

Problem Set 07 (due date: 02.12.2013)

1. Consider a monopolist who sells two types of notebooks with different batteries. One has a battery life time of $s_1 = 6$ hours and the other a battery life time of $s_2 = 4$ hours. The marginal costs of the high performance battery are $c_1 = 200\text{€}$ and the marginal costs of the standard $c_2 = 120\text{€}$. Depending on the quality level and on the price, consumer's utility is $U = \theta s_j - p_j$, with $j = 1,2$ and θ equally distributed in the interval $[0,100]$.
 - a) Derive the demand functions for notebooks with quality s_1 and notebooks with quality s_2 .
 - b) Derive the equilibrium prices and quantities and calculate the firm's profit.
 - c) Is the market covered? Illustrate your answer.

2. A cable company has two services: the Basic Service channel and the Walt Disney channel. The potential subscribers for the services regard the two services as separate alternatives, that is, not as complementary products. Thus the demand for the two services is completely unrelated for each and every consumer. Each buyer is characterized by a pair of reservation prices as shown in the following table:

	Basic Service	Disney channel
Students	5	15
Families	11	9
Hotels	14	6
Schools	4	16
Young adults	0	17
Pensioners	17	0

The marginal cost of each service is \$3. Assume there are equal numbers of consumers in each category.

- a) If services are sold separately and not offered as a bundle, what price should the cable operator set for each service? What profits will it earn? Which consumers will subscribe to which service?
- b) Suppose that the operator decides to pursue a mixed bundling strategy. What price should be set for the bundled service? What price should be set for each service if purchased individually? Which consumers buy which options, and what are the cable operator's profits?
- c) How would your answers to the first two questions change if the marginal cost of producing each service had been \$10 instead of \$3?

3. Consider the following simplified picture of the personal computer industry. There are many price taking firms that assemble computer systems. Call these firms “computer OEMs” (“Original Equipment manufacturers”). Each of these firms must buy three inputs for each computer system that it sells: (1) a variety of components that are themselves supplied competitively and collectively cost the computer OEM \$ 500 per computer; (2) the Windows operating system, available only from Microsoft, at a price p_M , to be discussed below; and (3) a Pentium microprocessor, available only from Intel, at a price p_I , also to be discussed below.

Since each computer system requires precisely one operating system and one microprocessor, the marginal cost of a computer to an OEM is $500 + p_M + p_I$. Assume that competition among OEMs drives the price of a computer system down to marginal cost, so we have $p = 500 + p_M + p_I$, where p represents the price of a computer system.

The demand for computer system is given by $Q = 100mio - 50\,000 p$. Microsoft is the sole supplier of the windows operating system for personal computers. The marginal cost to Microsoft of providing Windows for one more computer is zero. Intel is the sole supplier of the Pentium microprocessors for personal computers. The marginal cost to Intel of a Pentium microprocessor for one more computer system is \$ 300.

- a) Suppose that Microsoft and Intel simultaneously and independently set the prices for Windows and Pentium chips, p_M and p_I . What are the Nash equilibrium prices p_M^* and p_I^* ?

Now suppose that Microsoft and Intel sit down to negotiate an agreement to sell Windows and Pentium chips as a package to computer OEMs for a package price of p_{MI} .

- b) What package price would maximize Microsoft's and Intel's combined profits? By how much would an agreement between Microsoft and Intel boost their combined profits?
- c) Would final consumers benefit from such an agreement between Microsoft and Intel, or would they be harmed? What about computer OEMs? Relate your answer to your calculations in part a) and b) and explain the economic principles underlying your answer.