# F. Fortune over Sportsmanship

Time limit: 2 seconds
Memory limit: 256 megabytes

There is a tennis tournament happening right around the corner, with $n$ vicious participants.

The marketing experts have devised an $n \times n$ matrix $P$, where $P_{i,j}$ is the popularity score gained if player $i$ competes in a match with player $j$. They also observed the following social phenomenon: whenever player $i$ competes against player $j$ and wins, player $i$ will inherit all the popularity scores of player $j$, that is, $P_{i,x}$ becomes the maximum of $P_{i,x}$ and $P_{j,x}$, for all $1 \leq x \leq n$ (and similarly for $P_{x,i}$).

Since fairness isn't a concern, the tournament doesn't have to be perfect. In that sense, any set of $n-1$ matches played in order can be a valid tournament. To top if off, the contestants are numbered from 1 to $n$ in descending order of their performance. In that sense, if players $i$ and $j$ were to compete in a match, where $i < j$, then player $i$ will always win.

Given the popularity matrix $P$, you have to decide the $n-1$ matches that are going to be played in order during the tournament, such that the total popularity score over the $n-1$ matches is as large as possible. Note that once a match takes place, the loser gets disqualified, therefore she/he cannot not participate in future matches.

## Input

The first line of the input contains a single integer $n$ ($1 \leq n \leq 1000$), the number of players.

The $i$-th of the following $n$ lines contains $n$ integers $P_{i,1}, P_{i,2}, \ldots, P_{i,n}$, describing the $i$-th row of the popularity matrix $P$.

It is guaranteed that $1 \leq P_{i,j} \leq 10^6$ and $P_{i,j} = P_{j,i}$ for all $1 \leq i < j \leq n$. Moreover, $P_{i,i} = 0$ for all $1 \leq i \leq n$.

## Output

Output $n$ lines. The first line contains a single integer – the maximum possible total popularity score. Each of the following $n-1$ lines should contain two integers, indicating the participants that fight in each of the $n-1$ matches in order. If there are multiple solutions, output any of them.

## Example

| standard input | standard output |
|---|---|
| 5<br>0 2 3 4 5<br>2 0 4 5 6<br>3 4 0 6 7<br>4 5 6 0 8<br>5 6 7 8 0 | 26<br>4 5<br>3 4<br>2 3<br>2 1 |