

## Hand-in exercise 3 in Linear and Combinatorial Optimization 2019.

Work in pairs and hand in a solution by sending the description of your solution and your answers for exercises 1, 2 and 3 below by email or in class to me (sara@maths.lth.se). Make sure both names are on everything that you hand in.

*Due date: 5 March 2019.*

An airline company can buy gasoline from three suppliers. The suppliers have available 100K, 120K and 60K of liters, respectively (where K=1000). The company needs gasoline at four locations, each location requiring 50K, 40K, 90K and 70K of liters, respectively. The price (in kronor) per liter for gas delivered to each location is as follows.

		location			
		1	2	3	4
supplier	1	11	*	8	8
	2	7	5	6	12
	3	7	6	8	5

However, supplier 1 cannot deliver gas to location 2 (and therefore no price is given in the table). In addition, supplier 1 offers a discount for delivery to location 4: every 1 liter bought after 20K liters will cost 5 kronor (instead of 8 kronor). For example, if the company buys 30K liters from supplier 1 for location 4, then the cost is  $20K \times 8 + 10K \times 5 = 210K$  kronor.

1. Formulate the above problem as a mathematical optimization problem.
2. Describe a way to solve the formulated problem.
3. How should the company buy the gasoline to minimize the total cost in this case?