Laplacian Matrices (1) X11939_en

A square matrix M of size $n \times n$ that contains only zeros and ones, and only zeros in the diagonal, is called a *binary matrix*.
The Laplacian of a binary matrix M is another $n \times n$ square matrix L with the following content:

- All cells L_{ii} (i.e. the diagonal of L), are equal to the number of ones in row i of M.
- Any other cell in L contains the same value than the corresponding cell in M but with opposite sign (since M contains only 0 and 1, these L cells will contain 0 or -1 accordingly).

For example, the following binary matrix 5×5:

```
 0  1  1  0  0
 1  0  0  1  1
 0  1  0  0  1
 1  1  1  0  1
 0  0  0  0  0
```

has as Laplacian the following Matrix:

```
 2 -1 -1  0  0
-1  3  0 -1 -1
 0 -1  2  0 -1
-1 -1 -1  4 -1
 0  0  0  0  0
```

Write a program that reads one binary matrix and prints its Laplacian following the format shown in the examples.

Input

Input consists of a number $n > 0$, the dimension of the binary matrix, followed by $n \times n$ integers describing the matrix: all of them either 0 or 1, where all the diagonal entries are zero.

Output

The output must contain the Laplacian transform of the input matrix.

Sample input 1

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

Sample output 1

```
1 -1 0
0 1 -1
-1 -1 2
```

Sample input 2

```
4
0 1 1 0
1 0 0 1
1 1 0 1
0 1 1 0
```

Sample output 2

```
2 -1 -1 0
-1 2 0 -1
-1 -1 3 -1
0 -1 -1 2
```

Sample input 3

```
3
0 0 0
0 0 0
0 0 0
```

Sample output 3

```
0 0 0
0 0 0
0 0 0
```

Problem information

Author : ProAl1 professors
Generation : 2024-03-20 15:11:06