



Damietta University Faculty of Commerce English Program

Production and Operations Management

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Location Strategies

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Location Strategies

Transportation Models



Outline

- ▶ Transportation Modeling
- ▶ Developing an Initial Solution
- ▶ The Stepping-Stone Method



Intuitive Lowest-Cost Method

1. Identify the cell with the lowest cost
2. Allocate as many units as possible to that cell without exceeding supply or demand; then cross out the row or column (or both) that is exhausted by this assignment
3. Find the cell with the lowest cost from the remaining cells
4. Repeat steps 2 and 3 until all units have been allocated

Intuitive Lowest-Cost Method

From \ To	(A) Albuquerque	(B) Boston	(C) Cleveland	Factory capacity
(D) Des Moines	\$5	\$4	\$3 100	100
(E) Evansville	\$8	\$4	\$3	300
(F) Fort Lauderdale	\$9	\$7	\$5	300
Warehouse requirement	300	200	200	700

First, \$3 is the lowest cost cell so ship 100 units from Des Moines to Cleveland and cross off the first row as Des Moines is satisfied

Figure C.4

Intuitive Lowest-Cost Method

From \ To	(A) Albuquerque	(B) Boston	(C) Cleveland	Factory capacity
(D) Des Moines	\$5	\$4	100 \$3	100
(E) Evansville	\$8	\$4	100 \$3	300
(F) Fort Lauderdale	\$9	\$7	\$5	300
Warehouse requirement	300	200	200	700

Second, \$3 is again the lowest cost cell so ship 100 units from Evansville to Cleveland and cross off column C as Cleveland is satisfied

Figure C.4

Intuitive Lowest-Cost Method

From \ To	(A) Albuquerque	(B) Boston	(C) Cleveland	Factory capacity
(D) Des Moines	\$5	\$4	\$8	100
(E) Evansville	\$8	\$4	\$8	300
(F) Fort Lauderdale	\$9	\$7	\$5	300
Warehouse requirement	300	200	200	700

Third, \$4 is the lowest cost cell so ship 200 units from Evansville to Boston and cross off column B and row E as Evansville and Boston are satisfied

Figure C.4

Intuitive Lowest-Cost Method

From \ To	(A) Albuquerque	(B) Boston	(C) Cleveland	Factory capacity
(D) Des Moines	\$5	\$4	\$3	100
(E) Evansville	\$8	\$4	\$3	300
(F) Fort Lauderdale	\$9	\$7	\$5	300
Warehouse requirement	300	200	200	700

Finally, ship 300 units from Albuquerque to Fort Lauderdale as this is the only remaining cell to complete the allocations

Figure C.4

Intuitive Lowest-Cost Method

From \ To	(A) Albuquerque	(B) Boston	(C) Cleveland	Factory capacity
(D) Des Moines	\$5	\$4	\$3 100	100
(E) Evansville	\$8	\$4 200	\$3 100	300
(F) Fort Lauderdale	\$9 300	\$7	\$5	300
Warehouse requirement	300	200	200	700

$$\begin{aligned}
 \text{Total Cost} &= \$3(100) + \$3(100) + \$4(200) + \$9(300) \\
 &= \$4,100
 \end{aligned}$$

Figure C.4

Intuitive Lowest-Cost Method

From \ To	(A) Albuquerque	(B) Boston	(C) Cleveland	Factory capacity
(1) Fort Lauderdale	500			100
(2) Fort Lauderdale		0		300
(3) Fort Lauderdale				300
Warehouse requirement	300	200	200	700

Cost matrix (unit costs):

	(A) Albuquerque	(B) Boston	(C) Cleveland
(1) Fort Lauderdale	\$4	\$4	\$3
(2) Fort Lauderdale	\$4	\$4	\$3
(3) Fort Lauderdale	\$7		\$5

This is a feasible solution, and an improvement over the previous solution, but not necessarily the lowest cost alternative

$$\begin{aligned} \text{Total Cost} &= \$3(100) + \$3(100) + \$4(200) + \$9(300) \\ &= \$4,100 \end{aligned}$$

Figure C.4

Thank you

