Optimization Theory

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Section: DS2A

Childfair Company

The Childfair Company has three plants producing child push chairs that are to be shipped to four distribution centers. Plants 1, 2, and 3 produce 12, 17, and 11 shipments per month, respectively. Each distribution center needs to receive 10 shipments per month. The distance from each plant to the respective distributing centers is given below:

		Distance			
		Distribution Center			
		1	2	3	4
Plant	1	800 miles	1,300 miles	400 miles	700 miles
	2	1,100 miles	1,400 miles	600 miles	1,000 miles
	3	600 miles	1,200 miles	800 miles	900 miles

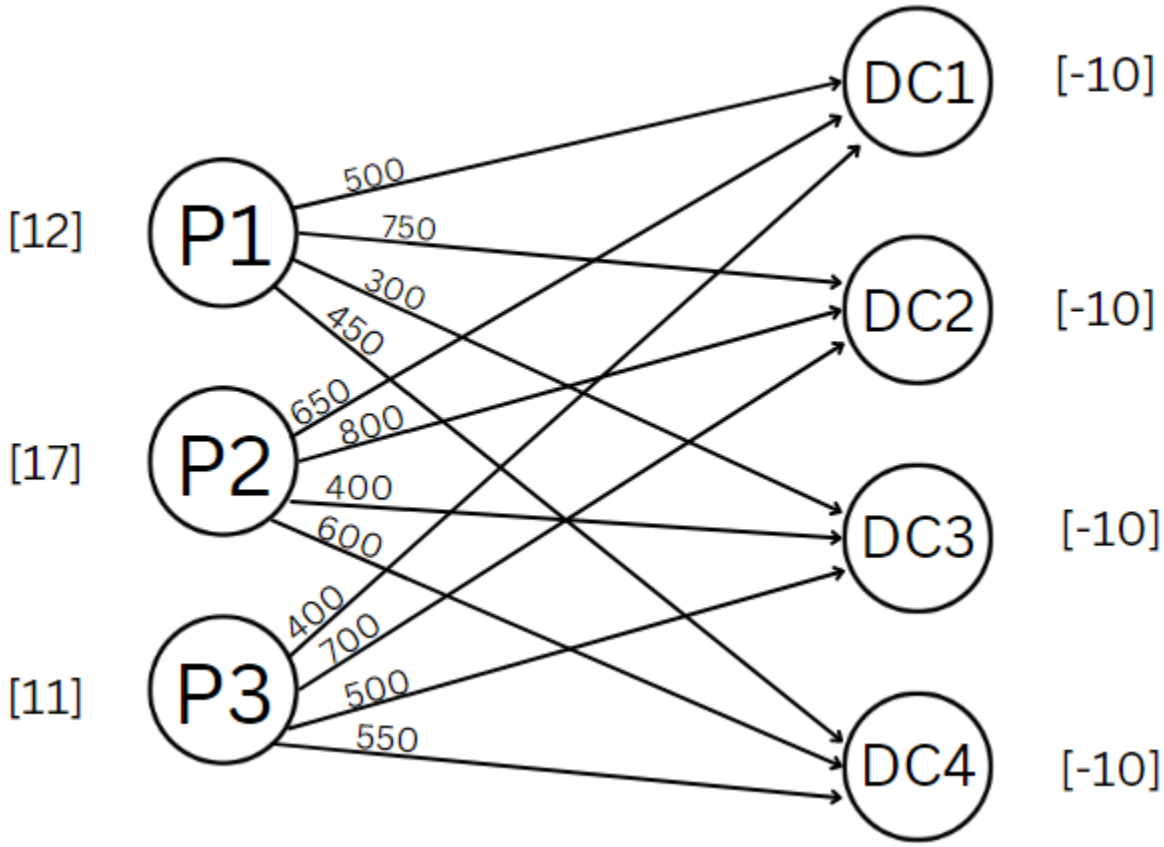
The freight cost for each shipment is $100 plus 50 cents per mile. How much should be shipped from each plant to each of the distribution centers to minimize the total shipping cost?
(a) Formulate this problem as a transportation problem by constructing the appropriate parameter table.
(b) Draw the network representation of this problem.
(c) Obtain an optimal solution.

A. Formulate this problem as a transportation problem by constructing the appropriate parameter table.

		Distance			
		Distribution Center			
		1	2	3	4
Plant	1	800	1,300	400	700
	2	1,100	1,400	600	1,000
	3	600	1,200	800	900

		Freight				
		Distribution Center				Cost
		1	2	3	4	
Plant	1	$ 500	$ 750	$ 300	$ 450	$ 2,000
	2	$ 650	$ 800	$ 400	$ 600	$ 2,450
	3	$ 400	$ 700	$ 500	$ 550	$ 2,150
Allocation		$ 1,550	$ 2,250	$ 1,200	$ 1,600	

B. Draw the network representation of this problem.



C. Obtain an optimal solution.

		Shipped						
		Distribution Center				Total		Produce
		1	2	3	4			
	1	0	0	2	10	12	=	12
Plant	2	0	9	8	0	17	=	17
	3	10	1	0	0	11	=	11
Total		10	10	10	10	20200	(Total shipping cost)	
		=	=	=	=			
Demand		10	10	10	10			