Linear programming

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Part I

Zad. 1. Manufacturer produces two goods W_I i W_{II}, profit from selling them is respectively 4 and 1. There are three resources used in the production process S_1, S_2 and S_3, reserves are respectively 12, 6 and 1. For production of W_I 2 units of S_1 are required, 3 units of S_2 and 1 of S_3. Resource S_3 is a waste in production process of good W_{II} (2 units pre product), additionally unit of W_{II} needs 3 units of S_1 and one unit of S_2. Manufacturer is obliged to give away to its contractor 3 units of S_3 at the end of production process. Construct linear programming model. How to maximize profit?

Zad. 2. Two distinct goods G_1 and G_2 are produced. Production process needs three resources consumption, limits and profits are given in the table.

Resource	G_1	G_2	Limits
R_1	1	1	7
R_2	4	10	40
R_3	0	1	3
Profit	1	4	

Determine the optimal solution assuming that products are indivisible.

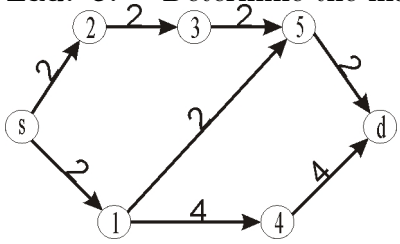
Zad. 3. There are four machines and three employees. Each machine can be operated by each worker, the costs are given in the table.Using Hungarian algorithm find the minimal matching, if we allow that one machine wont be operated.

	Machines			
Worker	M_1	M_2	M_3	M_4
W_1	5	1	6	4
W_2	4	8	5	3
W_3	7	2	5	6

Zad. 4. There are five workers and four tasks each cost of executing each task by each worker is given in the table. Using Hungarian algorithm find the minimal assignment.

	W_1	W_2	W_3	W_4	W_5
T_1	12	3	4	3	7
T_2	7	4	6	5	21
T_3	4	1	2	12	5
T_4	6	7	5	4	3

Zad. 5. Determine the maximal flow.



Zad. 6. Determine the maximal flow.