Row minima method

In this method, we first consider the first row and find the minimum cost cell. Let $(1,k)$ cell be the cell in the first row with minimum cost. We allot this cell the maximum allocation i.e, $x_{1k} = \min(a_1, b_k)$

If $a_1 < b_k$; $x_{1k} = a_1$ and we cross out the 1st row and consider the remaining tableau and proceed in the same way. If $a_1 > b_2$, $x_1 = b_k$ and we cross out the kth column and consider the remaining tableau and proceed next in the same way. If $a_1 = b_k$, then either 1st row or kth column will be crossed out and the remaining tableau will be considered.

Example:- solve the problem by Row minima method

	D_1	D_2	D_3	D_4	D_5	a_i
O_1	2	11	10	3	7	4
O_2	1	4	7	2	1	8
O_3	3	9	4	8	12	9
b_j	3	3	4	5	6	

Solution:- In the first row, the minimum cost cell (1,1)

so $x_{11} = \min(a_1, b_1) = \min(4,3) = 3$.

Since the demand of the 1st destination is fulfilled, so we delet the 1st column.

The remaining tableau is

	D_2	D_3	D_4	D_5	
O_1	11	10	3	7	1
O_2	4	7	2	1	8
O_3	9	4	8	12	9
	3	4	5	6	

In the 1st row of this tableau, the minimum cost cell is the cell containing the cost 3 and that cell is (1,4) cell. So, $x_{14} = \min(1,5) = 1$

Since the availability of the 1st row is exhaused, so we delet the 1st row. The remaining tableau is

	D_2	D_3	D_4	D_5	
O_2	4	7	2	1	8
O_3	9	4	8	12	9
	3	4	4	6	

proceeding in the same way $x_{25} = \min(8,6) = 6$

next tableau is

	D_2	D_3	D_4	
O_2	4	7	2	$2 = (8-6)$
O_3	9	4	8	9
	3	4	4	

Scanned with CamScanner

Now $x_{24} = \min(2,4) = 2$

next table is

	D_2	D_3	D_4	
O_3	9	4	8	
	3	4	2	

obviously, $x_{32} = 3$; $x_{33} = 4$; $x_{34} = 2$

So the final tableau is

	D_1	D_2	D_3	D_4	D_5	a_i
O_1	[3] 2	11	10	[1] 3	7	4
O_2	1	4	7	[2] 2	[6] 1	8
O_3	3	[3] 9	[4] 4	[2] 8	12	9
b_j	3	3	4	5	6	

Since the set of allocated cells does not contain any loop, so a basic feasible solution is

$x_{11} = 3$; $x_{14} = 1$; $x_{24} = 2$; $x_{25} = 6$; $x_{32} = 3$

$x_{33} = 4$; $x_{34} = 2$

The cost corresponding to this solution is

$(3\times2) + (1\times3) + (2\times2) + (6\times1) + (3\times9) + (4\times4) + (2\times8)$

$= 78$ units. units

Find out an initial B.F.S of the following balanced T.P using row minima method

	D_1	D_2	D_3	D_4	a_i
O_1	4	2	5	3	6
O_2	5	4	3	2	13
O_3	1	4	6	5	9
b_j	7	8	5	8	

It is displayed in the transportation table given below.—

	D_1	D_2	D_3	D_4					
O_1	4	$\boxed{6}$ 2	5	3	6				
O_2	5	$\boxed{0}$ 4	$\boxed{5}$ 3	$\boxed{8}$ 2	13	13	5	0	
O_3	$\boxed{7}$ 1	$\boxed{2}$ 4	6	5	9	9	9	9	0
	7	8	5	8					
	7	2	5	8					
	7	2	5						
	7	2							

Note:- i) 1st we allocate x_{12} and cross the 1st row.

ii) Next we allocate x_{24} and we cross out the 4th column.

iii) Next we allocate x_{23} and cross out 3rd column.

iv) Next we allocate x_{22} and cross out 2nd row.

v) Finally we allocate x_{31} and x_{32}.

Required initial B.F.S is

$x_{12}=6$; $x_{22}=0$; $x_{23}=5$; $x_{24}=8$; $x_{31}=7$

$x_{32}=2$

cost corresponding to this solution is

$(6\times2)+(0\times4)+(5\times3)+(8\times2)+(7\times1)+(2\times4)$ units

$=58$ units.

H.T (10) Determine an initial B.F.S to the following problems — (By Row minima method).

(1)

	D_1	D_2	D_3	D_4	a_i
O_1	21	16	25	13	11
O_2	17	18	14	23	13
O_3	32	27	18	41	19
	6	10	12	15	

a_i — capacity

Demand

Ans:- $x_{14} = 11$; $x_{21} = 1$; $x_{23} = 12$; $x_{31} = 5$; $x_{32} = 10$; $x_{34} = 4$

(2)

	D_1	D_2	D_3	D_4	a_i
O_1	9	5	4	7	12
O_2	2	5	8	3	15
O_3	6	2	3	4	13
b_j	6	11	13	10	

a_i — capacity

Demand.

Ans:- $x_{13} = 12$; $x_{21} = 6$; $x_{24} = 9$; $x_{32} = 11$; $x_{33} = 1$; $x_{34} = 1$