

2D Managing Incomplete Data

If it is not possible to assign a task to a given person:

1. An agency needs to assign four relief chefs Denis, Hilary, Robert and Trudy to four restaurants serving Chinese, French, Indian and Italian food. The travelling expenses, in pounds, that will be paid to each chef are shown in the table. Some of the chefs cannot work in some of the restaurants, since they are not familiar with that style of cookery.

	New Dell (Chinese)	Aye Full Tower (French)	Hows a Curry (Indian)	Piece a Pasta (Italian)
Denis	–	27	15	40
Hilary	14	21	17	13
Robert	20	–	13	–
Trudy	14	24	10	30

Use the Hungarian algorithm, reducing rows first, to obtain an allocation that minimises the total travelling expenses paid.

	New Dell (Chinese)	Aye Full Tower (French)	Hows a Curry (Indian)	Piece a Pasta (Italian)
Denis				
Hilary				
Robert				
Trudy				

	New Dell (Chinese)	Aye Full Tower (French)	Hows a Curry (Indian)	Piece a Pasta (Italian)
Denis				
Hilary				
Robert				
Trudy				

	New Dell (Chinese)	Aye Full Tower (French)	Hows a Curry (Indian)	Piece a Pasta (Italian)
Denis				
Hilary				
Robert				
Trudy				

	New Dell (Chinese)	Aye Full Tower (French)	How's a Curry (Indian)	Piece a Pasta (Italian)
Denis				
Hilary				
Robert				
Trudy				

	New Dell (Chinese)	Aye Full Tower (French)	How's a Curry (Indian)	Piece a Pasta (Italian)
Denis				
Hilary				
Robert				
Trudy				

Incomplete data when maximising:

2. A team of four workers A, B, C and D are to be assigned to four tasks 1, 2, 3 and 4. Each worker can only be assigned to one task and each task is to be completed by one worker. Worker B cannot be assigned to task 3. The table shows the profit, in pounds, to be made by each worker on each task.

	1	2	3	4
A	47	68	125	52
B	39	72	-	60
C	48	63	140	63
D	37	75	132	68

- a) Reducing rows first, use the Hungarian algorithm to allocate workers to tasks so that the profit is maximised. Show the table at each stage.

	1	2	3	4
A				
B				
C				
D				

	1	2	3	4
A				
B				
C				
D				

	1	2	3	4
A				
B				
C				
D				

	1	2	3	4
A				
B				
C				
D				

	1	2	3	4
A				
B				
C				
D				

	1	2	3	4
A				
B				
C				
D				

b) Work out the maximum profit.