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Find Solution of Transportation Problem using North-West Corner method

TOTAL no. of supply constraints : 9
TOTAL no. of demand constraints : 6
Problem Table is

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0	2	4	6	8	0	20
`S_2`	5	7	9	11	13	0	15
`S_3`	10	12	14	16	18	0	30
`S_4`	999999	5	7	9	11	0	20
`S_5`	999999	10	12	14	16	0	30
`S_6`	999999	999999	7	9	11	0	25
`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30
Demand	30	40	50	60	20	30	

The rim values for `S_1`=20 and `D_1`=30 are compared.

The smaller of the two i.e. min(20,30) = **20** is assigned to `S_1` `D_1`

This exhausts the capacity of `S_1` and leaves 30 - 20 = 10 units with `D_1`

Table-1

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5	7	9	11	13	0	15
`S_3`	10	12	14	16	18	0	30
`S_4`	999999	5	7	9	11	0	20
`S_5`	999999	10	12	14	16	0	30
`S_6`	999999	999999	7	9	11	0	25
`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30
Demand	10	40	50	60	20	30	

The rim values for `S_2`=15 and `D_1`=10 are compared.

The smaller of the two i.e. min(15,10) = **10** is assigned to `S_2` `D_1`

This meets the complete demand of `D_1` and leaves 15 - 10 = 5 units with `S_2`

Table-2

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7	9	11	13	0	5
`S_3`	10	12	14	16	18	0	30
`S_4`	999999	5	7	9	11	0	20
`S_5`	999999	10	12	14	16	0	30
`S_6`	999999	999999	7	9	11	0	25
`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	40	50	60	20	30	

The rim values for `S_2`=5 and `D_2`=40 are compared.

The smaller of the two i.e. min(5,40) = **5** is assigned to `S_2` `D_2`

This exhausts the capacity of `S_2` and leaves 40 - 5 = 35 units with `D_2`

Table-3

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12	14	16	18	0	30
`S_4`	999999	5	7	9	11	0	20
`S_5`	999999	10	12	14	16	0	30
`S_6`	999999	999999	7	9	11	0	25
`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30

Demand	0	35	50	60	20	30	

The rim values for `S_3`=30 and `D_2`=35 are compared.

The smaller of the two i.e. min(30,35) = **30** is assigned to `S_3` `D_2`

This exhausts the capacity of `S_3` and leaves 35 - 30 = 5 units with `D_2`

Table-4

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5	7	9	11	0	20
`S_5`	999999	10	12	14	16	0	30
`S_6`	999999	999999	7	9	11	0	25
`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	5	50	60	20	30	

The rim values for `S_4`=20 and `D_2`=5 are compared.

The smaller of the two i.e. min(20,5) = **5** is assigned to `S_4` `D_2`

This meets the complete demand of `D_2` and leaves 20 - 5 = 15 units with `S_4`

Table-5

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5 **(5)**	7	9	11	0	15
`S_5`	999999	10	12	14	16	0	30
`S_6`	999999	999999	7	9	11	0	25
`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30

`S_9`	999999	999999	999999	10	12	0	30
Demand	0	0	50	60	20	30	

The rim values for `S_4`=15 and `D_3`=50 are compared.

The smaller of the two i.e. min(15,50) = **15** is assigned to `S_4` `D_3`

This exhausts the capacity of `S_4` and leaves 50 - 15 = 35 units with `D_3`

Table-6

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	0
`S_5`	999999	10	12	14	16	0	30
`S_6`	999999	999999	7	9	11	0	25
`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	0	35	60	20	30	

The rim values for `S_5`=30 and `D_3`=35 are compared.

The smaller of the two i.e. min(30,35) = **30** is assigned to `S_5` `D_3`

This exhausts the capacity of `S_5` and leaves 35 - 30 = 5 units with `D_3`

Table-7

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	0
`S_5`	999999	10	12 **(30)**	14	16	0	0
`S_6`	999999	999999	7	9	11	0	25

`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	0	5	60	20	30	

The rim values for `S_6`=25 and `D_3`=5 are compared.

The smaller of the two i.e. min(25,5) = **5** is assigned to `S_6` `D_3`

This meets the complete demand of `D_3` and leaves 25 - 5 = 20 units with `S_6`

Table-8

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	0
`S_5`	999999	10	12 **(30)**	14	16	0	0
`S_6`	999999	999999	7 **(5)**	9	11	0	20
`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	0	0	60	20	30	

The rim values for `S_6`=20 and `D_4`=60 are compared.

The smaller of the two i.e. min(20,60) = **20** is assigned to `S_6` `D_4`

This exhausts the capacity of `S_6` and leaves 60 - 20 = 40 units with `D_4`

Table-9

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	0
`S_5`	999999	10	12 **(30)**	14	16	0	0

`S_6`	999999	999999	7 **(5)**	9 **(20)**	11	0	0
`S_7`	999999	999999	10	12	14	0	30
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	0	0	40	20	30	

The rim values for `S_7`=30 and `D_4`=40 are compared.

