

Problem M: Mother Hulda

Time limit: 2 seconds



ONCE upon a time, a girl lost a spindle in a well. Her stepmother made her fetch the spindle, and the girl had to jump into the well. After that she knew nothing, and when she came to herself, she was in a beautiful meadow where she met an old woman. The woman introduced herself as Mother Hulda, and asked the girl to live with her. She promised that things would go well with the girl if she only did the woman's housework.

From then on, the girl did everything to the woman's satisfaction, and shook the bed with such a will that the feathers flew about like snowflakes.

After many days, the girl began to feel homesick. Before letting her go, Mother Hulda gave her one final task: the girl was to place some figurines on a tiled floor, but Mother Hulda believed that figuring out on which tile to place which figurine was part of the task. So she gave the girl only the distances that each pair of figurines should have.

The tiles form a $10^9 \times 10^9$ grid, where the rows and columns are numbered 1 through 10^9 . The distance between a figurine placed on the tile in row i and column j and one on the tile in row i' and column j' is $\sqrt{(i - i')^2 + (j - j')^2}$.



Illustration by Hermann Vogel. Public Domain, [Leipziger Turm-Verlag](#) via [Wikimedia Commons](#)

Input

The input consists of:

- One line with an integer n ($2 \leq n \leq 500$), the number of figurines.
- n lines, the i th of which contains n integers $d_{i,1}, \dots, d_{i,n}$ ($0 \leq d_{i,j} \leq 10^9$ for each j), where $d_{i,j}$ is the *square* of the desired Euclidean distance between figurines i and j .

Integers on the diagonal are zero, all other entries are positive. It is further guaranteed that $d_{i,j} = d_{j,i}$ for all $1 \leq i, j \leq n$.

Output

If the figurines cannot be placed onto the tiles according to Mother Hulda's specification, output "impossible".

Otherwise, output the n coordinates of the figurines.

If there are multiple valid solutions, you may output any one of them.

Sample Input 1

```
3
0 1 1
1 0 2
1 2 0
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Sample Output 1

```
1 1
1 2
2 1
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<p>Sample Input 2</p> <pre> 2 0 10000000000 10000000000 0 </pre>	<p>Sample Output 2</p> <pre> 1 1 1201 31601 </pre>
<p>Sample Input 3</p> <pre> 3 0 7 13 7 0 17 13 17 0 </pre>	<p>Sample Output 3</p> <pre> impossible </pre>