Harvest

IOI Farm is an agricultural farm growing apples. It is famous for being located around a large circular lake.

In IOI Farm, there are N employees, numbered from 1 to N. There are M apple trees, numbered from 1 to M. The perimeter of the lake is L meter.

In the beginning, the employee i ($1 \leq i \leq N$) is waiting at the distance of A_i meter from the northernmost point of the lake, in the clockwise direction. The values of A_i ($1 \leq i \leq N$) are distinct. The apple tree j ($1 \leq j \leq M$) is grown up at the distance of B_j meter from the northernmost point of the lake, in the clockwise direction. The values of B_j ($1 \leq j \leq M$) are distinct. Moreover, there is no apple tree at the initial position of any employee.

Due to a special breed improvement of the apple trees in IOI Farm, every apple tree can have at most one apple at the same time. Moreover, if an apple is harvested from the apple tree, it will have a new apple exactly after C seconds. At time 0, every apple tree has an apple, and every employee starts walking around the lake in the clockwise direction. The speed of every employee is 1 meter per second. If an employee arrives at an apple tree with an apple, then the employee will always harvest it (If an apple tree has a new apple at the same time when an employee arrives there, then the employee will harvest it too). We ignore the time it takes for an employee to harvest an apple.

President K is an stock holder of IOI Farm. Since you are a manager of IOI Farm, President K asked you to report on the efficiency of the employees. More precisely, President K wants to know the following Q values.

> For each k ($1 \leq k \leq Q$), the number of apples harvested by the employee V_k until time T_k (including an apple harvested exactly at time T_k if it exists).

Write a program which, given the number of the employees, the number of the apple trees, the perimeter of the lake, the time it takes for an apple tree to have a new apple, the positions of the employees and the apple trees, and information on Q queries, calculates the number of harvested apples for each query.

Input

Read the following data from the standard input. All the values in the input are integers.

$N\ M\ L\ C$
$A_1 \cdots A_N$
$B_1 \cdots B_M$
Q
$V_1\ T_1$
$\vdots$
$V_Q\ T_Q$

Output

Write Q lines to the standard output. In the k-th line ($1 \leq k \leq Q$), output the answer to the k-th query.

Constraints

- $1 \leq N \leq 200\,000$.
- $1 \leq M \leq 200\,000$.
- $N + M \leq L \leq 1\,000\,000\,000$.
- $1 \leq C \leq 1\,000\,000\,000$.
- $0 \leq A_i < L$ ($1 \leq i \leq N$).
- $A_i < A_{i+1}$ ($1 \leq i \leq N - 1$).
- $0 \leq B_j < L$ ($1 \leq j \leq M$).
- $B_j < B_{j+1}$ ($1 \leq j \leq M - 1$).
- $A_i \neq B_j$ ($1 \leq i \leq N$, $1 \leq j \leq M$).
- $1 \leq Q \leq 200\,000$.
- $1 \leq V_k \leq N$ ($1 \leq k \leq Q$).
- $1 \leq T_k \leq 1\,000\,000\,000\,000\,000\,000 = 10^{18}$ ($1 \leq k \leq Q$).

Subtasks

1. (5 points) $N \leq 3\,000$, $M \leq 3\,000$, $Q \leq 3\,000$.
2. (20 points) $T_k \geqq 1\,000\,000\,000\,000\,000 = 10^{15}$ ($1 \leqq k \leqq Q$).
3. (75 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
3 2 7 3 1 4 6 0 5 3 1 7 2 3 3 8	2 1 1

- At time 1, the employee 2 harvests an apple from the apple tree 2, and the employee 3 harvests an apple from the apple tree 1.
- At time 3, the employee 2 arrives at the apple tree 1. Since it has no apple at that time, the employee does no harvest an apple.
- At time 4, the employee 1 harvests an apple from the apple tree 2.
- At time 6, the employee 1 harvests an apple from the apple tree 1. The employee 3 arrives at the apple tree 2, but does not harvest an apple since the apple tree has no apple at that time.
- At time 8, the employee 2 harvests an apple from the apple tree 2. The employee 3 arrives at the apple tree 1, but does not harvest an apple since the apple tree has no apple at that time.

As the number of apples harvested by the employee 1 until time 7 (including an apple harvested at time 7) is 2, output 2 in the first line.

Sample Input 2	Sample Output 2
5 3 20 6 0 4 8 12 16 2 11 14 9 4 1932 2 93787 1 89 5 98124798 1 2684 1 137598 3 2 3 8375 4 237	146 7035 7 7359360 202 10320 0 628 18

Sample Input 3	Sample Output 3
8 15 217 33608	33230868503053
0 12 71 96 111 128 152 206	3
4 34 42 67 76 81 85 104 110 117 122 148 166 170 212	5
14	1
2 223544052420046341	123542793648997
3 86357593875941375	8
4 892813012303440034	165811220737767
1 517156961659770735	8
7 415536186438473633	7
6 322175014520330760	1
7 557706040951533058	1
6 640041274241532527	7
5 286263974600593111	7535161012043
8 349405886653104871	132506837660717
1 987277313830536091	
5 989137777159975413	
2 50689028127994215	
7 445686748471896881	