Problem AB

Input data	`stdin`
Output data	`stdout`

Alice has decided to impress her little brother, Bob, with her mathematical deduction abilities. She places, in a matrix with N rows and M columns, all the numbers $1, 2, \ldots, N \times M$, such that each line, and each column, respectively, is sorted in a strictly increasing order. We call a matrix with these properties an *AB matrix*.

Alice then asks Bob to take out K values from the matrix, such that no two such values are adjacent horizontally or vertically. She will then try to place those K numbers back into the matrix, such that it remains an *AB matrix*. After several tries, Alice realises that, in some cases, there can be multiple ways of placing back the K numbers on the empty positions.

Write a program that, given the initial *AB matrix* and Q queries, each consisting of a list of numbers that are taken out from the matrix, determines, for each query, whether a unique way of placing those numbers exists such that the resulting matrix is an *AB matrix*.

Input Data

The first line of the input contains three space separated positive integers N, M, and Q, with the respective meanings from the statement above. The next N lines contain M space separated values each, representing the initial *AB matrix* as built by Alice. Then, Q queries follow, each consisting of two lines. The first line of a query contains the positive integer K, representing the number of values that Bob takes out for this query. Then second line contains K space separated integers, representing the numbers that are taken out.

Output Data

Output Q lines, each containing an integer. On the i^{th} line, output the answer for the i^{th} query: the answer will be 1 if there is a unique way of placing back the numbers such that the resulting matrix is an *AB matrix*, or 0 otherwise.

Restrictions

- $1 \leq N, M \leq 2\,000$
- $1 \leq Q \leq 25$
- $K \geq 1$
- For any query, we guarantee that no two numbers that Bob takes out are equal, and also that they are not horizontally or vertically adjacent.
- The total number of numbers that Bob takes out over all queries does not exceed $4\,000\,000$.
- You will get points for a test only if all queries are answered correctly.

#	Points	Restrictions
1	21	$1 \leq N, M \leq 10$
2	18	$1 \leq N, M \leq 100$
3	55	$1 \leq N, M \leq 400$
4	6	No further constraints.

Examples

Input data	Output data	Explanations
3 3 2 1 2 4 3 5 8 6 7 9 3 1 5 9 3 5 4 6	1 0	In the first query Bob takes out numbers 1, 5 and 9. The matrix, after this operation, looks like this: ? 2 4 3 ? 8 6 7 ? We observe that there is a unique way of placing the numbers back, as we can only obtain the initial matrix. In the second query Bob takes out numbers 5, 4 and 6: 1 2 ? 3 ? 8 ? 7 9 Placing back the numbers is not unique, as, besides the original matrix, we can also obtain: 1 2 5 3 6 8 4 7 9