

## **Homework (2)**

### **Exercise:**

A company successively stores two types of polystyrene A1 and A2 in three separate warehouses E1, E2 and E3 so that they undergo special treatment there. The operating cost of warehouse E1 is 200 euros per day, that of warehouse E2 is 400 euros and that of warehouse E3 is 300 euros. Storage times for one ton of A1 polystyrene are 3 days in warehouse E1, 1 day in warehouse E2 and half a day in warehouse E3. They are for 2-day A2 polystyrene in each of the 3 warehouses.

The manufacturing costs of polystyrene A1 and A2 are respectively 600 euros and 400 euros per ton. The selling price of one ton of polystyrene manufactured is 1950 euros for A1 and 2440 euros for A2.

### **Task 1:**

- (a) Calculate the cost of storing one ton of polystyrene A1 and one ton of polystyrene A2.
- (b) Determine the profit made by manufacturing, storing and selling one ton of each of the products.
- (c) Write the objective function that maximizes company's profits.

### **Task 2:**

Storage logistics are such that warehouse E1 can operate a maximum of 360 days a year, warehouse E2 can operate a maximum of 160 days a year, warehouse E3 cannot operate for more than 120 days annually. The demand is such that the production of polystyrene A1 cannot exceed 120 tons, that of A2 50 tons.

We now want to determine the number of tons of the two products that would give the firm the maximum profit.

- (a) Give the production constraints in the form of a linear program
- (b) Use the simplex method to determine the quantity production, which will ensure the maximum benefit.