2-D Permutations

Time limit: 2.0s **Memory limit:** 1G

Edward spent the whole weekend brainstorming problems involving 2-D arrays. Unfortunately, they were all too hard, so he came up with this instead:

> You are given $N \times M$ integers, numbered from 1 to $N \times M$. You would like to arrange these numbers into an $N \times M$ array A. The rows are numbered from 1 to N and the columns from 1 to M. Denote the number assigned to the i-th cell from the top and the j-th cell from the left $A_{i,j}$. An arrangement is called valid if for all cells with $i > 1$, $A_{i,j} > A_{i-1,j}$, and for all cells with $j > 1$, $A_{i,j} > A_{i,j-1}$. You are also given Q queries. For each query, a number q_i is given, and you must return the number of different cells q_i can be placed in all valid arrangements.

Edward has no idea how to solve this problem either. Please help him solve it.

Input Specification

The first line will contain three integers N, M, and Q, the dimensions of the array and the number of queries.

The next Q lines will each contain one integer q_i, as specified in the problem statement.

Output Specification

Output Q lines, the i-th line containing the number of different cells q_i can be placed in all valid arrangements.

Constraints

For all subtasks:

$1 \leq N, M \leq 5000$

$1 \leq Q \leq 10^6$

$1 \leq q_i \leq N \times M$

Subtask 1 [15%]

$1 \leq N \times M \leq 10$

$1 \leq Q \leq 10$

Subtask 2 [35%]

$1 \leq N, M, Q \leq 300$

Subtask 3 [50%]

No additional constraints.

Sample Input 1

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

Sample Output 1

```
1
2
2
1
```

Explanation for Sample 1

The two valid arrangements are:

1	2
3	4

1	3
2	4

2 and 3 can be placed in two different cells, while 1 and 4 can only be placed in one.

Sample Input 2

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

Sample Output 2

```
1
1
1
```

Explanation for Sample 2

The only valid arrangement is:

1	2	3

Since there is only 1 valid arrangement, each number can only be placed in 1 unique cell.

Sample Input 3

```
5 5 1
18
```

Sample Output 3

```
11
```

Explanation for Sample 3

The following diagram shows the 11 possible cells 18 can be placed in. Green cells denote possible cells, while red cells denote otherwise: