

University of British Columbia
Department of Economics

NAME:

Economics 221 (002 & 004)
Introduction to Strategic Thinking
Winter Session Term I, 2011

STUDENT NUMBER:

DISCUSSION GROUP / T.A.:

Midterm Examination

Time Allowed: 75 Minutes

Total Marks: 50

ANSWER ALL PARTS OF THE EXAMINATION.

PART A: Answer *BOTH* questions. Each question is worth 5 marks.

1. Explain why a Nash equilibrium may be an appropriate solution or prediction of the way a simultaneous-move game will be played, but may not be a very good predictor of how a sequential-move game will be played.

2. Player 1 and Player 2 play a game where Nature chooses between two different matrices. The choice of Nature is random with the probability of matrix A , $\mathbb{P}(A) = \frac{1}{3}$.

Nature: A

		Player 2	
		L	R
Player 1	U	(3, 3)	(8, 6)
	D	(6, 9)	(4, 4)

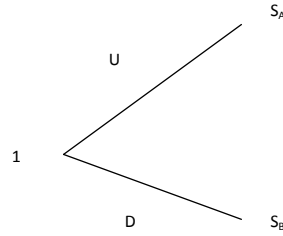
Nature: B

		Player 2	
		L	R
Player 1	U	(9, 3)	(6, 6)
	D	(12, 6)	(4, 3)

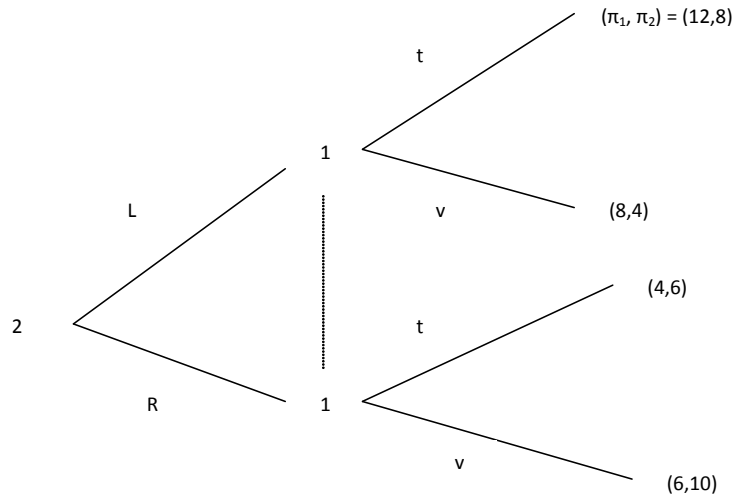
Find a Nash Equilibrium to this game.

PART B: Answer both questions. Each question is worth 20 marks.

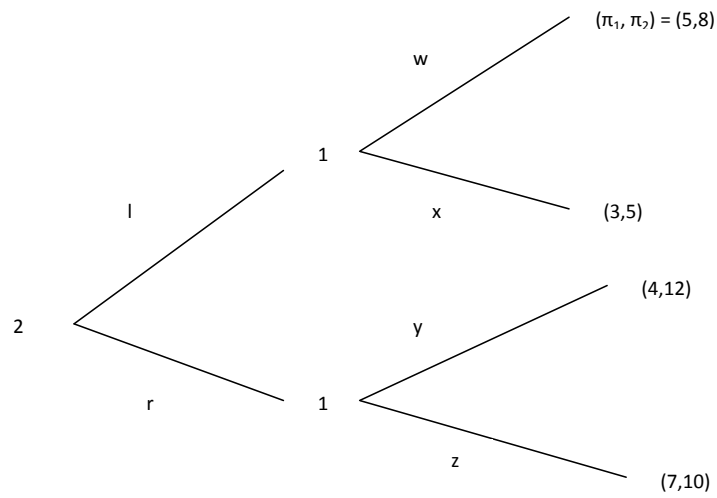
1. Player 1 and Player 2 play a game which consists of a mix of sequential and simultaneous moves. Player 1 begins by choosing U or D and the game goes to either subgame S_A or subgame S_B



Subgame S_A is give by the game tree



And Subgame S_B is give by the game tree



(a) How many subgames are there in this game? (*4 marks*)

- (b) How many strategies does player 2 have in this game? How many strategies does player 1 have in this game? How many possible strategy profiles will this game have? (*4 marks*)

(c) Find all the Nash Equilibria to the simultaneous subgame S_A . (6 marks)

(d) Find all the Subgame Perfect Nash equilibria to the game. (6 marks)

2. Two firms compete in a duopoly market. The firms produce homogeneous goods and each firm has constant marginal costs. The marginal cost of firm 1 is $c_1 = \$20$. The marginal cost of firm 2 is $c_2 = \$30$. Market demand is $Q = 360 - 3P$.

(a) If the firms compete in a Cournot duopoly (compete in quantities), derive the best response functions for both firms, $q_1 = R_1(q_2)$ and $q_2 = R_2(q_1)$. (6 marks)

- (b) Use the Best Response Functions from part (a) to find the Cournot-Nash equilibrium, $\{q_1^c, q_2^c\}$ and determine the total output and price in the market. (5 marks)

- (c) If the firms compete in a Bertrand duopoly (compete in prices), graph the best response functions of both firms and describe the Bertrand-Nash equilibrium. (Show all relevant values on the axes). (5 marks)

- (d) Compare Industry profits in the Cournot-Nash equilibrium (part (b)) and the Bertrand-Nash equilibrium (part (c)). Explain whether industry profits under one competitive structure (Cournot or Bertrand) will always be larger or smaller than the other. (4 marks)