Problem G. Graph Problem With Small n

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

You are given an undirected graph with n vertices. For each pair of vertices (i, j) $(i \neq j)$, determine whether there exists a Hamiltonian path starting at i and ending at j.

Recall that a Hamiltonian path is a path consisting of $n-1$ edges that passes through all vertices exactly once.

Input

The first line contains one integer n $(2 \leq n \leq 24)$ — the number of vertices in the graph.

The i-th of the next n lines contains a binary string s_i of length n. Its i-th character is always equal to `0`, and for $j \neq i$ its j-th character is equal to `1` if there is an edge between vertices i and j, and `0` otherwise.

It is guaranteed that for any $i \neq j$, the i-th character of the j-th line coincides with the j-th character of the i-th line.

Output

Print n lines. In i-th of them, print a binary string of length n. Its i-th character must be equal to `0`, and j-th character at $j \neq i$ must be equal to `1` if there is a Hamiltonian path between vertices i and j, and `0` otherwise.

Examples

standard input	standard output
4 0110 1010 1101 0010	0001 0001 0000 1100
6 010001 101000 010100 001010 000101 100010	010001 101000 010100 001010 000101 100010
4 0111 1011 1101 1110	0111 1011 1101 1110

Note

In the first example, the Hamiltonian path exists between pairs $(1, 4)$ and $(2, 4)$.

In the second example, the graph is a cycle of length 6. The Hamiltonian path here exists only between pairs of adjacent vertices.

In the third example, we have a complete graph with 4 vertices. There exists a Hamiltonian path between each pair of vertices.