CS455b

Solution Set for Homework #3

Problem 1

In Figure 1, suppose that, at each node C_i, there is an agent i with utility 2. Also suppose that there is an agent 0 at node X, with utility 4n+1. If every agent tells the truth, then agent 0 pays n+1, while each agent i>0 pays 1. However, if every agent i>0 falsely reports that its utility is 3, then agent 0 only pays 1, but other agents' payments don't change. This means that the group {0,1,2,…,n} of all agents is a group that can strategize successfully.

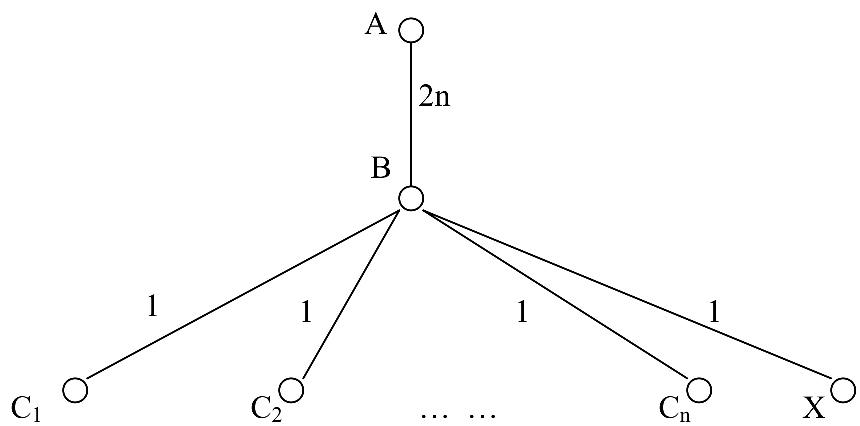

Figure 1

Problem 2

A more general result is proven in Section 4 of the paper at
http://www.cs.yale.edu/homes/jf/FKSS2.ps
You will get full credit for any correct proof of the "one direction" of this result that is asked for in this question.

Problem 3

[This answer was given in class on the day that this paper was presented.] Condition 1 says that, *for a fixed Q*, T is a lowest-cost tree that reaches Q. Condition 6 seeks to maximize $(\Sigma_{i\in Q}u_i - \Sigma_{e\in T}c_e)$ *over all Q* and all T that reach Q. The former is easier to approximate than the latter.

Problem 4

Consider a tree with exactly two nodes, A and B, where A considered the root. The payoff matrix of A is

A \ B	0	1
0	2	0
1	0	1

while the payoff matrix of B is

A \ B	0	1
0	1	0
1	0	100

The "solution" would find the Nash equilibrium p=(1,1) (*i.e.*, both nodes play 0 with probability 1), while the Nash equilibrium with the maximum sum of payoffs is p*=(0,0) (*i.e.*, both nodes play 1 with probability 1).