Floyd-Warshall!

Time Limit: 1 Second
Memory Limit: 256 MB

Given a directed graph G with n vertices and m edges ($1 \leq n \leq 400, 0 \leq m \leq \frac{n(n-1)}{2}$). For every pair on vertices $u, v \in [1, n]$, calculate the distance from vertex u to v. If v is not reachable from u, output -1.

Input

The first line of input contains a single integer n ($1 \leq n \leq 400$) - the number of vertices.

The next n lines describe the edges with an adjacent matrix. The i-th line contains n integers $a_{i,1}, \ldots a_{i,n}$ ($0 \leq a_{i,j} \leq 10^5$). The j-th entry $a_{i,j}$ denotes that there is an directed edge from i to j with weight $a_{i,j}$, where $a_{i,j} = 0$ denotes that such edge doesn't exist. It is guaranteed that $\forall i \in [1, n], a_{i,i} = 0$.

Output

Output an $n \times n$ matrix d where $d_{i,j}$ denotes the distance from vertex i to vertex j. If j is not reachable from i, set $d_{i,j} = -1$.

Sample Inputs

```
3
0 1 2
1 0 2
1 2 0
```

Sample Outputs

```
0 1 2
1 0 2
1 2 0
```