IOI Training Camp 2010 – Final 2, 26 June, 2010

Problem 1 Matrix Game[1]

Nikhil and Lavanya are spending their summer with Milind Uncle who has designed an interesting game for them to play. Milind writes down an $N \times N$ matrix of numbers and sets the score to 0. Nikhil and Lavanya play alternately. In each round, Nikhil first picks a row that has not been picked so far. After Nikhil's move, Lavanya then picks a column that has not been picked so far. The number at the position common to the selected row and column is added to the score.

Lavanya's aim is to minimize the final score and Nikhil's aim is to maximize it. You may assume that both of them are smart enough to play optimally. Milind would like to amuse himself by calculating the final score (assuming both of them play optimally) before handing out the matrix to them. Your task is to help him by writing a program that calculates the optimal value for any given matrix.

Here is an example with a 3×3 matrix.

1	2	3
5	3	6
8	2	3

In this case, in the first round, Nikhil picks the first row and then Lavanya picks the first column. In the second round, Nikhil picks the second row and then Lavanya picks the second column. Finally, Nikhil picks the third row and then Lavanya picks the third column, for a total score of 7. You can verify that there is no way Nikhil can ensure a higher score or Lavanya can ensure a lower score.

Input format

The first line of input contains a single positive integer N giving the dimension N of the matrix. This is followed by N lines, each containing N positive integers.

[1]Problem formulated by Adhiraj Somani

Output format

A single line with a single integer giving the score of the game if both players play optimally.

Test Data

You may assume that $1 \leq N \leq 20$. You may assume that the sum of all values in the input will fit in a 32-bit signed integer.

Sample input	Sample output
3 1 2 3 5 3 6 8 2 3	7

Time and memory limits

The time limit for this task is 2 seconds. The memory limit is 44 MB (actual limit 32 MB, plus 12 MB buffer for 64-bit compilation).