

Problem K

The Game of Eight

In "The Game of Eight", you are given a 3x3 board containing 8 squares labeled 1 through 8, and one empty space. The initial state of the board is given in a 3x3 matrix, where '.' represents the empty space. In each turn, you pick any square which is horizontally or vertically adjacent to an empty space and move it to the empty space. Your goal is to arrange the squares so the board looks like this:

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123
456
78.
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Compute the minimum number of moves necessary to achieve this goal.

Input

First line of the input contains T, the number of test cases. Each test case consists of a 3x3 matrix denoting the initial state of the board.

Output

For each test case, output the minimum number of moves necessary to achieve this goal or -1 if it is impossible.

Sample Input	Sample output
3	-1
781	4
654	18
2.3	
123	
485	
76.	
518	
423	
.76	