

D. Cinema

time limit per test: 1 second

memory limit per test: 256 megabytes

input: input.txt

output: output.txt

Overall there are m actors in Berland. Each actor has a personal identifier — an integer from 1 to m (distinct actors have distinct identifiers). Vasya likes to watch Berland movies with Berland actors, and he has k favorite actors. He watched the movie trailers for the next month and wrote the following information for every movie: the movie title, the number of actors who starred in it, and the identifiers of these actors. Besides, he managed to copy the movie titles and how many actors starred there, but he didn't manage to write down the identifiers of some actors. Vasya looks at his records and wonders which movies may be his favourite, and which ones may not be. Once Vasya learns the exact cast of all movies, his favorite movies will be determined as follows: a movie becomes favorite movie, if no other movie from Vasya's list has more favorite actors.

Help the boy to determine the following for each movie:

- whether it surely will be his favourite movie;
- whether it surely won't be his favourite movie;
- can either be favourite or not.

Input

The first line of the input contains two integers m and k ($1 \leq m \leq 100$, $1 \leq k \leq m$) — the number of actors in Berland and the number of Vasya's favourite actors.

The second line contains k distinct integers a_i ($1 \leq a_i \leq m$) — the identifiers of Vasya's favourite actors.

The third line contains a single integer n ($1 \leq n \leq 100$) — the number of movies in Vasya's list.

Then follow n blocks of lines, each block contains a movie's description. The i -th movie's description contains three lines:

- the first line contains string s_i (s_i consists of lowercase English letters and can have the length of from 1 to 10 characters, inclusive) — the movie's title,
- the second line contains a non-negative integer d_i ($1 \leq d_i \leq m$) — the number of actors who starred in this movie,
- the third line has d_i integers $b_{i,j}$ ($0 \leq b_{i,j} \leq m$) — the identifiers of the actors who star in this movie. If $b_{i,j} = 0$, than Vasya doesn't remember the identifier of the j -th actor. It is guaranteed that the list of actors for a movie doesn't contain the same actors.

All movies have distinct names. The numbers on the lines are separated by single spaces.

Output

Print n lines in the output. In the i -th line print:

- 0, if the i -th movie will surely be the favourite;
- 1, if the i -th movie won't surely be the favourite;
- 2, if the i -th movie can either be favourite, or not favourite.

Examples

input

```
5 3
1 2 3
6
firstfilm
3
0 0 0
```

<pre> secondfilm 4 0 0 4 5 thirdfilm 1 2 fourthfilm 1 5 fifthfilm 1 4 sixthfilm 2 1 0 </pre>
output
<pre> 2 2 1 1 1 1 2 </pre>

input
<pre> 5 3 1 3 5 4 jumanji 3 0 0 0 theeagle 5 1 2 3 4 0 matrix 3 2 4 0 sourcecode 2 2 4 </pre>
output
<pre> 2 0 1 1 </pre>

Note

Note to the second sample:

- Movie `jumanji` can theoretically have from 1 to 3 Vasya's favourite actors.
- Movie `theeagle` has all three favourite actors, as the actor Vasya failed to remember, can only have identifier 5.
- Movie `matrix` can have exactly one favourite actor.
- Movie `sourcecode` doesn't have any favourite actors.

Thus, movie `theeagle` will surely be favourite, movies `matrix` and `sourcecode` won't surely be favourite, and movie `jumanji` can be either favourite (if it has all three favourite actors), or not favourite.