PIB '20 P5 - 4D Matrices

Time limit: 0.5s **Memory limit:** 256M

You are given a grid d of size $N \times (N-1)$.

Using this grid, you are to generate a new grid a of size $N \times N$ as follows:

1. The first element in each row i will be assigned a value of v_i. The array v is unknown to you.
2. For each element $2 \leq j \leq N$ in row i, $a_{i,j} = a_{i,j-1} + d_{i,j-1}$.

A third array, k will then be generated as follows:

1. The i^{th} element is the *median* of the i^{th} column in a.

It is known that the *median* of the array k is **exactly** zero. Can you determine any array v that makes the median of k zero, or state that it is impossible?

Note: For odd N, the median of the array is the middle element in the sorted array. For even N, the median is the *minimum* of the two middle elements in the sorted array. For example, the median of $[1, 6, 4, 3]$ is 3.

Input Specification

The first line will contain the integer N $(2 \leq N \leq 1000)$.

The next N lines will each contain $N-1$ integers, $d_{i,j}$ $(|d_{i,j}| \leq 10^5)$.

Output Specification

If it is impossible, print `NO` on one line.

Otherwise, print `YES` on the first line.
On the second line, print N space separated integers, the array v. v_i must fit in a 32-bit integer $(-2^{31} \leq v_i < 2^{31})$, or you will receive `Wrong Answer`.

Subtasks

Subtask 1 [7%]

$N \leq 5, d_{i,j} \geq 0$

Subtask 2 [24%]

$d_{i,j} \geq 0$

Subtask 3 [69%]

No additional constraints.

Sample Input for Subtask 1

```
4
2 1 0
3 3 0
1 6 1
1 1 1
```

Sample Output for Subtask 1

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

Explanation for Sample for Subtask 1

The array a that is generated with the array k below is:

```
-1  1  2  2
-3  0  3  3
-2 -1  5  6
 0  1  2  3
-----------
-2  0  2  3
```

The median of the array k is 0. Note that there could be multiple answers. For example, $[-2, -3, -3, 0]$ is also an answer. You are only required to print *any* one of them.

Sample Input for Subtask 2

```
7
1 2 2 2 1 1
3 0 0 1 1 1
0 0 0 0 0 0
1 0 2 1 0 1
2 0 0 1 4 0
2 1 1 2 4 5
1 1 1 1 1 1
```

Sample Output for Subtask 2

```
YES
5 1 -2 -3 1 -5 -8
```

Sample Input for Subtask 3

```
3
3 -12
-6 3
6 -5
```

Sample Output for Subtask 3

```
YES
-1 5 -1
```