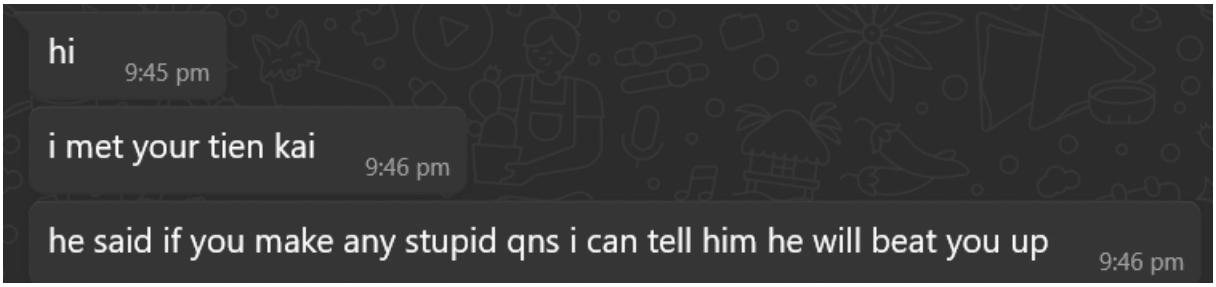
Run Away

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes



So now Tien Kai has trapped Ket the cat in his basement. Tien Kai's basement is a weird place and can be modelled as a one-dimensional line with positions 1 to N, inclusive, numbered from left to right. Tien Kai then creates M clones of himself to catch Ket the cat while he sits down and watches the chase...

At the start, all M Tien Kai clones and Ket are in distinct positions. They then make moves. During each move, Ket goes to an adjacent position or stays at the current one. Then, each of the M clones simultaneously goes to an adjacent position or stays at the current one. Note that the room is enclosed and the far ends of the room are dead ends.

This continues until Ket is caught. Ket is caught if any of the clones (possibly more than one) is located in the same position as him.

Everyone sees each others' moves, so they all act optimally.

Your task is to find how many moves it will take for the Tien Kai clones to catch Ket if they all act optimally.

Acting optimally means Ket makes his moves in a way that maximizes the number of moves the clones need to catch him; and the clones coordinate with each other to make their moves in a way that minimizes the number of moves they need to catch Ket.

Also, this task is too easy so you will be given Q queries on Ket's position.

Input

In the first line, you are given three integers N, M, and Q — the number of positions in Tien Kai's basement, the number of clones, and the number of queries.

In the second line, you are given M distinct integers B_1, B_2, ..., B_M — the positions of the clone.

In the third line, you are given Q integers A_1, A_2,... , A_Q — Ket's position for every query.

Output

Output Q lines, the i^{th} line containing the answer to the i^{th} query.

Scoring

For all testcases, it is guaranteed that:

- $1 \leq N \leq 10^9$
- $1 \leq M,\ Q \leq 2 * 10^5$
- $1 \leq A_i,\ B_i \leq N$
- It is guaranteed that for any i, j such that $1 \leq i \leq M$ and $1 \leq j \leq Q$, $b_i \neq a_j$. i.e. Ket's starting position will never be the same as that of a clone.

Subtask	**Constraints**	**Points**
1	$M = 1$	7
2	$Q = 1$	7
3	$N,\ Q \leq 1000,\ M \leq N - 1$	17
4	$A_i > B_j$ for all i and j	24
5	—	45
6	Sample Testcases	0

Examples

standard input	standard output
8 1 1 6 3	5
10 3 3 1 4 8 2 3 10	1 1 2