Problem G. Graph Coloring

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	512 mebibytes

You are given a tournament, represented as a complete directed graph (for all pairs i, j of two different vertices, there is exactly one edge among $i \to j$ and $j \to i$), with $n \leq 3000$ vertices. You need to color its edges into 14 colors.

There should be no path $i \to j \to k$ in this graph such that the colors of edges $i \to j$ and $j \to k$ are the same.

It is guaranteed that this is always possible.

Input

The first line of input contains one integer n ($3 \leq n \leq 3000$): the number of vertices in the given tournament.

Next $n - 1$ lines contain the description of the graph: the i-th line contains a binary string with i characters.

If the j-th character in this string is equal to '1', then the graph has an edge from $(i+1) \to j$. Otherwise, it has an edge from $j \to (i+1)$.

Output

The output should contain $n - 1$ lines, where the i-th line contains a string with i characters.

The j-th character in this string should be a lowercase Latin letter between 'a' and 'n'. If the graph has an edge from $(i+1) \to j$, then this character represents the color of the edge from $(i+1) \to j$. Otherwise it represents the color of the edge from $j \to (i+1)$.

There should be no path $i \to j \to k$ in this graph such that the colors of edges $i \to j$ and $j \to k$ are the same.

Examples

standard input	standard output
3 1 11	a ab
5 1 10 100 0100	a bc def ghij