Escape Route 2

The IOI Kingdom consists of N cities lined up from west to east, with cities numbered from 1 to N in order from west.

In the IOI Kingdom, they use *Byou* as the unit of time. A day in the IOI Kingdom is divided into T units of time. The moment x Byous ($0 \leq x < T$) after the beginning of a day is called time x. Therefore, when 1 Byou passes from time $T - 1$ of a certain day, it becomes time 0 of the next day.

JOI Group is one of the secret sects in the IOI Kingdom. Since it is a secrect sect, members must navigate around the country's checkpoints. Consequently, JOI Group members are restricted to using only flights operated by JOY Airlines for intercity travel.

JOY Airlines operate M_i flights departing from city i ($1 \leq i \leq N - 1$). The j-th flight ($1 \leq j \leq M_i$) departs from city i at time $A_{i,j}$ every day and arrives at city $i + 1$ at time $B_{i,j}$ on the same day. Here, $A_{i,j} < B_{i,j}$ holds. These flights allow convenient transfers, and it is also possible to depart from a city immediately upon arrival or stay overnight at the company's airports.

The JOI Group has Q members, numbered from 1 to Q. Member k ($1 \leq k \leq Q$) places their operational base in city L_k and their living base in city R_k. Therefore, they want to know the minimum time required to travel from city L_k to city R_k by selecting the departure time from city L_k and flights to use appropriately.

Given information about the flights operated by JOY Airlines and the members of the JOI Group, create a program to find the minimum time required for each member k to travel from city L_k to city R_k.

Input

Read the following data from the standard input.

$N\ T$
M_1
$A_{1,1}\ B_{1,1}$
$A_{1,2}\ B_{1,2}$
$\vdots$
$A_{1,M_1}\ B_{1,M_1}$
M_2
$A_{2,1}\ B_{2,1}$
$A_{2,2}\ B_{2,2}$
$\vdots$
$A_{2,M_2}\ B_{2,M_2}$
$\vdots$
M_{N-1}
$A_{N-1,1}\ B_{N-1,1}$
$A_{N-1,2}\ B_{N-1,2}$
$\vdots$
$A_{N-1,M_{N-1}}\ B_{N-1,M_{N-1}}$
Q
$L_1\ R_1$
$L_2\ R_2$
$\vdots$
$L_Q\ R_Q$

Output

Output Q lines to the standard output. On the k-th line ($1 \leq k \leq Q$), output the minimum time required for the member k to travel from city L_k to city R_k.

Constraints

- $2 \leq N \leq 100\,000$.
- $2 \leq T \leq 10^9$.
- $M_i \geq 1$ $(1 \leq i \leq N-1)$.
- $M_1 + M_2 + \cdots + M_{N-1} \leq 100\,000$.
- $0 \leq A_{i,j} < B_{i,j} < T$ $(1 \leq i \leq N-1, 1 \leq j \leq M_i)$.
- $1 \leq Q \leq 300\,000$.
- $1 \leq L_k < R_k \leq N$ $(1 \leq k \leq Q)$.
- Given values are all integers.

Subtasks

1. (6 points) $N \leq 2\,000$, $M_i = 1$ $(1 \leq i \leq N-1)$.
2. (8 points) $N \leq 2\,000$, $M_i \leq 5$ $(1 \leq i \leq N-1)$.
3. (17 points) $M_i = 1$ $(1 \leq i \leq N-1)$.
4. (23 points) $M_i \leq 5$ $(1 \leq i \leq N-1)$.
5. (36 points) $N \leq 90\,000$, $Q \leq 90\,000$, $M_1 + M_2 + \cdots + M_{N-1} \leq 90\,000$.
6. (10 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
4 10000 1 100 300 2 200 400 300 600 1 500 600 3 1 3 2 4 1 4	500 400 10500

As a demonstration, let us designate the day on which member k departs from city L_k as day 1.

Member 1 can travel from city 1 to city 3 in 500 Byou by following actions:

1. Depart from city 1 at time 100 on day 1 and arrive at city 2 at time 300 on day 1.
2. Depart from city 2 at time 300 on day 1 and arrive at city 3 at time 600 on day 1.

Since there is no faster way to travel, output 500 on line 1.

Member 2 can travel from city 2 to city 4 in 400 Byou by following actions:

1. Depart from city 2 at time 200 on day 1 and arrive at city 3 at time 400 on day 1.
2. Depart from city 3 at time 500 on day 1 and arrive at city 4 at time 600 on day 1.

Since there is no faster way to travel, output 400 on line 2.

Member 3 can travel from city 1 to city 4 in 10500 Byou by following actions:

1. Depart from city 1 at time 100 on day 1 and arrive at city 2 at time 300 on day 1.
2. Depart from city 2 at time 300 on day 1 and arrive at city 3 at time 600 on day 1.
3. Depart from city 3 at time 500 on day 2 and arrive at city 4 at time 600 on day 2.

Since there is no faster way to travel, output 10500 on line 3.

This sample input satisfies the constraints of subtasks 2, 4, 5, 6.

Sample Input 2	Sample Output 2
6 10000 1 100 300 1 400 700 1 500 600 1 300 900 1 200 800 1 1 6	30700

This sample input satisfies the constraints of all subtasks.