

Hacking the Traffic Lights

Input file: **standard input**
Output file: **standard output**
Time limit: 4 seconds
Memory limit: 1024 megabytes

A student team in Limassol is tired of being late because the traffic lights on their way to the university are poorly synchronized.

There are n traffic lights along their path. The car starts at an integer time $x \geq 0$ and reaches the i -th light exactly d_i seconds later, without stopping.

All lights have the same integer period c . Originally, light i is green at an integer time t if $(t - s_i) \bmod c$ belongs to $\{0, 1, \dots, g_i - 1\}$. Remainders are taken between 0 and $c - 1$: the green interval may wrap around the period, and $g_i = c$ means the light is always green.

The team has found a backdoor in the road department's server. They can shift each light's phase independently in either direction. Choose a nonnegative integer shift magnitude $\delta_i \in \{0, 1, \dots, c - 1\}$ for each light, and replace s_i with either $(s_i + \delta_i) \bmod c$ or $(s_i - \delta_i) \bmod c$.

Choose the starting time and phase shifts so that the car passes every light on green. Minimize $\sum_{i=1}^n \delta_i$, the sum of the shift magnitudes.

Input

The first line contains two integers n and c ($1 \leq n \leq 200\,000$, $1 \leq c \leq 10^9$), the number of traffic lights and their common period.

Each of the next n lines contains three integers d_i , s_i , and g_i ($1 \leq d_i \leq 10^9$, $0 \leq s_i < c$, $1 \leq g_i \leq c$), describing the i -th light. The travel times satisfy $d_1 < d_2 < \dots < d_n$.

Output

Print one integer: the minimum sum of the shift magnitudes.

Examples

standard input	standard output
2 10 1 1 1 2 7 1	5
3 8 2 0 3 5 3 2 9 0 8	0
3 7 1 2 2 3 0 1 8 6 1	3

Note

In the first example, start at $x = 0$ and shift the second light by 5 seconds. Both lights are then green at the arrival times, 1 and 2. The total cost is 5.

In the second example, start at $x = 6$. The arrival remainders are 0, 3, and 7, so no shifts are needed.

In the third example, start at $x = 4$, shift the first light by 2 seconds and the third by -1 second, and leave the second light unchanged. The total cost is 3.