Stockholm University

Department of Economics

Course name:	**Economic Strategic Thinking**
Course code:	**EC2109**
Type of exam:	**RETAKE**
Examiner:	**Robert Östling**
Number of credits:	**7.5 credits**
Date of exam:	**Saturday 27 April 2013**
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 9 questions. Each question is worth 1 to 26 points, 100 points in total. Credits from the home assignments and class experiment will be added to your exam score. For 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 17 May 2013 at the latest.

Good luck!

PART A: Multiple-choice questions

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

QUESTION 1 (8 POINTS)

The relationship between North Korea and the US has been quite tense lately. Suppose that both countries have the option to attack the other country using nuclear weapons. If they both attack, the payoffs are -10 to both, whereas they if they both abstain they get a payoff of 10. Not attacking is risky, however, and the country that is hit by a unilateral attack gets a payoff of -20. This game has two pure strategy Nash equilibria and the experience so far suggest that both countries is playing the efficient equilibrium. Suppose that they instead play the mixed strategy equilibrium of this game. What would the probability of peace (i.e. both not attacking) be in this case?

		Kim Jong-un	
		Attack	No attack
Barack Obama	Attack	-10,-10	0,-20
	No attack	-20,0	10,10

(A) 75 percent
(B) 50 percent
(C) 33 percent
(D) 25 percent
(E) None of the above alternatives.

QUESTION 2 (8 POINTS)

Consider the following two-player game. What strategy profiles are pure-strategy Nash equilibria of this game?

		Column			
		W	X	Y	Z
Row	A	73,83	10,20	-4,8	0,84
	B	60,50	60,65	-10,15	0,30
	C	60,10	8,18	-5,20	0,0
	D	10,20	60,0	-9,2	0,30
	E	0,0	0,0	200,0	1,1

(A) (B,X) and (E,Z).
(B) (E,Z).
(C) (A,W), (E,Y) and (E,Z).
(D) (A,W), (B,X) and (E,Z).
(E) None of the above alternatives.

QUESTION 3 (8 POINTS)
In the TV show *Golden Balls* two contestants have to simultaneously choose "Split" or "Steal". The payoffs to both players are described by the payoff matrix below. (Note that the payoffs have been adjusted compared to the game discussed in class – it is here assumed that a player gets a negative payoff when choosing split against an opponent that picks steal.)

		Player 2	
		Split	Steal
Player 1	Split	50,50	-10,100
	Steal	100,-10	0,0

Comparing the pure-strategy Nash equilibrium when they choose actions simultaneously to the subgame perfect Nash equilibrium when one players get to choose first (and this is observed by the other player), which of the following statements about move-order advantages is true?

(A) Both players gain when one player moves first.
(B) The order of moves does not matter in this game.
(C) The first-moving player gains.
(D) The second-mover gains.
(E) None of the above alternatives is true.

QUESTION 4 (8 POINTS)
Bob and Francisco eventually decided to enter the health drink business and both of them are doing surprisingly well. They are now about to expand by opening factories that produce homeopathic drugs (which are in high demand despite being useless). They both have to make a decision about how large the production capacity of their factories should be. Both of them choose capacity independently and simultaneously.

Bob's profit function when Bob chooses capacity Q_B is $\Pi_B = P \times Q_B - 5 \times Q_B$ and Francisco's profit with capacity Q_F is $\Pi_F = P \times Q_F - 5 \times Q_F$. The price of the drug when they produce Q_B and Q_F units is $P = 125 - Q_B - Q_F$. Which capacity will Bob choose in the Nash equilibrium of this game?

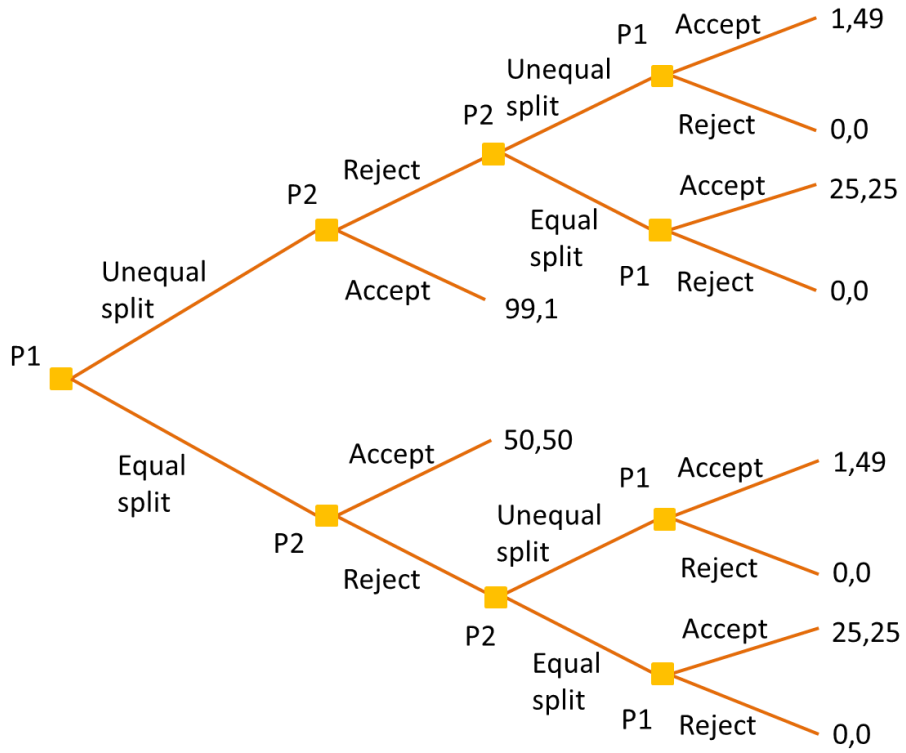
(A) 0
(B) 20
(C) 40
(D) 60
(E) None of the above alternatives.

