# Problem A. Abstract Circular Cover

| | |
|---|---|
| Input file: | *standard input* |
| Output file: | *standard output* |
| Time limit: | 20 seconds |
| Memory limit: | 512 mebibytes |

*The time limit is a bit strict.*

There are $n$ distinct points on a circle, numbered from 0 to $n-1$ inclusive in the clockwise order. A *circular segment* of length $\ell$ ($1 \le \ell \le n$) with start at $i$ ($0 \le i \le n-1$) is a tuple of $\ell$ consecutive points in the clockwise order, starting with $i$ (in other words, a tuple of points with numbers $i, (i+1) \bmod n, (i+2) \bmod n, \ldots, (i+\ell-1) \bmod n$). Circular segments of length $n$ with starts at $0, 1, \ldots, n-1$ are considered to be pairwise different, despite containing the same set of points.

An integer cost $c_{i,\ell}$ is assigned to each circular segment. For each $k$ from 1 to $n$, find the minimum total cost of exactly $k$ circular segments, such that each of the $n$ points is contained in exactly one of them.

Note that there are **no** properties that values $c_{i,\ell}$ satisfy, except being comparatively small positive integers. That is, any $n \times n$ array of integers between 1 and $10^6$ is a valid test for this problem.

## Input

The first line contains an integer $n$ ($1 \le n \le 850$), the number of points on the circle. The $(i+1)$-st ($0 \le i \le n-1$) of the following $n$ lines contains $n$ space-separated integers $c_{i,1}, c_{i,2}, \ldots, c_{i,n}$ ($1 \le c_{i,\ell} \le 10^6$ for $1 \le \ell \le n$).

## Output

Output $n$ space-separated integers: $k$-th of them should be the minimum total cost of $k$ circular segments that cover every point exactly once.

## Examples

| standard input | standard output |
|---|---|
| 3<br>10 12 23<br>7 4 11<br>8 5 3 | 3 12 25 |
| 1<br>15 | 15 |