

Problem G

Ministry of Magic


Problem ID: ministryofr

CPU Time limit: 2 secon

Memory limit: 1024 ME

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Source: HiQ Challenge 2

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Many countries have a system of government where the parliament chooses the prime minister, who then forms a government. Generally, the parliament needs to elect the prime minister by majority vote. When no single party manages to get a majority in parliament, parties have to form a coalition that gets a majority vote. As a result, some countries have been without a government for years during negotiations!

The wizarding world realized that lacking a government for years is not sustainable because dark wizards could easily use the lack of government to take over the wizarding world without anyone fighting back. Thus it was decided that the minister of magic would be determined automatically as soon as everyone has cast their votes. The system they use for this is called *instant-runoff voting*.



The election of the European minister of magic

Author: inyucho, cc by

In instant-runoff voting, C candidates compete against each other in up to $C - 1$ rounds. After each round, if one of the candidates gets a majority vote, that candidate is elected. Otherwise, the least popular candidate is eliminated. If two candidates both are equally unpopular, the lowest numbered one is eliminated. Here, a majority vote requires a *strict* majority, i.e. more than half of the votes.

Votes for all the rounds are specified before the first round by giving a ranking of all the C candidates. Given such a ranking, a voter will vote for the highest ranked candidate in their ranking that hasn't been eliminated. For example, if a voter has the ranking 4, 1, 2, 3, 5 and the candidates 1, 4, 5 have been eliminated, the voter will vote for candidate 2 in the next round.

Just as in the normal world, the wizarding world has a number of parties (more specifically P parties). Each party has a number of representatives in the parliament that choose the minister. You will be given the candidate rankings for each party. Can you determine who will win the election?

Explanation of Sample 1

The favourite candidate of the four parties are 1, 4, 1 and 4. Each party have a single vote, so candidates 1 and 4 get two votes each in the first round. In the first two rounds, this means candidates 2 and 3 have zero votes, so they will be eliminated (first 2 since it is the lower-numbered candidate). Finally, candidate 1 is eliminated since candidates 1 and 4 are both equally unpopular with 2 votes, but 1 is the lower-numbered candidate. This means candidate 4 wins.

Input

The first line contains two integers – the number of candidates C ($1 \leq C \leq 10\,000$) and parties P ($1 \leq P \leq 100$). The next P lines describe each party. Each line starts with an integer v ($1 \leq v \leq 10^6$), the number of votes that the party has in the parliament, followed by a permutation of the numbers $1, 2, \dots, C$, the party's ranking of the candidates. The ranking is given from most preferred candidate to least preferred candidate.

Output

Output a single integer, the number of the candidate that is elected.

Sample Input 1

```
4 4
1 1 2 3 4
1 4 3 2 1
1 1 3 2 4
1 4 2 3 1
```

Sample Output 1

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4
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