The smaller of the two i.e. min(30,40) = **30** is assigned to `S_7` `D_4`

This exhausts the capacity of `S_7` and leaves 40 - 30 = 10 units with `D_4`

Table-10

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	0
`S_5`	999999	10	12 **(30)**	14	16	0	0
`S_6`	999999	999999	7 **(5)**	9 **(20)**	11	0	0
`S_7`	999999	999999	10	12 **(30)**	14	0	0
`S_8`	999999	999999	999999	8	10	0	30
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	0	0	10	20	30	

The rim values for `S_8`=30 and `D_4`=10 are compared.

The smaller of the two i.e. min(30,10) = **10** is assigned to `S_8` `D_4`

This meets the complete demand of `D_4` and leaves 30 - 10 = 20 units with `S_8`

Table-11

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	0

`S_5`	999999	10	12 **(30)**	14	16	0	0
`S_6`	999999	999999	7 **(5)**	9 **(20)**	11	0	0
`S_7`	999999	999999	10	12 **(30)**	14	0	0
`S_8`	999999	999999	999999	8 **(10)**	10	0	20
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	0	0	0	20	30	

The rim values for `S_8`=20 and `D_5`=20 are compared.

The smaller of the two i.e. min(20,20) = **20** is assigned to `S_8` `D_5`

This exhausts the capacity of `S_8` and leaves 20 - 20 = 0 units with `D_5`

Table-12

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	0
`S_5`	999999	10	12 **(30)**	14	16	0	0
`S_6`	999999	999999	7 **(5)**	9 **(20)**	11	0	0
`S_7`	999999	999999	10	12 **(30)**	14	0	0
`S_8`	999999	999999	999999	8 **(10)**	10 **(20)**	0	0
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	0	0	0	0	30	

The rim values for `S_9`=30 and `D_5`=0 are compared.

The smaller of the two i.e. min(30,0) = **0** is assigned to `S_9` `D_5`

This meets the complete demand of `D_5` and leaves 30 - 0 = 30 units with `S_9`

Table-13

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0

`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	0
`S_5`	999999	10	12 **(30)**	14	16	0	0
`S_6`	999999	999999	7 **(5)**	9 **(20)**	11	0	0
`S_7`	999999	999999	10	12 **(30)**	14	0	0
`S_8`	999999	999999	999999	8 **(10)**	10 **(20)**	0	0
`S_9`	999999	999999	999999	10	12	0	30
Demand	0	0	0	0	0	30	

The rim values for `S_9`=30 and `D_6`=30 are compared.

The smaller of the two i.e. min(30,30) = **30** is assigned to `S_9` `D_6`

Table-14

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	0
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	0
`S_3`	10	12 **(30)**	14	16	18	0	0
`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	0
`S_5`	999999	10	12 **(30)**	14	16	0	0
`S_6`	999999	999999	7 **(5)**	9 **(20)**	11	0	0
`S_7`	999999	999999	10	12 **(30)**	14	0	0
`S_8`	999999	999999	999999	8 **(10)**	10 **(20)**	0	0
`S_9`	999999	999999	999999	10	12	0 **(30)**	0
Demand	0	0	0	0	0	0	

Final Allocation Table is

	`D_1`	`D_2`	`D_3`	`D_4`	`D_5`	`D_6`	Supply
`S_1`	0 **(20)**	2	4	6	8	0	20
`S_2`	5 **(10)**	7 **(5)**	9	11	13	0	15
`S_3`	10	12 **(30)**	14	16	18	0	30
`S_4`	999999	5 **(5)**	7 **(15)**	9	11	0	20
`S_5`	999999	10	12 **(30)**	14	16	0	30
`S_6`	999999	999999	7 **(5)**	9 **(20)**	11	0	25

`S_7`	999999	999999	10	12 **(30)**	14	0	30
`S_8`	999999	999999	999999	8 **(10)**	10 **(20)**	0	30
`S_9`	999999	999999	999999	10	12	0 **(30)**	30
Demand	30	40	50	60	20	30	

The minimum total transportation cost `= 0 xx 20 + 5 xx 10 + 7 xx 5 + 12 xx 30 + 5 xx 5 + 7 xx 15 + 12 xx 30 + 7 xx 5 + 9 xx 20 + 12 xx 30 + 8 xx 10 + 10 xx 20 + 0 xx 30 = 1790`

Here, the number of allocated cells = 13, which is one less than to m + n - 1 = 9 + 6 - 1 = 14
`:.` This solution is degenerate

Solution is provided by AtoZmath.com