

Answer on Question #65631 – Economics – Economics of Enterprise

	Schools			
Stores	1	2	3	4
1	3	5	2	6
2	4	3	3	1
3	2	1	5	2

Stores	Supply
1	35
2	25
3	20

Schools	Demand
1	18
2	27
3	17
4	8

Here Total Demand = 70 is less than Total Supply = 80. So we add a dummy demand constraint (b5) with 0 unit cost and with allocation 10.

a) Initial tableau

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10
a1= 35					
a2= 25					
a3= 20					

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10	
a1= 35	X					35
a2= 25						25
a3= 20						20
	18	27	17	8	10	

The rim values for a1 =35 and b1 =18 are compared.

The smaller of the two i.e. $\min(35,18) = 18$ is assigned to for a1b1

This meets the complete demand of b1 and leaves $35 - 18 = 17$ units with a1

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10	
a1= 35	18	X				17
a2= 25						25
a3= 20						20
	0	27	17	8	10	

The rim values for a2 =25 and b2=10 are compared.

The smaller of the two i.e. $\min(25,10) = 10$ is assigned to a2b2

This meets the complete demand of b2 and leaves $25 - 10 = 15$ units with a2

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10	
a1= 35	18	17				0
a2= 25		X				25
a3= 20						20
	0	10	17	8	10	

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10	
a1= 35	18	17				0
a2= 25		10	X			15
a3= 20						20
	0	0	17	8	10	

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10	
a1= 35	18	17				0
a2= 25		10	15			0
a3= 20			X			20
	0	0	2	8	10	

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10	
a1= 35	18	17				0
a2= 25		10	15			0
a3= 20			2	X		18
	0	0	0	8	10	

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10	
a1= 35	18	17				0
a2= 25		10	15			0
a3= 20			2	8	X	10
	0	0	0	0	10	

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10	
a1= 35	18	17				0
a2= 25		10	15			0
a3= 20			2	8	10	0
	0	0	0	0	0	

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10
a1= 35	18 3	17 5			
a2= 25		10 3	15 3		
a3= 20			2 5	8 2	10 0

Total transportation cost = $3 \times 18 + 5 \times 17 + 3 \times 10 + 3 \times 15 + 5 \times 2 + 2 \times 8 + 0 \times 10 = 240$

b) Transportation schedule that minimize cost

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10
a1= 35	18	17			
a2= 25		10	15		
a3= 20			2	8	10

$U_i + V_j = P_{ij}$

	b1	b2	b3	b4	b5

a1	3	5				u1=0
a2		3	3			u2=-2
a3			5	2	0	u3=0
	v1=3	v2=5	v3=5	v4=2	v5=0	

- 1) $V_5 = 0$;
- 2) $U_3 = P_{3,5} - V_5$;
- 3) $V_3 = P_{3,3} - U_3$;
- 4) $V_4 = P_{3,4} - U_3$;
- 5) $U_2 = P_{2,3} - V_3$;
- 6) $V_2 = P_{2,2} - U_2$;
- 7) $U_1 = P_{1,2} - V_2$;
- 8) $V_1 = P_{1,1} - U_1$;

Now, for all non-filled cells of the matrix calculate the S_{ij} , according to the formula:
 $S_{ij} = P_{ij} - U_i - V_j$ (green). If there are negative valuation it means that the plan can be improved

	b1	b2	b3	b4	b5	
a1	3	5	-3	4	0	u1=0
a2	3	3	3	1	2	u2=-2
a3	-1	-4	5	2	0	u3=0
	v1=3	v2=5	v3=5	v4=2	v5=0	

	b1=18	b2=27	b3=17	b4=8	b5=10
a1=35	18	17			
a2=25		10 -	15 +		
a3=20			2 -	8	10
		+			

	b1=18	b2=27	b3=17	b4=8	b5=10
a1=35	18	17			
a2=25		8	17		
a3=20		2		8	10

	b1	b2	b3	b4	b5	
a1	3	5	-3	0	-4	u1=4
a2	3	3	3	-3	-2	u2=2
a3	3	1	4	2	0	u3=0
	v1=-1	v2=1	v3=1	v4=2	v5=0	

	b1=18	b2=27	b3=17	b4=8	b5=10
a1=35	18	17 -			+
a2=25		8	17		
a3=20		2 +		8	10 -

M = 10

	b1=18	b2=27	b3=17	b4=8	b5=10
a1=35	18	7			10
a2=25		8	17		
a3=20		12		8	

	b1	b2	b3	b4	b5	
a1	3	5	-3	0	0	u1=0
a2	3	3	3	-3	2	u2=-2
a3	3	1	4	2	4	u3=-4
	v1=3	v2=5	v3=5	v4=6	v5=0	

	b1=18	b2=27	b3=17	b4=8	b5=10
a1=35	18	7			10
a2=25		8	17		
a3=20		12		8	

M = 7

	b1=18	b2=27	b3=17	b4=8	b5=10
a1=35	18		7		10
a2=25		15	10		
a3=20		12		8	

	b1	b2	b3	b4	b5	
a1	3	3	2	3	0	u1=0
a2	0	3	3	-3	-1	u2=1
a3	0	1	4	2	1	u3=-1
	v1=3	v2=2	v3=2	v4=3	v5=0	

	b1=18	b2=27	b3=17	b4=8	b5=10
a1=35	18		7		10
a2=25		15	10		
a3=20		12		8	

M = 8

	b1=18	b2=27	b3=17	b4=8	b5=10
a1=35	18		7		10
a2=25		7	10	8	
a3=20		20			

	b1	b2	b3	b4	b5	
a1	3	3	2	6	0	u1=0

a2	0	3	3	1	-1	u2= 1
a3	0	1	4	3	1	u3= -1
	v1= 3	v2= 2	v3= 2	v4= 0	v5= 0	

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10
a1= 35	18		7 +		10 -
a2= 25		7	10 -	8	+
a3= 20		20			

M = 10

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10
a1= 35	18		17		
a2= 25		7	0	8	10
a3= 20		20			

	b1	b2	b3	b4	b5	
a1	3	3	2	6	1	u1= -1
a2	0	3	3	1	0	u2= 0
a3	0	1	4	3	2	u3= -2
	v1= 4	v2= 3	v3= 3	v4= 1	v5= 0	

The table does not contain negative assessments (the plan can not be improved), therefore the optimal solution is reached.

	b1= 18	b2= 27	b3= 17	b4= 8	b5= 10
a1= 35	18 3		17 2		
a2= 25		7 3	0 3	8 1	10 0
a3= 20		20 1			

Minimized transportation cost = 137

Answer provided by <https://www.AssignmentExpert.com>