University of Toronto
Faculty of Arts and Sciences

APRIL EXAMINATIONS 2014

ECO316H1S

Duration - 2 hours

No aids are allowed

There are 5 questions in 3 pages. **You must give arguments to support your answers.**

Question 1. [30 points] Consider a variation of the two-party political competition model we studied in class, where each party only cares about the policy outcome of the election (and not about winning itself). Policies are real numbers and the two parties, A and B, simultaneously choose a policy. Each citizen votes for the party whose policy proposal is closest to the citizen's favorite policy, and m denotes the median of the citizens' favorite positions. Party A and B favourite policies are a^* and b^* respectively. If a party receives more than 50% of the votes, the policy outcome is the policy proposed by that party (e.g. if A proposed policy a and receives more votes than B, a is the policy outcome.) If both parties receive 50% of the votes, the policy outcome is an average of the policies proposed by the two parties (i.e. if A proposed a and B proposed b, in case of a tie the policy outcome is $(a+b)/2$.) Both parties only care about the policy outcome of the election. Party A prefers policy outcomes that are closer to its favorite policy a^*, and party B prefers policy outcomes that are closer to its favorite policy b^*.

- Assume $a^* < b^* < m$. (That is, both parties' favorite policies are to the left of the median voter's favorite policy.)

  a) Is the strategy profile $(a, b) = (m, m)$ (i.e. both parties choose the median voter's favorite policy) a Nash equilibrium?

  b) Is the strategy profile $(a, b) = (a^*, b^*)$ (i.e. each party chooses its favorite policy) a Nash equilibrium?

  c) Is the strategy profile $(a, b) = (b^*, b^*)$ (i.e. both parties choose B's favorite policy) a Nash equilibrium?

  d) Is the strategy profile $(a, b) = (a^*, a^*)$ (i.e. both parties choose A's favorite policy) a Nash equilibrium?

  e) For what values of x, with $x < m$, is the strategy profile $(a, b) = (x, 2m - x)$ a Nash equilibrium?

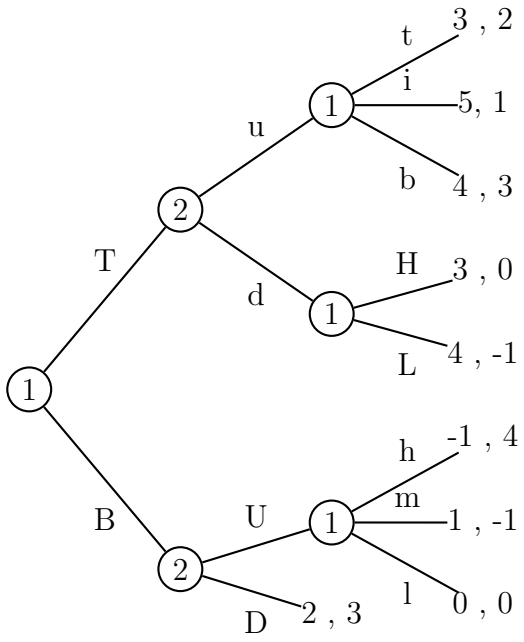
- Assume $a^* < m < b^*$.

  f) How does your answer to questions a) through e) above change?

  g) Find all the Nash equilibria of this game.

— Continued —

Question 2. [25 points] Consider the extensive form game drawn below



a) Describe a strategy for Player 2.

b) How many strategies does Player 1 have in this game?

c) Find all subgame perfect Nash equilibria (backward induction equilibria) of this game.

d) Can you find a strategy that is weakly but not strictly dominated for Player 2?

e) Can you find a strategy that is strictly dominated for Player 2?

f) Solve the game by iterative deletion of **strictly** dominated strategies.

g) Does the game have a Nash equilibrium that is not a subgame perfect (backward induction) equilibrium?

— Continued —

Question 3. [15 points] Consider the two-player zero-sum game described below, where the numbers refer to the payoff of the row player (i.e. the player choosing between T and B).

	l	m	r
T	3	-1	2
B	1	2	-2

a) Find a mixed strategy Nash equilibrium **by using the indifference principle.**

b) Find all Nash equilibria (in pure or mixed strategies) **by finding the intersections of the best response functions.**

c) Find all Nash equilibria **by using the min-max method**.

Question 4. [10 points] Consider the symmetric two-player game described below.

	A	B
A	$1,1$	$1,0$
B	$0,1$	$2,2$

Find all the evolutionary stable strategies (consider both pure and mixed strategies).

Question 5. [20 points] Consider the following strategic game in which x is a real number (can be both positive or negative).

	X	Y	Z
X	x,x	$x,0$	$x,0$
Y	$0,x$	$2,0$	$0,2$
Z	$0,x$	$0,2$	$2,0$

a) Find all the Nash equilibria in pure strategies, as a function of x.

b) Find the values of x for which the game has a mixed strategy Nash equilibrium in which each player assigns positive probability only to Y and Z.

c) For what values of x, if any, the game has a mixed strategy Nash equilibrium in which each player assigns positive probability to all three actions?