Problem M. Circular Route

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

Little Cyan Fish is the king of city $\mathcal{H}$ from the Cup Universe. In city $\mathcal{H}$, there is a circular route of length L. There are L stations on the route numbered by $0, \ldots, L-1$ counterclockwise. Station $(p+1) \bmod L$ is located at the point reached by walking counterclockwise one unit distance from station p.

A bus starts at station x at time 0 and moves at a constant speed of 1 along this circular route counterclockwise, looping endlessly. The bus is small, so there can be at most one person on the bus at any moment.

Now, there are n people who want to travel by bus. The i-th person wants to travel from the station s_i to the destination station t_i. Passengers may board the bus when it arrives at their starting station and must remain on board until reaching their destination. They may also choose to not board the bus and wait for it to arrive again in a future loop.

Little Cyan Fish wants to know, starting from time 0, what is the minimum time needed to transport all individuals to their respective destinations? We assume that boarding and disembarking happen instantaneously, without requiring any additional time.

Please answer q queries regarding the shortest time needed for different starting points x.

Input

There are multiple test cases in a single test file. The first line of the input contains a single integer T ($1 \le T \le 10^5$), indicating the number of test cases.

For each test case, the first line contains two integers n and L ($1 \le n \le 2 \times 10^5$, $2 \le L \le 10^9$).

The next n lines describe travel plans for n people. The i-th line of these lines contains two integers s_i and t_i ($0 \le s_i, t_i < L, s_i \ne t_i$), indicating the beginning and the ending of the i-th person.

The next line contains an integer q ($1 \le q \le 10^6$).

The next q lines describe the queries. The i-th line of these lines contains one integer x_i indicating the position of the bus at time 0.

It is guaranteed that the sum of n over all test cases does not exceed 2×10^5, and the sum of q over all test cases does not exceed 10^6.

Output

For each test case, output q lines. The i-th line should contain an integer indicating the answer for the starting point x_i.

Example

standard input	standard output
3 2 10 3 7 8 0 4 1 3 5 9 4 4 0 2 2 0 1 3 3 1 1 0 3 1000000000 0 999999999 0 999999999 0 999999999 1 1	9 7 12 11 9 3999999998