Name: _____
SID: _____

EEP100 Final (Dec 15, 2009)

This final is worth 20 percent of your entire grade. The questions are worth 20 points in total. For full credit, show your work. Clear, concise answers are better than disorganized, vague essays. Enjoy!

True/False and Explain [$\frac{1}{2}$ point each]

If you get the T/F wrong, you get *no credit*. If you get the T/F right, then *all* of your credit depends on a good explanation, which need not be long as much as hit the main points.

(1) Some suggest that a high social discount rate (SDR) be used to analyze the cost-benefit of actions to address climate change. This is because we do not know the probabilities of risky outcomes that may result from different sets of actions.

(2) Taxes are less popular than regulations because they are less efficient in changing behavior.

(3) Monopolies (with strong property rights) are good at conserving natural resources.

(4) An Agent with a strong intrinsic motivation to promote the Principal's interest will succeed without need for monitoring.

(5) In the past, farmers and fishermen in the Netherlands agreed on how to manage land/water.

(6) ♂ + ♀ = ♡

(7) A Pigouvian tax on A is the best response when A's pollution has an adverse effect on B.

(8) US sugar production destroyed wetlands and increased the demand for high-fructose-corn-syrup (HFCS); these are market failures.

(9) We elect politicians to represent us, but they may not. Voters may have trouble catching them if politicians serve their own interests.

(10) CSR (Corporate Social Responsibility) programs can harm shareholders, especially when CSR officers (bootleggers) protect managers (baptists) pursuing pet projects.

(11) Two homo economicus players in a repeated Prisoner's Dilemma will play defect due to bounded rationality.

(12) Gordon's article ("The Economic Theory of a Common-Property Resource: The Fishery") explains why fish farms can succeed.

(13) VSL (value of a statistical life) is how much you are WTA (willing to accept) to die.

(14) A risk-averse person will take a risky gamble – even when expected earnings are below risk-free earnings – in exchange for a suitable "option" payment.

(15) Competition for grades is like competition for jobs, peer-grading in class is like peer-review in a company, and a professor's decision on grades is like a boss's decision on salaries.

(16) According to Schelling, we slow down to look at a traffic accident for ten seconds because that marginal benefit is worth the ten minute cost we've just paid.

Longer Questions [2 points each]

Show your work! (Use the back of the page but put your answers in the spaces provided.)

Note that *pure strategy Nash equilibrium/ia* occur when a player has no incentive to change his move (an action, not a combination of actions), given the move of the other player.

(1) These are simultaneous move, one-shot games.

(a) Find the pure and mixed strategy Nash equilibrium/ia in this game.

		Player 2 A	Player 2 B
Player 1	C	3,4	5,5
	D	9,2	0,1

(b) Find the pure strategy Nash equilibrium/ia in this game.

		Player 2 A	Player 2 B
Player 1	C	0,2	3,1
	D	5,4	-1,2

(c) Find the pure strategy Nash equilibrium/ia in this game.

		Player 2 A	Player 2 B
Player 1	C	-1,2	3,1
	D	4,4	5,4

(d) Find the pure and mixed strategy Nash equilibrium/ia in this game.

		Player 2	
		A	B
Player 1	C	0,-2	4,0
	D	-1,6	6,-3

(2) Consider the following simultaneous move, one-shot game. **(Do not look for mixed strategies.)**

		Player 2				
		A	B	C	D	E
Player 1	F	-1,2	3,0	2,5	0,-2	4,7
	G	4,3	1,8	0,0	6,8	2,-2
	H	0,2	1,-1	5,4	6,0	-4,5
	I	4,5	8,7	-1,-3	5,1	3,6
	J	6,2	10,3	3,8	-9,-6	-3,-5

(a) Find all pure strategy Nash equilibrium/ia.

(b) Are there any moves that Player 1 would never choose? Are there any moves that Player 2 would never choose? Identify these moves if they exist. Explain your answer.

(c) Suppose this is a sequential move game (i.e., with the branch structure) where Player 1 moves first and then Player 2 moves after observing Player 1. Taking away irrelevant moves (if any) that you found in (b), how many decision nodes would Player 1 have? How many would Player 2 have? How many payoff pairs will there be?

(3) Consider the following game with complete information. Suppose that Coke is debating whether or not to enter a new market where the market is dominated by its rival, Pepsi. Suppose that the game proceeds as follows: First, Coke chooses to enter the new market or stay out; Second, if Coke chooses to enter, then Pepsi reacts by either playing "tough" (e.g. mounts a big advertising campaign) or "accommodate" (e.g. does not mount such a tough counterattack). Simultaneously, Coke makes its second move (if it enters), by playing either "counter ad-tack" (get it? hahaha) or "nothing" *without* observing Pepsi's reaction. Therefore we can draw the game tree below ("Figure. Coke vs Pepsi"), where E means "enter", O means "stay out", T means "tough", A means "accommodate", C means "counter ad-tack" and N means "nothing". Note that the first entry in each pair of payoffs is Coke's payoff, and the second entry is Pepsi's payoff.

