Problem F. Physics

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	512 mebibytes

There are n balls on a smooth horizontal straight track. The track can be considered to be a number line. The balls can be considered to be particles with the same mass.

At the beginning, ball i is at position X_i. It has an initial velocity of V_i and is moving in direction $D_i = \pm 1$.

Additionally, a constant C is given. At any moment, ball i has acceleration A_i and velocity V_i, they have the same direction, and magically satisfy the equation that $A_i \cdot V_i = C$.

As there are multiple balls, they may collide with each other during the movement. We suppose all collisions are perfectly elastic collisions.

There are multiple queries. Each query consists of two integers t and k. Your task is to find out the k-th smallest velocity of all the balls exactly t seconds after the beginning.

Note that *perfectly elastic collision* is defined as one in which there is no loss of kinetic energy in the collision.

Input

The first line of the input contains two integers n and C ($1 \le n \le 10^5$, $1 \le C \le 10^9$).

Then n lines follow. The i-th of them contains three integers V_i, X_i, D_i. V_i denotes the initial velocity of ball i ($1 \le V_i \le 10^5$), X_i denotes the initial position of ball i ($1 \le X_i \le 10^9$), D_i denotes the direction ball i moves in.

The next line contains an integer $1 \le q \le 10^5$, denoting the number of queries. After that, q lines follow. Each line contains two integers $1 \le t \le 10^9$ and $1 \le k \le n$.

Output

For each query, print a single line containing the answer with absolute error at most 10^{-3}.

Example

standard input	standard output
3 7 3 3 1 3 10 -1 2 7 1 3 2 3 1 2 3 3	6.083 4.796 7.141