

# Automated Theorem Proving

Time Limit: 2 Second  
Memory Limit: 256 MB

Automated Theorem Proving (ATP) is the process of proving theorems with computer programs. You are given  $n$  terms and a list of theorems in the form  $t_i \rightarrow t_j$ , where  $t_i$  and  $t_j$  are in the given set of terms. For each pair of terms  $(t_i, t_j)$ , find out if we can prove  $t_i \rightarrow t_j$  with the given theorems.

## Input

The first line of input contains a single integer  $n$  ( $1 \leq n \leq 2000$ ) - number of terms.

The following  $n$  lines describe the theorems with an adjacency matrix. The  $i$ -th line contains  $n$  integers  $a_{i,1}, \dots, a_{i,n}$ , where the  $j$ -th entry  $a_{i,j} = 1$  only if  $t_i \rightarrow t_j$  is a theorem. It is guaranteed that  $\forall i, a_{i,i} = 1$ .

## Output

Output an  $n \times n$  binary matrix in the same format as the input. The  $(i, j)$ -th entry of the matrix is 1 only if  $t_i \rightarrow t_j$  can be proved given the theorems.

## Sample Inputs

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```
3
1 1 1
1 1 0
0 0 1
```

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## Sample Outputs

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```
1 1 1
1 1 1
0 0 1
```

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