Problem K
LOGCFL

Time Limit: 2 seconds

You are given a 3-dimensional integer array A of size $N \times N \times N$.

Initialize the following variables:

```
integer x = 0;
integer w = 1;
stack s = {};
```

Then, for each $t = 0, 1, \ldots, N-1$, choose an integer y_t such that $-1 \leq y_t < N$ and do the following action:

If $0 \leq y_t$, do the following:

```
w *= A[t][x][y];
s.push(x);
x = y;
```

The above `y` denotes y_t.

If $y_t = -1$, do the following:

```
assert(!s.empty());
w *= A[t][x][s.top()];
x = (x + s.top()) % N;
s.pop();
```

You can't choose $y_t = -1$ if the stack is empty before the action.

Note that the stack has the following operations:

- `push(x)`: adds an element `x` to the collection.
- `pop()`: removes the most recently added element.
- `top()`: returns the value of most recently added element.

For each $i = 0, 1, \ldots, N-1$, consider all possible sequences $y_0, y_1, \ldots, y_{N-1}$ such that the final value of `x` is i. Compute the sum of the corresponding values of `w` over all such sequences, and output the result modulo 998244353.

Input

The input is given in the following format:

$$
\begin{aligned}
&N \\
&A_{0,0,0} \ldots A_{0,0,N-1} \\
&\vdots \\
&A_{0,N-1,0} \ldots A_{0,N-1,N-1} \\
&\vdots \\
&\vdots \\
&A_{N-1,0,0} \ldots A_{N-1,0,N-1} \\
&\vdots \\
&A_{N-1,N-1,0} \ldots A_{N-1,N-1,N-1}
\end{aligned}
$$

$A_{i,j,k}$ means the value of $A[i][j][k]$.

- $1 \leq N \leq 30$
- $0 \leq A_{i,j,k} \leq 10^9$ $(1 \leq i, j, k \leq N)$
- All input values are integers.

Output

Output N lines. On the i-th line $(0 \leq i < N)$, output the answer for i.

Sample Input 1

```
2
1 10
100 1000
1 3
9 27
```

Sample Output 1

```
92
363
```

Sample Input 2

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

Sample Output 2

```
63
68
56
```

Sample Input 3	Sample Output 3
4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	120 120 120 120