Exercise 1

The Austrian ministry has 6 delegates (D1-D6) waiting to be sent to the ambassadors of the following foreign countries: Egypt, Rumania, Tunisia, Japan, and Benin. Since each embassy is only to be assigned with 1 delegate, one of them has to stay in Austria. See the following table for the expected profit for each delegate being assigned to each of the embassies:

	Egypt	Rumania	Tunisia	Japan	Benin
D1	29	9	2	17	21
D2	4	20	22	26	20
D3	9	24	28	20	5
D4	21	20	16	13	17
D5	15	28	17	8	18
D6	26	19	5	22	15

a) What ist he optimal assignment of delegates to embassies?

Exercise 2

An international company plans the outsourcing of it's marketing activities to five of their subcompanies, each of them located in one of the continents: Europe, Asia, Africa, America, Australia. At the moment there are 5 marketing specialist available and each of them should be assigned to one of the subcompanies.

The following table contains the expected costs for each combination of marketing specialist and subcompany. Recently, the head of marketing announced that he wants to gain experience abroad, as well. Due to several reasons the cost of assigning him to any of the subcompanies always equals the minimum assignment cost for this continent (e.g. assigning the head of marketing to Europe leads to the same cost as the assignment for specialist 3 to Europe).

	Europe	Asien	Afrika	Amerika	Australien
Specialist 1	11	20	18	11	18
Specialist 2	20	17	27	24	28
Specialist 3	9	14	2	22	6
Specialist 4	13	11	28	28	27
Specialist 5	14	8	7	13	10

Apply Kuhn's Algorithm in order to find the optimal assignment of specialists and head of marketing to the continents. Which of them has to carry on working in the headquarter?

Exercise 3

Company XY built a new production plant consisting of 4 assembly halls.

1	3
2	4

Each hall is going to be equipped with a machine (A, B, C, and D). The following material flow is expected to be transported between the 4 machines (per day):

	А	В	С	D
А	-	4	8	15
В		-	2	6
С			-	20
D				-

Transportation cost for 1 material unit moved from one hall to an adjacent one is 1 monetary unit. The CEO of XY is trying to find out an assignment of machines to halls minimizing the total transportation cost.

He has to take into account that due to technical reasons machine D has to be allocated to hall 3 (this you have to consider in your starting solution

a) Solve the given problem by applying "Umlaufmethode". If there are 2 halls which seem to be equally suitable for the next allocation choose those with the smaller number. What are the total transportation costs?