QUESTION 5 (8 POINTS)
In which type of auction is it in your interest to bid truthfully (i.e. bid your valuation or best guess of the value of the object)? We assume that you want to maximize earnings and are risk neutral.

(A) Common-value English auction
(B) Private-value Dutch auction
(C) Private-value sealed-bid second-price auction
(D) Private-value sealed-bid first-price auction
(E) All-pay auction

QUESTION 6 (8 POINTS)

Consider the "alternating-offers bargaining game" shown below in which Player 1 (P1) first proposes how to split 100 SEK (either 50-50 or 99-1). Player 2 (P2) then has the choice to accept or reject. If P2 accepts, the game is over and they each get what P1 proposed. If P2 rejects P1's proposal, the total amount to be shared shrinks and P2 gets to make a counterproposal how to split 50 SEK which P1 then has to either accept or reject. Assuming that players only care about getting as much money as possible, how much does P1 get in the subgame perfect Nash equilibrium?

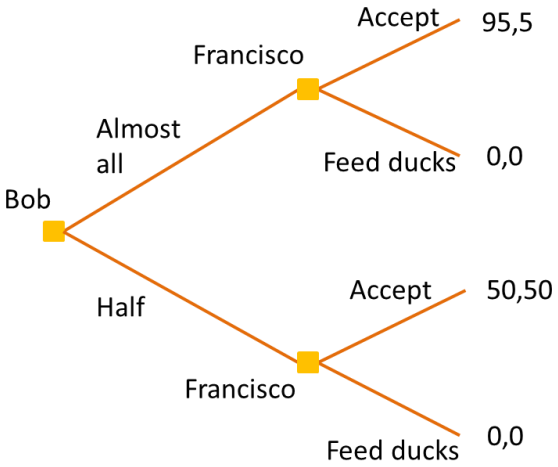


(A) 0
(B) 1
(C) 49
(D) 50
(E) 99

PART B: Open-ended questions

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

QUESTION 7 (25 POINTS)
When Bob and Francisco still were a couple they once decided to share a cinnamon roll to celebrate their anniversary. They decided that Bob was going to take a part of the roll and that Francisco then could choose to either eat the rest of it or to give the whole roll to some ducks in a nearby pond. This situation can be represented by the game tree shown below. In part (A) to (C) of this question we assume that the numbers below represent calories and that Bob and Francisco only care about maximizing their own calorie intake.



(A) (5 POINTS) What is the subgame perfect Nash equilibrium of this game?

(B) (8 POINTS) Write down the payoff matrix for the simultaneous-move version of this game that include all strategies of the extensive form game (i.e. two strategies for Bob and four for Francisco). Find all pure-strategy Nash equilibria of the game.

(C) (6 POINTS) Are there Nash equilibria that are not subgame perfect? If so, argue why these equilbria are not credible.

(D) (6 POINTS) Discuss what you think would happen in a real-life situation like this (i) among two people who know each other well and (ii) by students participating in an experiment that are anonymous to each other?

QUESTION 8 (26 POINTS)
At many workplaces there is a common kitchen that the staff can use. Anecdotal evidence suggests that it is a common problem that people do not keep the kitchen tidy by cleaning their dishes etc. Keeping a common kitchen in order appears to be a collective action problem of the prisoner's dilemma type: it is individually rational not to the dishes and everybody not doing their dishes results in a very dirty kitchen. For the purpose of this question, we assume that it is not possible to hire someone to keep the kitchen tidy.

(A) (16 POINTS) Discuss four potential solutions to this particular collective action problem based on what you have learnt in this course.

(B) (10 POINTS) Given the plethora of potential solutions, briefly discuss why dirty kitchens seems to be a problem at many workplaces.

QUESTION 9 (1 POINT)

Two students went on a weekend trip before an exam and therefore did not have enough time to prepare for the exam. The students decided to make up a story about having a flat tire on their way back so that they did not have enough time to prepare for the exam. They asked their teacher if they could have an extra day to prepare for the exam. The teacher surprisingly agreed and prepared a special exam for the two students. The exam only consisted of one single question: “Which tire?”.

If you were one of the two students, which tire would you choose (rear-right/rear-left/front-right/front-left)? If you pick the same tire as most of the other students that take this exam you get 1 point, otherwise you get zero points.