

# Harry Potter and the Chamber of Secrets

Harry Potter and his friends were standing in front of the Chamber of Secrets and they want to open it to know about the mystery. The chamber of secrets contains a lock which is a  $N \times N$  grid containing integers from 1 to  $N^2$ .

Harry suddenly realized that he forgot his magic wand at his room, so now he has to unlock the lock manually using valid moves.

The valid moves are -

1. Rotate a row horizontally right or left in a circular manner.
2. Rotate a column vertically up or down in a circular manner.

The lock will open only if the grid is in the configuration of a magic square. A  $N \times N$  magic square is a square that has the same sum of rows, columns and diagonals and contains each integer from 1 to  $N^2$  exactly once.

A single valid move takes 1 sec time. You are given the initial configuration of the grid, can you write a program that can find for each test case the minimum time to unlock the lock.

If the lock can not be unlocked then print "-1".

## Input Format

The first line contains an integer  $K$  denoting the number of test cases.

For each test case -

1. The first line contains an integer  $N$ .
2. In the next  $N$  lines, each line contains  $N$  space-separated integers representing the configuration of the grid.

## Constraints

$$1 \leq T \leq 3$$

$$1 \leq N \leq 3$$

$$1 \leq \text{grid}[i][j] \leq N^2$$

Each element of the grid is unique.

## Output Format

For each test case -

A single line representing the minimum number of moves.

### Sample Input 0

```
1
3
2 7 1
9 5 8
4 3 6
```

### Sample Output 0

```
1
```

### Explanation 0

In one move last column can be rotated vertically down to obtain a magic square.