

How to Use the Hungarian Algorithm

The Hungarian algorithm allows a "minimum matching" to be found. This can be used in instances where there a multiple quotes for a group of activities and each activity must be done by a different person, to find the minimum cost to complete all of the activities.

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<u>Steps</u> edit

Arrange your information in a matrix with the "people" on the left and the "activity" along the top, with the "cost" for each pair in the middle.

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Row and Column Database MPP row and column database with integrated analytics engine. www.asterdata.com

	W	X	Y	Z	
Α	10	19	8	15	30
В	10	18	7	17	
C	13	15	9	14	
D	12	19	8	18	
E	14	17	10	19	

€

2 Ensure that the matrix is square by the addition of dummy rows/columns if necessary. Conventionally, each element in the dummy row/column is the same as the largest number in the matrix.

10	19	8	15	19
10	18	7	17	19
13	16	9	14	19
12	19	8	18	19
14	17	10	19	19

⊕

Reduce the rows by subtracting the minimum value of each row from that row.

2	11	0	7	11
3	11	0	10	12
4	7	0	5	10
4	11	0	10	11
4	7	0	9	9
-				

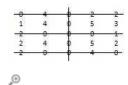
⊕

4 Reduce the columns by subtracting the minimum value of each column from that column.

0	4	0	2	2
1	4	0	5	3
2	0	0	0	1
2	4	0	5	2
2	0	0	4	0

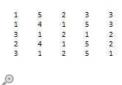
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5 Cover the zero elements with the minimum number of lines it is possible to cover them with. (If the number of lines is equal to the number of rows then go to step 9)

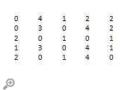


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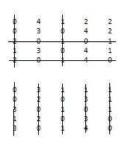
6 Add the minimum uncovered element to every covered element. If an element is covered twice, add the minimum element to it twice.



7 Subtract the minimum element from every element in the matrix.

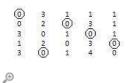


8 Cover the zero elements again. If the number of lines covering the zero elements is not equal to the number of rows, return to step 6.



This example had to be reduced once more

9 Select a matching by choosing a set of zeros so that each row or column has only one selected.



Apply the matching to the original matrix, disregarding dummy rows. This shows who should do which activity, and adding the costs will give the total minimum cost.

	W	Х	Y	Z
A	(10)	19	8	15
В	10	18	7	17
C	13	16	9	14)
D	12	19	8	18
Ε	14	17	10	19

Notice that D has not been

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<u>Tips</u> edit

• If you wish to find a maximum matching rather than a minimum, multiply each number by -1 in step 1, then follow the steps as written.

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