Problem K: Ants

Time limit: 3s; Memory limit: 512 MB

Given an n x n map ($n \leq 100$) where each cell is **randomly filled** with a number. Over time, several ant nests are born on this map. Each ant nest occupies a cell in the map and is represented by the symbol '*'. The number of ant nests is no more than 15. Additionally, there is always at least one cell in the map that does not contain the '*' symbol.

Initially, there is no relationship between the ant nests, and each nest belongs to a different ant species. A researcher wants to merge all these species into a single species. He plans to guide all ants from two different species to a location on the map where there are no ant nests to perform the merging process. Ants can move in four directions: Up, Down, Left, and Right, and they are not allowed to move diagonally. The movement cost is the sum of the numbers on the map along the path taken by the ants to the desired location. Ants can move into their own nest or into another species' nest without incurring any cost. After two species merge, all ants transform into a single species, and they can return to their original nests without additional cost.

Your task is to calculate the **minimum** total cost for the researcher to achieve his goal.

Input

- The first line contains an integer n ($1 \leq n \leq 100$).
- The next n lines represent the map, where each cell contains either a positive integer (less than or equal to 10^9) or the symbol '*'. It is guaranteed that there is at least one cell without the '*' symbol.

Output

- The minimum total cost required as described in the problem.

Sample

Input	Output
3 5 6 10 3 * 4 3 3 *	6

4 10 7 * 10 5 * 1 8 * 6 * 1 3 7 9 9	14

Explanation:

Explanation for Example 1: The two ant nests move to cell (3, 2) to perform the merging.

Explanation for Example 2:

- Suppose the ant species are initially labeled as A, B, C, and D. The map is as follows:

10 7 A 10
5 B 1 8
C 6 D 1
3 7 9 9

- A and B merge at cell (2,3) with a cost of 1 + 1 = **2**, forming species E:

10 7 E 10
5 E 1 8
C 6 D 1
3 7 9 9

- Next, E and D merge at cell (2,3) with a cost of 1 + 1 + 1 = **3**, forming species F:

10 7 F 10
5 F 1 8
C 6 F 1
3 7 9 9

- Finally, C and F merge at cell (2,3) with a cost of (1 + 5) + 1 + 1 + 1 = **9**.

The total cost is 2 + 3 + 9 = **14**.

In this example, all the merging processes happen at the same location, but in other cases, the locations might differ. Feel free to try other cases to explore different scenarios.