Problem E. lanhf and the VNOI Cup T-Shirt Distribution Process

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

In the XX season, VNOI Cup attracts n participants. The competition consists of m rounds, and to increase the chances of receiving a shirt, all participants participate in all m rounds. In each round, the participants are ranked from 1 to n, and no two participants have the same rank. The *ranking table* for a round is defined as a list of participants in order of their rankings from 1 to n.

After the end of all m rounds, the organizers will choose a number k and distribute shirts to all participants with a rank no greater than k in each round. The organizers want to choose the largest possible value of k, such that the total number of participants receiving shirts does not exceed a given limit s.

For example,

- If $n = 3$, $m = 3$, $s = 2$, the ranking tables for the 3 rounds are
  - $[3, 1, 2]$ (participant 3 has rank 1, participant 1 has rank 2, and participant 2 has rank 3),
  - $[2, 1, 3]$,
  - $[2, 3, 1]$.

  The organizers will choose $k = 1$. In this case, the number of participants who receive shirts is 2, which are participants with indices 3 and 2. The organizers cannot choose $k = 2$ or $k = 3$, as all 3 participants would receive shirts.
- If $n = 2$, $m = 2$, $s = 1$, the ranking tables for the 2 rounds are
  - $[1, 2]$,
  - $[2, 1]$.

  The organizers will choose $k = 0$. In this case, the number of shirts distributed is 0. The organizers cannot choose $k = 1$ or $k = 2$, as both participants would receive shirts.

lanhf is responsible for distributing shirts to the participants. Currently, the competition has gone through $m-1$ rounds. Assuming the result of the last round is completely random, meaning each of the $n!$ different ranking tables has a probability of $\frac{1}{n!}$ to occur. Help *lanhf* calculate the probability for each participant to be on the list of shirt recipients so that *lanhf* can better prepare the shirts for packaging!

Input

The first line contains three positive integers n, m, s ($1 \le n, m \le 2000$, $1 \le s \le n$) — the number of participants, the number of rounds in the competition, and the maximum number of participants who can receive shirts.

The i-th line among the next $m-1$ lines contains n distinct positive integers $r_{i,1}, r_{i,2}, \ldots, r_{i,n}$ ($1 \le r_{i,j} \le n$) — the ranking table for the i-th round.

Output

Print n integers $p_1, p_2, \ldots, p_n$ — where p_i is the probability for the i-th participant to receive a shirt, modulo $998\,244\,353$.

Let $M = 998\,244\,353$. We can represent the answer as a simplified fraction $\frac{p}{q}$, where p and q are integers and $q \not\equiv 0 \pmod{M}$. Print the number corresponding to $p \cdot q^{-1} \bmod M$, or in other words, print the corresponding integer x such that $0 \le x < M$ and $x \cdot q \equiv p \pmod{M}$.

Scoring

Subtask	Score	Constraints
1	500	$n, m \le 8$
2	1250	$n, m \le 500$
3	1000	No additional constraints
Total	2750	

Examples

standard input	standard output
3 3 2 3 1 2 2 1 3	0 665496236 665496236
2 2 1 1 2	499122177 0
3 3 3 1 2 3 2 1 3	1 1 1
8 4 6 2 7 1 4 8 6 5 3 2 7 1 3 8 6 5 4 7 2 1 8 3 6 4 5	1 1 516947969 516947969 623902721 623902721 1 516947969
3 1 2	665496236 665496236 665496236

Note

In the first sample test, consider all possible rankings that can occur in the final round:

- $[1, 2, 3]$: the organizers will choose $k = 0$, and no one will receive a shirt.
- $[1, 3, 2]$: the organizers will choose $k = 0$, and no one will receive a shirt.
- $[2, 1, 3]$: the organizers will choose $k = 1$, and the people who receive shirts are 2 and 3.
- $[2, 3, 1]$: the organizers will choose $k = 1$, and the people who receive shirts are 2 and 3.
- $[3, 1, 2]$: the organizers will choose $k = 1$, and the people who receive shirts are 2 and 3.
- $[3, 2, 1]$: the organizers will choose $k = 1$, and the people who receive shirts are 2 and 3.

Therefore, the probability of person 1 receiving a shirt is 0, while the probability of person 2 and 3 receiving shirts is both $\frac{4}{6} = \frac{2}{3}$. Since $665\,496\,236 \cdot 3 \equiv 2 \pmod{998\,244\,353}$, we will print $665\,496\,236$.

In the second sample test, consider all possible rankings that can occur in the final round:

- $[1, 2]$: the organizers will choose $k = 1$, and the person who receives a shirt is 1.
- $[2, 1]$: the organizers will choose $k = 0$, and no one will receive a shirt.

Therefore, the probability of person 1 receiving a shirt is $\frac{1}{2}$, while the probability of person 2 receiving a shirt is 0. Since $499\,122\,177 \cdot 2 \equiv 1 \pmod{998\,244\,353}$, we will print $499\,122\,177$.

In the third sample test, since the maximum number of shirts distributed is equal to the number of participants, everyone will definitely receive a shirt.

In the fourth sample test, the probabilities for each participant are $[1, 1, \frac{27}{56}, \frac{27}{56}, \frac{3}{8}, \frac{3}{8}, 1, \frac{27}{56}]$.

In the fifth sample test, since there is only one round, all participants have an equal probability of receiving a shirt, which is $\frac{2}{3}$.