Tale of Debt

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

It was raining as if the heavens were ready to fall. I was walking through a maze of dark deserted streets ignoring deep puddles. I was no longer the glorious knight in shining armor, I was just an outcast which no one would like to see on the doorstep that rainy night.

Fairy Kingdom was not like it had been before. The New King had started the restructuring of the political and economic systems under the loud slogans. This led to the collapse of the economy and the riot of criminals of all kinds. Artisans, merchants and even the owners of factories were forced to pay bandits or knights for the peaceful existence and the opportunity to continue to do business. More and more people indulged themselves in Blue Tea — an illegal powder named so because many people stored it in once popular tea boxes. To say it was dark time — to say nothing.

People told a funny story of n merchants who borrowed money from each other again and again, but never paid their debts. In the end it turned out that the i-th merchant owed a_{ij} gold the j-th one, and all these debts were huge amounts of money no one of them could have ever saved. Then they went to the King to solve this problem.

They were lucky. Good Magician was still working for the King that time. He noticed that for any ordered set of merchants $(i_1, i_2, \ldots, i_k)$ one can just add an arbitrary integer s to all the debts $a_{i_1 i_2}$, $a_{i_2 i_3}$, $\ldots$, $a_{i_{k-1} i_k}$, $a_{i_k i_1}$, but only if $\min\left(a_{i_1 i_2}, a_{i_2 i_3}, \ldots, a_{i_{k-1} i_k}, a_{i_k i_1}\right) + s \geq 0$. This way it was possible to increase or decrease debts depending on whether the number s was positive or negative. Having changed the debt matrix this way, Good Magician reached the state when the sum of its elements was as small as possible. It was not an easy task, but the old man was still in good shape that time.

Input

In the first line there is a single integer n ($2 \leq n \leq 1000$) — the number of merchants.

The next n lines contain n integers each. The i-th line on its j-th position contains an integer a_{ij} ($0 \leq a_{ij} \leq 10^9$, $a_{ii} = 0$) — the amount of gold the i-th merchant owes the j-th.

Output

Output n lines, each containing n non-negative integers. In the i-th line on its j-th position output an integer b_{ij} — the amount of gold the i-th merchant still owes the j-th after offsetting all debts. Offsetting must be done so that the sum of all b_{ij} is minimal possible. If there are several possible answers, output any of them.

Examples

standard input	standard output
3 0 10 1 1 0 15 20 1 0	0 0 0 5 0 0 5 0 0
7 0 1 2 3 4 5 6 6 0 1 2 3 4 5 5 6 0 1 2 3 4 4 5 6 0 1 2 3 3 4 5 6 0 1 2 2 3 4 5 6 0 1 1 2 3 4 5 6 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Note

The illustration for the first sample:

1) Consider the sequence a_{13}, a_{32}, a_{21}. The minimum of them is 1. Subtract 1 from all these three elements.

2) Consider the sequence a_{12}, a_{23}, a_{31}. The minimum of them is 10. Subtract 10 from all these three elements. Now the matrix looks like this:

$$\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 5 \\ 10 & 0 & 0 \end{pmatrix}$$

3) Consider the sequence a_{12}, a_{21}. By the problem statement we can also add an arbitrary number to all elements in the chain. Add 5 to these elements. Now the matrix is:

$$\begin{pmatrix} 0 & 5 & 0 \\ 5 & 0 & 5 \\ 10 & 0 & 0 \end{pmatrix}$$

4) Consider the sequence a_{12}, a_{23}, a_{31}. The minimum of them is 5. Subtract 5 from all these three elements. Finally, the matrix looks like this:

$$\begin{pmatrix} 0 & 0 & 0 \\ 5 & 0 & 0 \\ 5 & 0 & 0 \end{pmatrix}$$