

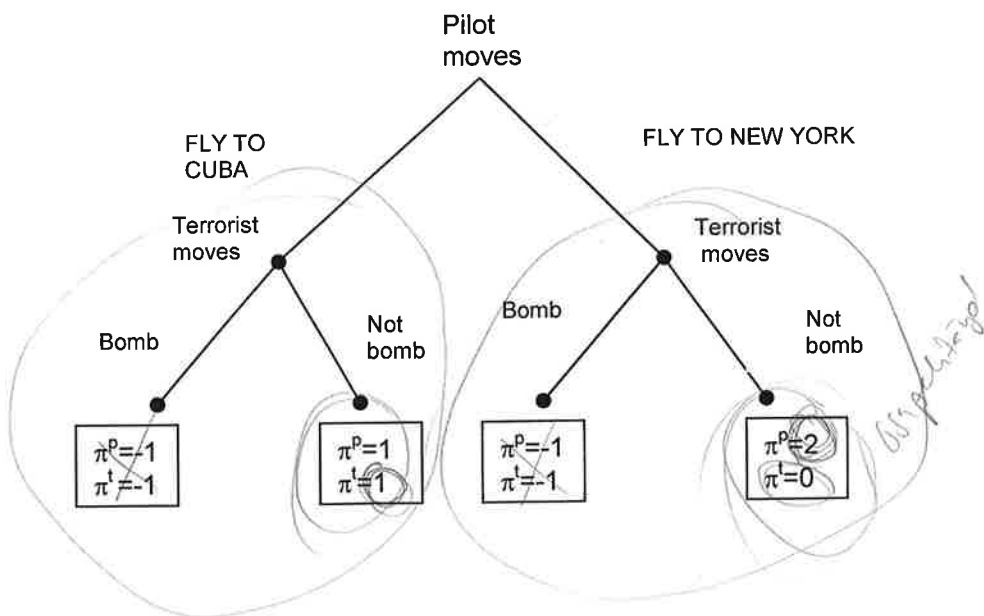


Tentin päivämäärä / Date of exam: 13.10.2015	Tentin kesto tunteina / Exam in hours: 4
Tiedekunta / Faculty: Oulu Business School	
Opintojakson koodi, nimi ja tentin numero / The code and the name of the course and number of the exam: 721333S, Industrial Organization (1)	
Tentaattori(t) / Examiner(s): Maria Kopsakangas-Savolainen	
Sallitut apuvälineet / The devices allowed in the exam: <input checked="" type="checkbox"/> Laskin (ei graafinen/ohjelma) / Calculator (not graphic, programmable) <input checked="" type="checkbox"/> Sanakirja/ Dictionary <input type="checkbox"/> Muu materiaali, tarkennettu alla / Other material, specified below	
Tenttiin vastaaminen / Please answer the questions: <input checked="" type="checkbox"/> suomeksi/ in Finnish <input checked="" type="checkbox"/> englanniksi/ in English	
Kysymyspaperi on palautettava / Paper with exam questions must be returned: <input checked="" type="checkbox"/> Kyllä/Yes <input type="checkbox"/> Ei/No	

Each question gives you max 6 points.

1. Figure below describes an extensive form version of the pilot and the terrorist game. One player is the pilot (p) and one is terrorist (t). A terrorist boards a flight from Minneapolis to New York. After thirty minutes, after reaching a cruising altitude of thirty thousand feet, the terrorist approaches the pilot and whispers to the pilot that she will explode a bomb if the pilot does not fly to Cuba. The payoffs of the game are presented at the end of the each branch. Work through the following problems:

- How many subgames are there in this game? Describe all the subgames.
- Find all the Nash equilibria in each subgame. Prove your answer.
- Find all the subgame perfect equilibria for this game



2. A local bar owner has a constant unit costs of 2€ per drink. He determines that the demand for drinks is different for students than it is for those age 25 or over, with each group comprising about half of his nightly crowd. Specifically, he discovers that the demand for drinks is:

$$\text{Age 18-25: } q = 18 - 5p$$

$$\text{Age 25 and over: } q = 10 - 2p$$

- a. If no discrimination is possible, what is the optimal uniform price assuming it is low enough that both groups buy?
 - b. If the bar owner adopts a two-part pricing policy that is the same for everyone, what will be the cover charge (fixed fee), and what will be the price per drink?
 - c. How would your answer to b. change if students comprised only 30 percent of the customers?
3. In a market with annual demand $Q = 100 - p$, there are two firms, A and B, that make identical products. Because their products are identical, if one firm charges a lower price than the other, all consumers will want to buy from the lower-priced firm. If they charge the same price, consumers are indifferent and end up splitting their purchases about evenly between the firms. Marginal cost is constant and there are no capacity constraints. (Assume marginal costs to be 10).
- a. What are the single-period Nash equilibrium prices, p_A and p_B ?
 - b. What prices would maximize the two firms' joint profits?

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Assume now, that one firm cannot observe the other's price until after it has set its own price for the year. Assume further that both firms know that if one undercuts the other, they will revert forever to the noncooperative behavior you described in a).

- c. If the interest rate is 10%, is one repeated-game Nash equilibrium for both firms to charge the price you found in part b)? What if the interest rate is 110%? What is the highest interest rate at which the joint profit-maximizing price is sustainable?
4. Give a definition of product differentiation, describe the spatial model of Hotelling and further, derive (at least graphically) the equilibrium resulting from Hotelling model for product differentiation.
5. Consider a situation where an authority wants to regulate a firm but it does not know the true costs of the firm. Explain what kind of economic mechanism would give the firms sufficient incentive to report its true costs.

