof of Theorem 3.1 in the lecture notes for a suggested method.)
2. Construct the linear program corresponding to the minimum dominating set of the complete bipartite graph $K_{n,n}$, and solve this LP. Compare the optimal solution to the solution produced by Algorithm 2 in the KW paper, for $k = 1, 2$. What happens in Algorithm 2 as k grows?