UNIVERSITY OF WISCONSIN
Economics 101 – Spring 2007
Professor Brown

Problem set 12 answers

Problem 1 - Game Theory

		Player 2		
		l	m	r
Player 1	U	5, 3	0, 4	3, 5
	M	4, 0	5, 5	4, 0
	D	3, 5	0, 4	5, 3

a. Underlined numbers correspond to that player's best response. For example, that "5" is underlined in the (U,l) box means that playing U is player 1's best response to 2 playing l. That both numbers are underlined in the (M,m) box tells us that each player's strategy is a best response to the other's, and so (M,m) is a Nash equilibrium

b. No. For both players, each strategy is sometimes a best response, depending on what the other player is doing, so no strategy is dominated.

Problem 2 – Culture

Examples abound. Drawing from *The Simpsons,* consider the episode where Marge's pretzel wagon is competing against Maude's "Fleet-a-pita" for customers. In the episode, both businesses end up ruined after a period of savage competition, so surely combined profits could have been increased had they simply agreed to split the market, yet this is not a Nash equilibrium as either player evidently had an incentive to resort to sabotage. Payoffs might look something like this, where only their order matters:

		Fleet-a-Pita	
		Compete fairly	Sabotage competition
Pretzel Wagon	Compete fairly	10,10	-5,15
	Sabotage competition	15, -5	0,0

This is a prisoners' dilemma; the Nash equilibrium is (Sabotage, Sabotage), and both players would be better off were they able to agree on playing (fair, fair).

Problem 3 – House Painters

a.Yes; anyone who changes the color of his house is made worse off, so this is a Nash equilibrium
b. No; Arnold would be better off painting his house green, as then all three houses would be the same color, and we're told this is each player's most preferred outcome.
c. Yes. Each person is doing as well as he can given that no one person can change the color of his house with the result that all three houses will be the same color.
d. No. Bob would prefer to switch his house to green.

Problem 4 – Negotiation and Choice

		Firm "macro"	
		R	S
Firm "micro"	A	2, 2	0, 1
	B	1, 4	0, 3

a. The Nash equilibrium of this game is for "micro" to send Alice and "macro" to send Roderick. "micro" gets a payoff of 2, "macro" gets a payoff of 2.

		Firm "macro"	
		R	S
Firm "micro"	A	2, 2	0, 1
	B	1, 4	0, 3
	C	3, 0	1, 1

b. The new Nash equilibrium is for "micro" to send Covington, and "macro" to send Susan. Each firm gets a payoff of 1.

c. Here, "micro" is given an additional choice, C, and yet his Nash equilibrium payoff is lower than before he had that choice. It must be that the choice made him worse off. The issue is that "micro" always prefers that "macro" send Roderick instead of Susan, as they always get a higher payoff this way, yet against the best negotiator for "micro", Covington, Susan gets "macro" the highest payoff.