Problem J
Wunkus

Tresno, a biologist, recently discovered the *wunkus*, a species of animal that loves pets.

There are N wunki (the plural form of wunkus) arranged in a circle, numbered from 1 to N in clockwise order. Initially, wunkus i ($1 < i < N$) is adjacent to wunki $i-1$ and $i+1$. If $N \geq 2$, wunki 1 and N are also adjacent.

Wunki are territorial creatures. Each day, while at least two wunki remain, exactly one pair of adjacent wunki fights. Only one winner can emerge from this fight; the loser is removed from the circle, while the winner stays. The remaining wunki close the gap without changing their relative clockwise order, and a new pair of wunki may become adjacent after a wunkus is removed from the circle. The fights will continue for $N-1$ days, until only one wunkus remains.

After arduous research, Tresno has determined a value $A_{i,j}$ for every i and j such that $1 \leq i, j \leq N$ and $i \neq j$. If $A_{i,j} = 1$, wunkus i can defeat wunkus j; if $A_{i,j} = 0$, it cannot. It is possible that $A_{i,j} = A_{j,i} = 1$, in which case either wunkus can win. Tresno also found out that for every pair of distinct wunki i and j, at least one of them can defeat the other (that is, $A_{i,j} = 1$ or $A_{j,i} = 1$).

For each i from 1 to N, determine the number of different fight sequences in which wunkus i becomes the sole survivor of the circle, modulo $998\,244\,353$.

Two fight sequences are considered different if the pair of fighting wunki or the winner of the fight differs on at least one day.

Input

The first line contains an integer N ($1 \leq N \leq 300$), the number of wunki.

Each of the next N lines contains N space-separated integers. The j-th integer on the i-th of these lines denotes $A_{i,j}$ ($A_{i,j} \in \{0, 1\}$; $A_{i,i} = 0$ for $1 \leq i \leq N$; $A_{i,j} = 1$ or $A_{j,i} = 1$ for $1 \leq i < j \leq N$).

Output

Output N lines, each containing an integer. The integer in the i-th line ($1 \leq i \leq N$) denotes the number of different fight sequences in which wunkus i is the sole survivor, modulo $998\,244\,353$.

Sample 1

Sample Input	Sample Output
3 0 1 1 1 0 1 1 1 0	4 4 4

Explanation of Sample 1: As $N = 3$, all pairs of wunki are initially adjacent.

The following 4 fight sequences leave wunkus 1 as the sole survivor:

- Wunkus 1 defeats wunkus 2. Then, wunkus 1 defeats wunkus 3.
- Wunkus 1 defeats wunkus 3. Then, wunkus 1 defeats wunkus 2.
- Wunkus 2 defeats wunkus 3. Then, wunkus 1 defeats wunkus 2.
- Wunkus 3 defeats wunkus 2. Then, wunkus 1 defeats wunkus 3.

As each wunkus can defeat every other wunkus, by symmetry, there are also 4 fight sequences in which wunkus 2 is the sole survivor and 4 in which wunkus 3 is the sole survivor.

Sample 2

Sample Input	Sample Output
4 0 1 1 1 0 0 0 1 1 1 0 0 0 0 1 0	12 0 5 2

Explanation of Sample 2: One fight sequence in which wunkus 3 is the sole survivor is as follows.

- Wunkus 1 defeats wunkus 4. Wunki 1 and 3 become adjacent.
- Wunkus 3 defeats wunkus 1.
- Wunkus 3 defeats wunkus 2.

Sample 3

Sample Input	Sample Output
12 0 1 0 0 0 0 1 0 1 1 1 1 1 0 1 0 1 0 1 1 1 0 0 1 1 1 0 1 0 0 1 1 1 0 1 1 1 1 1 0 1 1 0 0 0 1 0 1 1 0 1 1 0 1 1 1 1 1 1 0 1 1 1 1 1 0 1 0 1 1 1 0 1 1 1 1 0 0 0 0 1 0 1 0 1 1 1 1 0 1 1 0 1 1 0 1 0 0 0 1 1 0 0 0 0 1 1 1 0 1 1 1 0 1 1 1 0 0 0 1 1 1 1 1 1 1 1 1 1 1 0 0 1 0 1 1 1 1 1 1 1 0 1 0	253705092 701135062 777650332 660066508 259048839 712129222 108679704 96822248 243502928 400084708 448826007 384648733

Explanation of Sample 3: There are $2\,093\,310\,954$ fight sequences in which wunkus 8 survives. Thus, the integer on the eighth line of the output is $2\,093\,310\,954 \bmod 998\,244\,353 = 96\,822\,248$.