Relative Board

English Vietnamese

Given a matrix A with dimension N*N ($2 \le N \le 1000$) which contains only 6 types of value: {-1, -2, 0, 1, 2, 3}

A is called the relative board of a sequence $T = (T_1, T_2, ..., T_n)$, or T relates to A if:

- $A_{ij} = 0 : T_i = T_j$
- $A_{ij} = 1 : T_i < T_j$
- $A_{ij} = -1 : T_i > T_j$
- $A_{ij} = 2 : T_i \le T_j$
- $A_{ij} = -2 : T_i \ge T_j$
- $A_{ij} = 3 : T_i$ is not equal to T_j

For all i, j: 1 <= i, j <= N

Given the relative board A, find the sequence of positive integers $T = (T_1, T_2, ..., T_n)$ that relates to A such that Max(T) is as small as possible. Suppose that the sequence T always exists.

Define $Max(T) = Max(T_1, T_2, ..., T_n)$.

Input

The first line contains an integer N. N lines follow, each line contains N integers that describe the relative board A.

Output

The first line contains Max(T). The second line contains N separated positive integers $T_1, T_2, .., T_n$.

Score

Your score = Max(T).

Example

Input:

```
6
 0  1  1  1  2  2
-2  0  1  0  2  2
-2 -1  0  3  0  1
-2 -2  3  0  1  1
-1 -2  0 -1  0  1
-1 -2 -1 -1 -1  0
```

Output:

4
1 2 3 2 3 4

-> Score = 4