We have a grid of size $N \times N$. Each cell of the grid initially contains a zero(0) or a one(1). The *parity* of a cell is the number of 1s surrounding that cell. A cell is surrounded by at most 4 cells (top, bottom, left, right).

Suppose we have a grid of size 4×4:

1	0	1	0	**The parity of each cell would be**	1	3	1	2
1	1	1	1		2	3	2	1
0	1	0	0		2	1	2	1
0	0	0	0		0	1	0	0

For this problem, you have to change some of the 0s to 1s so that the parity of every cell becomes even. We are interested in the minimum number of transformations of 0 to 1 that is needed to achieve the desired requirement.

Input

The first line of input is an integer T $(T < 30)$ that indicates the number of test cases. Each case starts with a positive integer N $(1 \le N \le 15)$. Each of the next N lines contain N integers (0/1) each. The integers are separated by a single space character.

Output

For each case, output the case number followed by the minimum number of transformations required. If it's impossible to achieve the desired result, then output '-1' instead.

Sample Input

```
3
3
0 0 0
0 0 0
0 0 0
3
0 0 0
1 0 0
0 0 0
3
1 1 1
1 1 1
0 0 0
```

Sample Output

```
Case 1: 0
Case 2: 3
Case 3: -1
```