



Bitaro, who Leaps through Time

Beaverland consists of N cities, numbered from 1 to N . There are $N - 1$ roads connecting cities. The i -th ($1 \leq i \leq N - 1$) road connects the city i and the city $i + 1$ bidirectionally. In Beaverland, they use *Byou* as the unit of time. Each day in Beaverland is 1 000 000 000 Byous long. The moment x Byous ($0 \leq x < 1\,000\,000\,000$) after the beginning of a day is called time x . It takes 1 Byou to pass through any of the roads, and the i -th road can be passed through only between time L_i and time R_i every day. Specifically, to pass through the i -th road, we must leave the city i or the city $i + 1$ at time x satisfying $L_i \leq x \leq R_i - 1$, and must arrive at the other city at time $x + 1$.

Bitaro used to be an ordinary Beaver living in Beaverland. However, as he tries to cope with his lateness, he has finally acquired the skill of leaping through time. By using this skill once, he can go back 1 Byou ago. He cannot go back to the day before: if he uses the skill between time 0 and time 1, he will go back to time 0 of the day. He can use this skill only when he is at a city. The position of Bitaro does not change on using the skill.

Bitaro gets tired when he uses the skill. To find ways to travel with fewer number of usage of the skill, he decided to do a thought experiment consisting of Q steps. In the j -th ($1 \leq j \leq Q$) step in the thought experiment, he does one of the followings:

- Change the duration in which the P_j -th road can be traveled. After the modification, it can be passed through only between time S_j and time E_j .
- Suppose he is at the city A_j at time B_j . Then, compute the minimum number of usage of the skill to be at the city C_j at time D_j on the day.

He wonders the result of the thought experiment.

Write a program which, given the number of cities in Beaverland, the information of roads, and the details of the thought experiment, calculates the result of the thought experiment.

Input

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

N Q
 L_1 R_1
 \vdots
 L_{N-1} R_{N-1}
(Query 1)



⋮

(Query Q)

Here, each (Query j) consists of 4 or 5 integers separated by a space. Let T_j be the first integer in it. Then,

- If $T_j = 1$, (Query j) consists of 4 integers T_j, P_j, S_j and E_j . This means that, in the j -th step of the thought experiment, the duration in which the P_j -th road can be passed is changed to the interval between time S_j and time E_j .
- If $T_j = 2$, (Query j) consists of 5 integers T_j, A_j, B_j, C_j and D_j . This means that, in the j -th step of the thought experiment, your program should compute the minimum number of usage of the skill to be at the city C_j at time D_j on the day, on the assumption that Bitaro is at the city A_j at time B_j .

Output

For each step with $T_j = 2$, write a line containing the minimum number of usage of the skill to the standard output, in order.

Constraints

- $1 \leq N \leq 300\,000$.
- $1 \leq Q \leq 300\,000$.
- $0 \leq L_i < R_i \leq 999\,999\,999$ ($1 \leq i \leq N - 1$).
- $1 \leq T_j \leq 2$ ($1 \leq j \leq Q$).
- $1 \leq P_j \leq N - 1$ ($1 \leq j \leq Q, T_j = 1$).
- $0 \leq S_j < E_j \leq 999\,999\,999$ ($1 \leq j \leq Q, T_j = 1$).
- $1 \leq A_j \leq N$ ($1 \leq j \leq Q, T_j = 2$).
- $0 \leq B_j \leq 999\,999\,999$ ($1 \leq j \leq Q, T_j = 2$).
- $1 \leq C_j \leq N$ ($1 \leq j \leq Q, T_j = 2$).
- $0 \leq D_j \leq 999\,999\,999$ ($1 \leq j \leq Q, T_j = 2$).

Subtasks

1. (4 points) $N \leq 1000, Q \leq 1000$.
2. (30 points) $T_j = 2$ ($1 \leq j \leq Q$).
3. (66 points) No additional constraints.



Sample Input and Output

Sample Input 1	Sample Output 1
3 3	2
0 5	4
0 5	
2 1 3 3 3	
1 2 0 1	
2 1 3 3 3	

In the 1st step of the thought experiment, Bitaro moves from the city 1 to the city 2 in 1 Byou, then moves from the city 2 to the city 3 in 1 Byou to be at the city 3 at time 5. Therefore, by using the skill twice, he can be at the city 3 at time 3.

In the 2nd step of the thought experiment, the duration in which the 2nd road can be passed is changed to the interval between time 0 and time 1.

In the 3rd step of the thought experiment, Bitaro moves from the city 1 to the city 2 in 1 Byou to be at the city 2 at time 4. Then, he uses the skill four times, moves to the city 3 in 1 Byou and wait 2 Byous to be at the city 3 at time 3.

Sample Input 2	Sample Output 2
5 5	4
3 5	3
4 8	2
2 6	3
5 10	
2 5 3 1 10	
2 2 6 5 6	
1 3 4 6	
2 3 3 4 3	
2 4 5 1 5	



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Contest Day 3 – Bitaro, who Leaps through Time

Sample Input 3	Sample Output 3
7 7	145611455
112103440 659752416	0
86280800 902409187	447180143
104535475 965602300	0
198700180 945132880	207252171
137957976 501365807	0
257419446 565237610	0
2 4 646977260 7 915994878	
2 1 221570340 6 606208433	
2 7 948545948 4 604273995	
2 7 247791098 5 944822313	
2 7 250362511 2 50167280	
2 3 364109400 4 555412865	
2 7 33882587 7 186961394	

Sample Input 4	Sample Output 4
7 7	10467449
535825574 705426142	164858601
964175291 996597835	
481817391 649559926	
4519006 410772613	
74521477 274584126	
256535565 899389890	
1 6 511428966 602601933	
1 1 69986642 201421232	
2 3 636443425 4 625975977	
1 6 235225515 405336399	
2 3 866680458 3 701821857	
1 6 180606048 900533151	
1 6 612564160 720179605	