

Prof. Dr. Anke Gerber

# Advanced Game Theory

2. Exam Summer Term 2014

## Important Instructions

1. You have 90 minutes to finish the exam.
2. The maximum number of points is 90.
3. You are not allowed to use any material (books, lecture notes etc.), but you may use a non-programmable calculator.
4. Give a reason for your answers. You may end up with zero points for a question if it is not clear how you arrived at your solution.
5. Only use the paper that is handed out to you and submit all paper in the end (including any notes you do not want to be graded).
6. Please write your name on each sheet of paper, number the pages and leave a margin (2.5cm) on each page.
7. Please write legibly and make sure that your answers are coherent and complete.
8. Mobile phones must be switched off throughout the exam.

Good luck!

**Problem 1****(40 Points)**

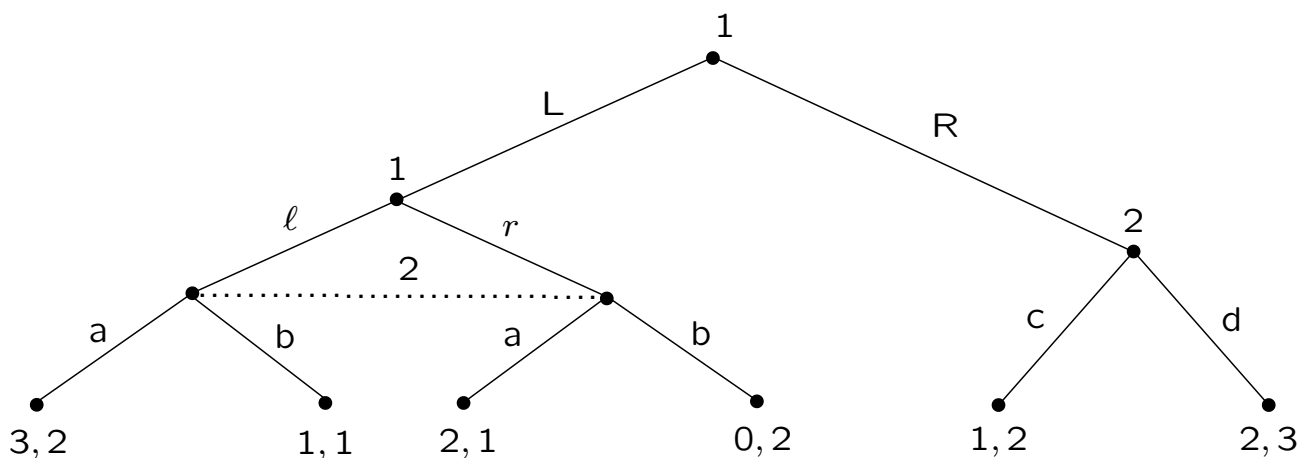
Consider the following two-player normal form game:

		Player 2		
		A	B	C
Player 1	A	2, 2	3, 1	4, 1
	B	1, 3	6, 6	1, 2
	C	1, 4	2, 1	3, 3

1. Determine all pure and mixed strategy Nash equilibria of the game.  
(15 Points)
2. Which of the (pure and mixed strategy) Nash equilibria are trembling-hand perfect? Give a reason for your answer.  
(15 Points)
3. Determine all evolutionary stable strategies assuming that players cannot condition their behavior on playing the game as player 1 or player 2 (symmetric role behavior).  
(10 Points)

**Problem 2****(15 Points)**

Consider the following 2-player game with imperfect information:



The first number at a terminal node is player 1's utility payoff and the second number is player 2's utility payoff.

1. Determine the subgame perfect equilibrium/equilibria of the game.

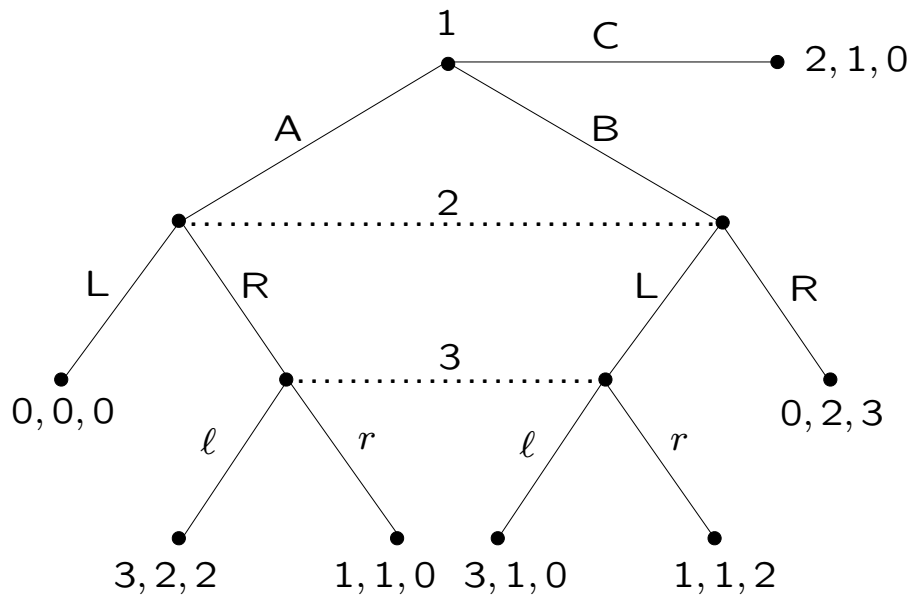
(10 Points)

2. Determine a Nash equilibrium which is no subgame perfect equilibrium of the game.

(5 Points)

**Problem 3****(25 Points)**

Consider the following 3-player game with imperfect information:



The first number at a terminal node is player 1's utility payoff, the second number is player 2's utility payoff and the third number is player 3's utility payoff.

1. Argue that there is no weak perfect Bayesian equilibrium, where player 1 plays  $B$ .  
(5 Points)
2. Determine a weak perfect Bayesian equilibrium, where player 1 plays  $A$ .  
(10 Points)
3. Determine a weak perfect Bayesian equilibrium, where player 1 plays  $C$ .  
(10 Points)