Fork

Time limit: 2 sec.
Memory limit: 512MB

Description

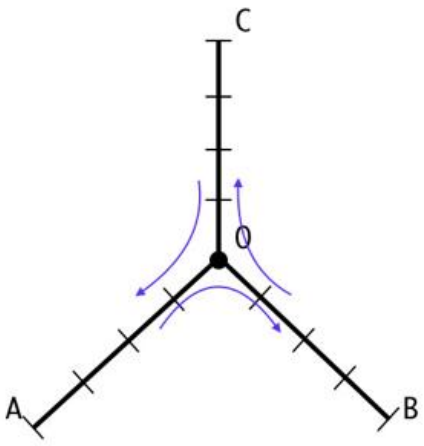

Figure 1) The three-way fork

As usual, n ants are on a three-way fork. Each endpoints of the three-way fork are named A, B, and C, and the center is named O. The distance of these three roads AO, BO, and CO are all identically l. Ants move with an initial position and an initial direction. All ants move exactly one space per second. Ants only change the direction of their movement when encountering special circumstances.

- Rule 1 – If two ants run into each other, then they both change the direction the opposite side in which they were originally going. This rule holds on every position on this three-way intersection, even at O.
- Rule 2 – If an ant arrives at O and don't run into other ants, then it travels to the right. (Arrow of Figure 1)

Ants stop when they arrive at A, B or C. Given the initial positions and directions of the ants, print the time for all ants to stop moving.

Input

The first line contains two integers, n, the number of ants, and l, the length of each road. (1 <= n <= 100,000) (2 <= l <= 1,000,000,000)

The next n lines contain the information of each ant's initial position and direction. First, the road the ant is on is given(A, B, or C). Then, x, the distance from O to the ant is given. (1 <= x <= l-1) The next integer is 0 if the ant is facing toward O, or 1 if the ant is facing away from O.

It is guaranteed that all n ants' positions are different.

Output

Print the time for all ants to stop moving, in a single line.

Sample I/O

Input(s)	Output(s)
5 3 B 2 0 A 1 1 A 2 0 B 1 0 C 2 1	5