



Stockholm
University

Department of Economics

Course name: Economic Strategic Thinking
Course code: EC2109
Semester: SPRING 2016
Type of exam: RETAKE
Examiner: Robert Östling
Number of credits: 7,5 credits
Date of exam: Sunday 24 April 2016
Examination time: 3 hours (9:00-12:00)

Write your identification number on each paper and cover sheet (the number stated in the upper right hand corner on your exam cover).

Use one cover sheet for all questions in Part A and one cover sheet per question in Part B. Explain notions/concepts and symbols. If you think that a question is vaguely formulated, specify the conditions used for solving it. Only legible exams will be marked. **No aids are allowed.**

The exam consists of 8 questions. Each question is worth 8 to 24 points, 100 points in total. For the grade E 45 points are required, for D 50 points, C 60 points, B 75 points and A 90 points.

Your results will be made available on your "My Studies" account (www.mitt.su.se) on Monday 16 May at the latest.

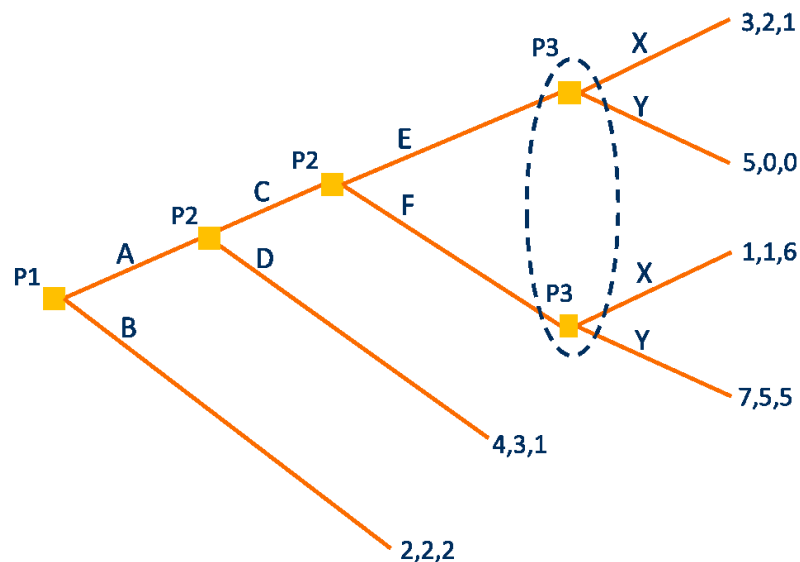
Good luck!

PART A: Multiple-choice questions

Indicate one alternative per question only. Correct answers give 8 points, incorrect answers minus 2 points.

QUESTION 1 (8 POINTS)

What is the subgame perfect Nash equilibrium of the following game?



- (A) P1 plays A, P2 plays D and E, P3 plays X.
- (B) P1 plays A, P2 plays C and E, P3 plays X.
- (C) P1 plays A, P2 plays C and F, P3 plays Y.
- (D) P1 plays B, P2 plays C and F, P3 plays Y.
- (E) P1 plays B, P2 plays C and E, P3 plays X.

QUESTION 2 (8 POINTS)

Consider the following Prisoner's Dilemma game where x is between 40 and 100. Suppose this game is repeated indefinitely and that the effective rate of return is 20 percent, i.e. a payoff of 100 in one period is worth 120 in the next. What is the lowest value of x such that mutual cooperation supported by grim-trigger strategies is a subgame perfect Nash equilibrium of the infinitely repeated game?

		Player 1	
		Cooperate	Defect
Player 2	Cooperate	x, x	25, 100
	Defect	100, 25	40, 40

- (A) x must be larger than 40.
- (B) x must be larger than 50.
- (C) x must be larger than 60.
- (D) x must be larger than 80.
- (E) Cooperation cannot be sustained for any x between 40 and 100.

QUESTION 3 (8 POINTS)

Xing and Yuki simultaneously choose numbers. Let Xing's choice be denoted x and Yuki's choice be denoted y . Xing's payoff is $3x - 2xy - 2x^2$ and Yuki's payoff is $y + 2xy - 2y^2$. What is the Nash equilibrium of this game?

