

14/01/22

Q.

Solve the following assignment problem:

	1	2	3	4
A	2	3	4	5
B	4	5	6	7
C	7	8	9	8
D	3	5	8	4

Soln

After row reduction

0	1	2	3
0	1	2	3
0	1	2	1
0	2	5	1

⇒

After column reduction

0	0	0	2
0	0	0	2
0	0	0	0
0	1	3	0

Now, cover the zeros by ^{minimum} st. lines =

0	0	0	2
0	0	0	2
0	0	0	0
0	1	3	0

The minimum no. of lines = 4 which is equal to dimension of matrix.

We observe that none of the rows/columns has a single zero.

We are at liberty to assign duty.

	1	2	3	4
A	0	1	3	2
B	1	0	0	2
C	1	0	0	3
D	1	1	3	0

If we assign

$A \rightarrow 1$ then

D gets 4.

Then $B \rightarrow 2, C \rightarrow 3$

or $B \rightarrow 3, C \rightarrow 2$

$\therefore A \rightarrow 1, B \rightarrow 2, C \rightarrow 3, D \rightarrow 4$
 or $A \rightarrow 1, B \rightarrow 3, C \rightarrow 2, D \rightarrow 4$] ~~min~~ Cost is same.

If we assign $A \rightarrow 2$ then ~~it~~ can be allocated task 1 or 3.

	1	2	3	4
A	1	0	3	2
B	0	1	3	2
C	1	1	0	3
D	1	1	3	0

Let $B \rightarrow 1 \Rightarrow D \rightarrow 4, C \rightarrow 3$

\therefore Cost = 20, the cost is same in all cases.