

D. Restoring Table

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

Recently Polycarpus has learned the "bitwise AND" operation (which is also called "AND") of non-negative integers. Now he wants to demonstrate the school IT teacher his superb manipulation with the learned operation.

For that Polycarpus came to school a little earlier and wrote on the board a sequence of non-negative integers a_1, a_2, \dots, a_n . He also wrote a square matrix b of size $n \times n$. The element of matrix b that sits in the i -th row in the j -th column (we'll denote it as b_{ij}) equals:

- the "bitwise AND" of numbers a_i and a_j (that is, $b_{ij} = a_i \& a_j$), if $i \neq j$;
- 1, if $i = j$.

Having written out matrix b , Polycarpus got very happy and wiped a off the blackboard. But the thing is, the teacher will want this sequence to check whether Polycarpus' calculations were correct. Polycarpus urgently needs to restore the removed sequence of integers, or else he won't prove that he can count correctly.

Help Polycarpus, given matrix b , restore the sequence of numbers a_1, a_2, \dots, a_n , that he has removed from the board. Polycarpus doesn't like large numbers, so any number in the restored sequence mustn't exceed 10^9 .

Input

The first line contains a single integer n ($1 \leq n \leq 100$) — the size of square matrix b . Next n lines contain matrix b . The i -th of these lines contains n space-separated integers: the j -th number represents the element of matrix b_{ij} . It is guaranteed, that for all i ($1 \leq i \leq n$) the following condition fulfills: $b_{ii} = -1$. It is guaranteed that for all i, j ($1 \leq i, j \leq n$; $i \neq j$) the following condition fulfills: $0 \leq b_{ij} \leq 10^9$, $b_{ij} = b_{ji}$.

Output

Print n non-negative integers a_1, a_2, \dots, a_n ($0 \leq a_i \leq 10^9$) — the sequence that Polycarpus wiped off the board. Separate the numbers by whitespaces.

It is guaranteed that there is sequence a that satisfies the problem conditions. If there are multiple such sequences, you are allowed to print any of them.

Examples

input
1 -1
output
0

input
3 -1 18 0 18 -1 0 0 0 -1
output
18 18 0

input

4 -1 128 128 128 128 -1 148 160 128 148 -1 128 128 160 128 -1
output
128 180 148 160

Note

If you do not know what is the "bitwise AND" operation please read: http://en.wikipedia.org/wiki/Bitwise_operation.