Mikroökonomik
WS 2000/2001

Übungsaufgaben 2

Aufgabe 1

Firm 1 and firm 2 produce differentiated products and engage in the following type of price competition: firm 1 chooses its price, p_1, first. Firm 2 observes this price choice, and then chooses its own price, p_2. Marginal costs are zero for both firms. The demand functions are

$$D_1 = 1 - p_1 + p_2 \quad \text{for firm 1, and}$$
$$D_2 = 1 - p_2 + p_1 \quad \text{for firm 2.}$$

   (a) Derive the subgame-perfect Nash equilibrium (prices). Show that in this game it is better to be the second mover.

   (b) How would your answer to (a) change, if the two firms chose prices simultaneously? (Derive equilibrium prices and profits.)

Aufgabe 2

Finden Sie alle Nash Gleichgewichte und teilspielperfekten Nash Gleichgewichte im folgenden Spiel:

Aufgabe 3

World market demand for crude oil is $Q = 150 - p$. There are two producers in the world, called Iran and Kuwait, with identical costs functions: $C(q) = 30\,q$.

(a) If the two producers compete in **Cournot** fashion by choosing output, calculate the Nash equilibrium outputs and profits of each producer and the equilibrium price.

(b) If Iran is the **Stackelberg** leader and Kuwait the follower, compute the subgame perfect Nash equilibrium outputs as well as price and profits.

(c) Now suppose that the two producers form a cartel and restrict their oil production. In particular, the producers decide to set production quotas where each of them gets to produce half the monopoly output. How much is each producer allowed to produce under the quota? Also compute the associated monopoly price and each producer's profit.

(d) If Iran were to abide by its quota (i.e. produced half the monopoly output), but Kuwait were to cheat by raising its output above the quota, how much oil would Kuwait produce and what would its profit from cheating be?

(e) Suppose that to maintain the cartel the two producers use the following trigger strategies: each country produces half the monopoly output and obtains half the monopoly profit as long as nobody has cheated; once a country has cheated, they play according to the Cournot-Nash equilibrium in all subsequent periods. If the discount factor between periods is given by δ, calculate the minimum discount factor needed to support the cartel.

(f) Show how your answer to (d) would change, if the countries were able to detect cheating and thus start punishment only after two periods have passed.