Problem A. Agenda

Input file:	*standard input*
Output file:	*standard output*
Time limit:	5 seconds
Memory limit:	1024 mebibytes

Jasper has a very full agenda. He currently has n appointments, where the i'th appointment takes place in the open time interval (x_i, y_i). Since many of them are online, Jasper can attend several appointments at the same time. To make his planning less chaotic, Jasper performs q operations on his current agenda:

- split t: Jasper takes a short break at time t. Every appointment (x, y) with $x < t < y$ is split into two new appointments: (x, t) and (t, y).
- skip t: Jasper decides to skip every appointment that is ongoing at time t. So each appointment (x, y) with $x < t < y$ is removed completely.

Note that the operations are persistent.

The duration of an appointment (x, y) is defined as $y - x$. Determine the total sum of durations of all appointments still in Jasper's agenda after each operation. The input uses the "prevans xor" encoding (see Input and Output).

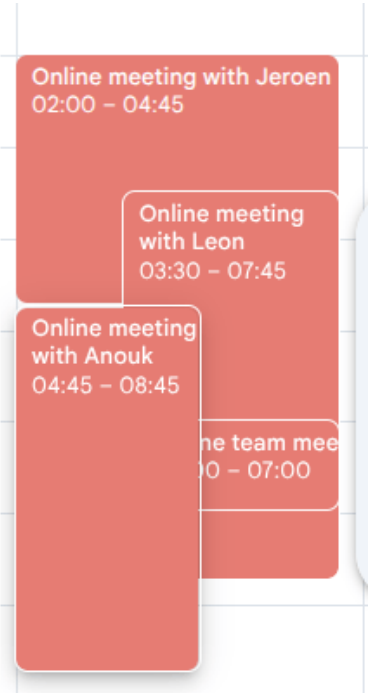


Figure 1: A normal day in the agenda of Jasper.

Input

The first line contains two integers n and q ($1 \le n, q \le 3 \cdot 10^5$), the original number of appointments and the number of operations.

The next n lines (one for each appointment) contain two integers x_i and y_i ($0 \le x_i < y_i \le 10^6$), the start and end time of appointment i.

The last q lines describe the operations. The i'th line consists of a string s_i and an integer t'_i, where s_i either equals "`split`" (denoting a split operation) or "`skip`" (denoting a skip operation). The time t_i of the operation equals $t_i = t'_i \oplus \text{ans}_{i-1}$, the bitwise XOR of the input t'_i and the answer ans_{i-1} after the previous operation. The value ans_0 is the sum of the durations of the initial n appointments.

It is guaranteed that $0 \le t_i \le 10^6$ for all i and that all t_i are distinct.

Output

Output $q+1$ integers $\text{ans}_0, \text{ans}_1, \ldots, \text{ans}_q$, where ans_i is the sum of the durations after the first i operations. The value ans_0 is the sum of the durations of the initial n appointments.

Example

standard input	*standard output*
3 3 1 10 2 5 4 13 split 22 skip 17 skip 0	21 21 12 3

Note

In the example, there are initially 3 appointments ($(1, 10)$, $(2, 5)$, and $(4, 13)$) with total duration 21. After the first operation (with $t = 22 \oplus 21 = 3$), there are 5 appointments ($(1, 3)$, $(3, 10)$, $(2, 3)$, $(3, 5)$, and $(4, 13)$) with total duration 21. The second operation (with $t = 17 \oplus 21 = 4$) will remove appointments $(3, 10)$ and $(3, 5)$, such that the total duration becomes 12. The third operation (with $t = 0 \oplus 12 = 12$) will remove appointment $(4, 13)$ as well, leaving a total duration of 3.