
Coin Game 2

Input file: **standard input**
Output file: **standard output**
Time limit: 5 seconds
Memory limit: 1024 megabytes

Jo Coder is playing the same game as before, but now the number of coins N can be as high as 8.

Input

The first line of input contains the single integer T denoting the number of test cases.

A test case consists of two lines. The first line contains a positive integer N ($N \leq 8$), which is the number of coins. We assume that the coins are labeled $1, 2, 3, \dots, N$. The second line contains a list of numbers 1 to N in an arbitrary order, which represents the initial coin configuration.

Output

For each test case, output one line, which will either contain the minimal number of moves in which Jo can achieve the goal coin line-up, or, if it is not possible to achieve the goal coin line-up, output 'IMPOSSIBLE'.

Scoring

Subtask 1 (10 points): $T = 1$, $N = 8$, and the coins are given in reverse order, i.e. 8 7 6 5 4 3 2 1

Subtask 2 (90 points): $T = 1$.

Bonus Subtask (50 points): $1 \leq T \leq 1\,000\,000$