# B. New Year Permutation

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

User ainta has a permutation $p_1, p_2, ..., p_n$. As the New Year is coming, he wants to make his permutation as pretty as possible.

Permutation $a_1, a_2, ..., a_n$ is *prettier* than permutation $b_1, b_2, ..., b_n$, if and only if there exists an integer $k$ $(1 \le k \le n)$ where $a_1 = b_1, a_2 = b_2, ..., a_{k-1} = b_{k-1}$ and $a_k < b_k$ all holds.

As known, permutation $p$ is so sensitive that it could be only modified by swapping two distinct elements. But swapping two elements is harder than you think. Given an $n \times n$ binary matrix $A$, user ainta can swap the values of $p_i$ and $p_j$ $(1 \le i, j \le n, i \ne j)$ if and only if $A_{i,j} = 1$.

Given the permutation $p$ and the matrix $A$, user ainta wants to know the prettiest permutation that he can obtain.

## Input

The first line contains an integer $n$ $(1 \le n \le 300)$ — the size of the permutation $p$.

The second line contains $n$ space-separated integers $p_1, p_2, ..., p_n$ — the permutation $p$ that user ainta has. Each integer between $1$ and $n$ occurs exactly once in the given permutation.

Next $n$ lines describe the matrix $A$. The $i$-th line contains $n$ characters '`0`' or '`1`' and describes the $i$-th row of $A$. The $j$-th character of the $i$-th line $A_{i,j}$ is the element on the intersection of the $i$-th row and the $j$-th column of A. It is guaranteed that, for all integers $i, j$ where $1 \le i < j \le n$, $A_{i,j} = A_{j,i}$ holds. Also, for all integers $i$ where $1 \le i \le n$, $A_{i,i} = 0$ holds.

## Output

In the first and only line, print $n$ space-separated integers, describing the prettiest permutation that can be obtained.

## Examples

**input**

```
7
5 2 4 3 6 7 1
0001001
0000000
0000010
1000001
0000000
0010000
1001000
```

**output**

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

**input**

```
5
4 2 1 5 3
00100
00011
10010
01101
01010
```

**output**

```
1 2 3 4 5
```

## Note

In the first sample, the swap needed to obtain the prettiest permutation is: $(p_1, p_7)$.

In the second sample, the swaps needed to obtain the prettiest permutation is $(p_1, p_3), (p_4, p_5), (p_3, p_4)$.

A **permutation** $p$ is a sequence of integers $p_1, p_2, ..., p_n$, consisting of $n$ distinct positive integers, each of them doesn't exceed $n$. The $i$-th element of the permutation $p$ is denoted as $p_i$. The size of the permutation $p$ is denoted as $n$.