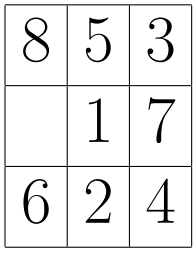
Problem E

Eight puzzle



You just got your sweet little brother Erling an entertaining puzzle. It is a 3 x 3 board with eight quadratic pieces, where you can slide a piece into the open slot. After rearranging the pieces randomly, the goal of the game is to get the board into the configuration

1	2	3
4	5	6
7	8	

by sliding pieces one by one.

After playing with a puzzle for a while, Erling claims that he can solve any instance in a minimal number of steps. Since you don't believe him, you write a program to solve the puzzles optimally.

Input specifications

The first line of input gives $1 \leq n \leq 100$, the number of test cases, followed by a blank line. Each test case is given by three lines giving the start configuration of the board, each consisting of three symbols, followed by a blank line. The cases all contain the symbols $1 \ldots 8$ and `#` exactly once, where the latter represents an open space.

Output specifications

For each test case output the minimum number of moves to solve the puzzle, or `impossible` if it cannot be done.

Sample input

```
2

123
4#5
786

123
456
87#
```

Output for sample input

```
2
impossible
```