Problem M. Number of Colorful Matchings

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

You are given a graph G with n black nodes and n white nodes, where every edge can only connect a black node and a white node (in other words, the graph is bipartite).

Each edge in G has a color: either blue or red. No two edges of the same color can connect the same pair of vertices (in other words, there are no same-color parallel edges).

For every k from 0 to n, please count the number of perfect matchings in G that contain exactly k red edges and $n - k$ blue edges. Recall that a perfect matching is a subset of n edges in which no two edges can share a common endpoint. Since the number could be large, you are only required to output the answers modulo 2.

Input

The first line contains a non-negative integer n ($1 \le n \le 300$).

Each of the next n lines contains n characters with no spaces. Together, these lines describe the adjacency matrix of red edges. The j-th character on the i-th line is "`1`" if there is one red edge connecting the i-th black node and the j-th white node, and "`0`" otherwise.

The next n lines describe the adjacency matrix of blue edges, in the same format as above.

Output

Output $n + 1$ lines containing your answers for $k = 0, 1, 2, \ldots, n$ respectively. Remember that you only need to output the answer modulo 2.

Example

standard input	standard output
2 11 10 00 11	0 0 1

Note

In the example, there exist three perfect matchings:

1. red $(1, 1)$, blue $(2, 2)$
2. red $(1, 2)$, blue $(2, 1)$
3. red $(1, 2)$, red $(2, 1)$