Problem B. The New Chairman for IUT ACM Chapter

This year there is a problem with deciding the next chairman for IUT ACM Chapter. The election procedure is as follows. Each of the IUT ACM Chapter members are allowed to vote by submitting an ordered list of the applicants, which denotes their preferred order for the next chairman.

Applicant A beats applicant B in an election, if he/she appears before applicant B on the list of more than half of the voters. An applicant wins the election if he/she beats every other applicant. Note that in some cases nobody wins the election.

You are given the list of preferences of all voters. You are requested to find the minimum number of extra voters with whatever voting list that you would like them to have, to ensure that the election **does not end up with any winner**.

Input

The first line contains two space-separated integers $3 \leq n \leq 6$ and m, where n is the number of the applicants, and m is the number of unique votes received. Applicants are represented by the first n upper-case letters of the English alphabet.

Each of the next $1 \leq m \leq n!$ lines contains an ordered list containing all applicants, and the number of total votes received with that order, respectively.

Output

Find the minimum number of voters to add so that the election **does not end up with a winner**.

Examples

test	answer
3 3 ABC 1 BCA 1 CAB 1	0