

Problem F. Attractions On Plane

Input file: *standard input*
Output file: *standard output*
Time limit: 2 seconds
Memory limit: 512 mebibytes

You are going on a trip on the Cartesian plane. Starting at $(0,0)$ and going to $(X,0)$ with constant speed, you will view attractions. Attractions are modeled as rectangles on the plane, with the base at (x_i, y_i) , width w_i and height h_i . Unfortunately, attractions can overlap.

The distance from you to an attraction is the Euclidean distance from you to its closest point. An attraction is the *Star Attraction* if the distance from you to that attraction is the minimum among all attractions. If several attractions are at minimum distance, the one with the lower index is the Star Attraction (it had better ratings).

You want to know how much time each attraction will be the Star Attraction, in percentages.

Input

The first line will contain two integers, N and X ($1 \leq N \leq 200\,000$, $1 \leq X \leq 1\,000\,000$).

Each of the next N lines contain four integers, x_i , y_i , w_i , and h_i ($1 \leq x_i, y_i \leq 1\,000\,000$, $0 \leq w_i, h_i \leq 1\,000\,000$).

Output

Output N lines. On the i -th line, output the percentage of time that the i -th attraction is the Star Attraction. Your answer will be considered correct if its absolute or relative error is at most 10^{-8} .

Examples

standard input	standard output
2 10 1 2 5 1 2 1 1 5	52.679491924 47.320508076
4 7 1 3 0 0 3 4 0 0 5 5 0 0 3 4 0 0	53.571428571 35.714285714 10.714285714 0.000000000