- (A) Xing chooses $1/2$ and Yuki chooses $1/2$.
- (B) Xing chooses $1/4$ and Yuki chooses $3/4$.
- (C) Xing chooses $3/4$ and Yuki chooses $1/4$.
- (D) Xing chooses $5/8$ and Yuki chooses $3/8$.
- (E) Xing chooses $3/8$ and Yuki chooses $5/8$.

QUESTION 4 (8 POINTS)

Consider the following game in which Anne, Bob and Francisco face the choice whether to come on time or to arrive late for a meeting. The payoffs of the players are represented by the payoff tables below, and payoffs are denoted as usual, i.e. "X,Y,Z" means X to Anne, Y to Bob and Z to Francisco. What is the pure-strategy Nash equilibrium (NE) prediction for what will happen?

		Bob	
		On time	Late
Anne	On time	6,6,6	0,5,0
	Late	5,0,0	5,5,0

		Bob	
		On time	Late
Anne	On time	0,0,5	0,5,5
	Late	5,0,5	4,4,4

- (A) The only pure-strategy NE is that all three come on time.
- (B) The only pure-strategy NE is that all three come late.
- (C) There are two pure-strategy NE: either they all come on time or they all come late.
- (D) There are three pure-strategy NE: one is on time and the other two are late.
- (E) None of the above alternatives.

QUESTION 5 (8 POINTS)

Suppose there are two firms A and B that compete in a market by setting quantities. Firm A first sets its quantity a . Firm B then observes Firm A's choice and sets its quantity b . The market price is then determined so that the profit of Firm A is $(12 - a - b) \cdot a$ and the profit of Firm B is $(12 - a - b) \cdot b$. What quantities do the two firm choose in the subgame perfect Nash equilibrium of this game? We assume that both firms maximize profits.

- (A) Firm A chooses $a = 6$ and firm B chooses $b = 3$.
- (B) Firm A chooses $a = 3$ and firm B chooses $b = 6$.
- (C) Both firms choose $a = b = 3$.
- (D) Both firms choose $a = b = 4$.
- (E) Both firms choose $a = b = 6$.

PART B: Open-ended questions

Clearly motivate your answers to the following questions and explain any calculations that you make!

QUESTION 6 (24 POINTS)

During the so called “Arab Spring” of 2011, millions of citizens in North Africa and the Middle East demonstrated against repressive regimes leading to governments being overthrown in several countries. Let x be the fraction of a population that participates in a protest. If you do stay home instead of participating in a protest, your utility is $S(x) = 4x$. Participating in a protest is costly because you risk getting punished, but if the protest succeeds the benefit will also be higher. Suppose therefore that the utility from participating is $P(x) = 8x - 2$.

(A) (6 POINTS) Draw a diagram showing the utility from staying home and participating, respectively. Put the fraction of people participating x (ranging from 0 to 1) on the horizontal axis.

(B) (6 POINTS) Determine the Nash equilibria of this game. Motivate your answer carefully.

(C) (6 POINTS) Are some of the equilibria found in (B) more or less plausible?

(D) (6 POINTS) In terms of the different types of simultaneous-move two-player games with two strategies for each player that were discussed in class (Hi-Lo Coordination, Chicken, etc), which is this game most similar to?

QUESTION 7 (12 POINTS)

(A) (1 BONUS POINT) Pick an integer between 1 and 100. The closest to $4/3$ of the average choice among everybody taking this exam gets a bonus point. If several answers are equally close, the bonus point is split among those that gave this answer.

(B) (12 POINTS) Motivate your answer to part (A) in light of both theory and empirical evidence.

QUESTION 8 (24 POINTS)

Donald Trump was recently asked in an interview with the news agency Bloomberg whether he would rule out using tactical nuclear weapons to combat ISIS. His response was the following:

“I'm never going to rule anything out. Even if I felt it wasn't good, I wouldn't want to tell you that because at a minimum, I want them [ISIS] to think maybe we would use them [nuclear weapons]. [...] The fact is, we need unpredictability and when you ask a question like that, it's a very sad thing to have to answer it because the enemy is watching and I have a very good chance of winning and I frankly don't want the enemy to know how I'm thinking. But with that being said, I don't rule out anything.”

Discuss in relation to what you have learnt in this course whether A) you think Mr. Trump's discussion about the importance of unpredictability makes sense and B) and what potential risks it involves.