

Problem

There are three factories producing shirts at different capacities and four customers with different demands for the shirts. Some customers are located closer to the factory than others, so the transportation cost per unit varies. The table below contains the cost per unit transported to each customer from each factory, the supply of each factory, and each customer's demand.

Find the initial basic feasible solution using the **northwest corner method** and calculate the total transportation cost in the hundreds.

Transport cost	Customer A	Customer B	Customer C	Customer D	Supply (units)
Factory 1	16	3	11	7	6
Factory 2	10	0	6	1	1
Factory 3	5	17	21	23	10
Demand (units)	7	5	3	2	

Solution

Our main objective is to find a basic yet feasible solution that matches the supply and demand of shirts. This solution should be efficient and cost-effective.

The method got its name northwest for a strong reason: one always has to look at the farthest northwest cell in the table.

When I say 'table,' I'm referring only to the cost values for one unit. We can see that the cell (Factory 1, Customer A) is the farthest northwest. We look at Factory 1's supply (i.e., 6) and Customer A's demand (i.e., 7). For this cell only, we conclude that 6 units can be supplied to the customer. We make a note in the cell that 6 units are supplied.

Now that 6 units are supplied, Factory 1's supply goes to 0, and Customer A's demand goes to 1. We remove the first row since Factory 1 cannot supply any more units.

We now look at the new table, which is the old one minus the first row. We find the most northwest cell (Factory 2, Customer A). We supply 1 unit and satisfy Customer A's demand. We note 1 unit in the cell and remove Customer A's column, as the demand was fully met, plus Factory 2's row as supply is now 0.

In the new table, we now focus on (Factory 3, Customer B) and look at the supply on the right side and the demand at the bottom. We provide 5 units, make a note, and satisfy the demand. Customer B's column gets dropped.

In the new table, we now focus on (Factory 3, Customer C), and look at the supply on the right and demand on the bottom. We satisfy the demand, make a note, and remove the column.

At this point, we are left with one cell. We supply 2 units, make a note, satisfy the demand, and drop the column or row as both supply and demand are 0.

We now look at the notes on the 5 cells and multiply the units by the transportation cost to get the total cost.

$$\text{Total cost} = 6 * 16 + 1 * 10 + 5 * 17 + 3 * 21 + 2 * 23 = 300 = \mathbf{3} \text{ hundreds}$$

Answer: 3

Worked table:

Transport cost	Customer A	Customer B	Customer C	Customer D	Supply (units)
Factory 1	16 (6)	3	11	7	6
Factory 2	10 (1)	0	6	1	1
Factory 3	5	17 (5)	21 (3)	23 (2)	10
Demand (units)	7	5	3	2	