IE 407 - FUNDAMENTALS OF OR | FALL 2022

HOMEWORK 2

Due: 17.00 on December 12, 2022

ABCco produces pesto sauce at five different plants. The capacity (in tons) of each plant is given in Table 1. The per-ton cost (in hundreds of dollars) of producing pesto sauce at each plant and shipping it to each warehouse is given in Table 2. ABCco has four customers. The cost of shipping a ton of sauce from each warehouse to each customer is as given in Table 3. Each customer must be delivered the amount (in tons) of sauce given in Table 4.

a) How should the customers be served to minimize the cost of meeting the customer demand?
b) Suppose these are annual demands and there is a fixed annual cost of operating each plant and warehouse. These costs (in thousands) are given in Table 5. How should the customers be served?
c) In addition to the fixed annual costs, sauce from warehouse 1 to all customers at the following prices: first 100 tons at the prices given in Table 3 and the rest is at $30/ton. Also suppose that pesto sauce is stored at one of three warehouses. How should the customers be served?

Table 1.

	Plant				
	1	2	3	4	5
Tons	300	200	300	200	400

Table 2.

		To		
		Warehouse 1	Warehouse 2	Warehouse 3
From	Plant 1	8	10	13
	Plant 2	7	5	8
	Plant 3	8	6	7
	Plant 4	5	6	8
	Plant 5	7	6	10

Table 3.

		To			
		Customer 1	Customer 2	Customer 3	Customer 4
From	Warehouse 1	40	70	90	50
	Warehouse 2	70	30	60	80
	Warehouse 3	80	60	50	60

Table 4.

	Customer			
	1	2	3	4
Demand	200	300	250	350

Table 5.

Facility	Fixed Annual Cost (in Thousands) $
Plant 1	40
Plant 2	50
Plant 3	45
Plant 4	50
Plant 5	45
Warehouse 1	30
Warehouse 2	40
Warehouse 3	30