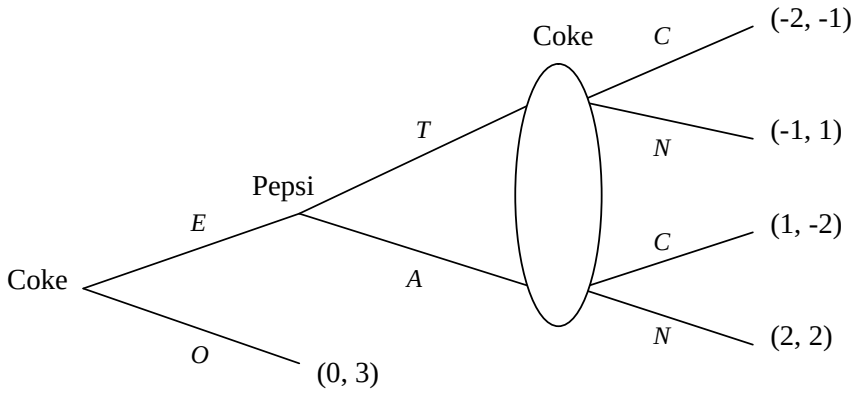

Figure. Coke vs Pepsi

Suppose that both Coke and Pepsi want to maximize their own payoffs. Find one pure strategy Nash equilibrium in this game.

(4) Consider the following sequential move game with complete information in the figure below ("Figure. Nature & two players"). The game proceeds as follows: First, Nature moves UP with a probability of 0.75 and $DOWN$ with a probability of 0.25; Second, Player 1 moves U^1 or D^1; Finally, Player 2 moves U^2 or D^2 (not all branches are marked on the figure). Assume that neither player knows Nature's move, but Player 2 observes Player 1's move. Suppose that both players are risk-neutral, i.e. they want to maximize their own expected payoffs. In the figure, N means "Nature", $P1$ means "Player 1", and $P2$ means "Player 2".

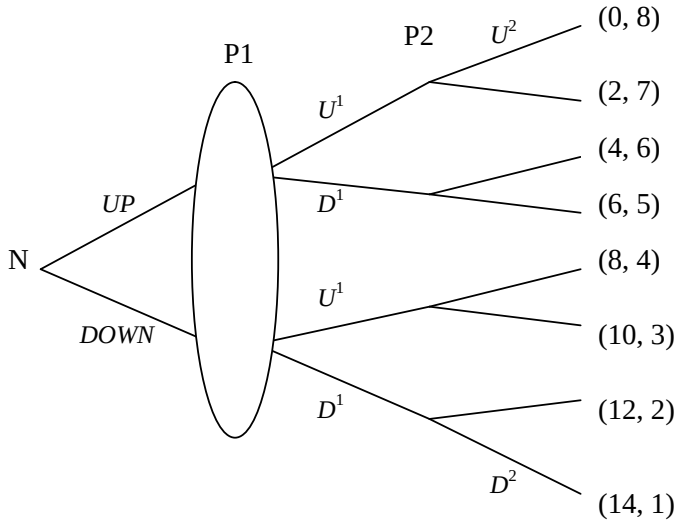

Figure. Nature & two players

(a) Use circles to join the decision nodes that Player 2 cannot tell apart in the figure.
(b) Use backward induction to find the pure strategy Nash equilibrium in this game.

(5) Consider an isolated market (no other entry) with complete information in which three firms are producing identical milk. Suppose that Firm 1 is the leader in the market in the sense that Firm 1 chooses its own production quantity q_1 first, and Firm 2 and Firm 3 are both followers in the sense that they simultaneously choose their production quantities q_2 and q_3 after observing Firm 1's choice. Assume that Firm 1 has a marginal cost of \$1 per gallon of milk, and both Firm 2 and Firm 3 have a marginal cost of \$2 per gallon of milk, and also assume that there are no fixed costs. The market demand Q is a linear function of the milk price P: $Q = 11 - P$.

(a) Find the reaction functions for Firm 2 and Firm 3 (hint: as a function of q_1.)

(b) Find the equilibrium production quantity for each of the three firms.

(c) Find market price ($P^\star$) and quantity ($Q^\star$) in equilibrium.

(d) Compute each firm's equilibrium profit.

(6) Ella is a fan of extreme sports and gets utility from skiing in dangerous areas. Suppose her utility from skiing is given by $4x^{\frac{1}{2}}$, where x is the number of years she chooses to ski. Suppose also that there is a utility cost of skiing associated with the injuries she faces given by $-x$.

(a) Write down Ella's total utility from skiing (taking both her benefits and costs into account). Determine her optimal level of skiing (assume she maximizes her utility in all parts of this question).

(b) Suppose now that Ella has health insurance (for no cost) and she only faces half of the cost associated with skiing while her insurance company pays the rest. Write down Ella's new total utility and determine her optimal level of skiing.

(c) Compare the results from parts (a) and (b). Is this an example of moral hazard, adverse selection, or neither? Explain.

(d) Suppose now that Ella does not have "ski career" insurance and is deciding if she wants to buy it one thousand dollars. Explain how Ella decides if she is going to buy the insurance (or not) and how much she skis, if she does or does not decide to buy the insurance.