Ripples

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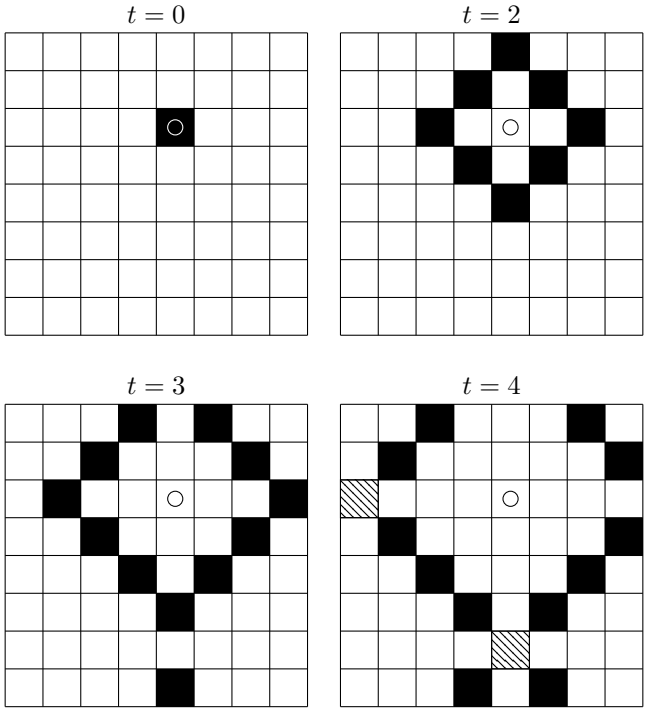
January 31, 2019

Problem Description

In an oddly square world, ripples do not radiate from the source as a ring but rather as a diamond as demonstrated in Figure 1. Note that when a wave meets the end of the defined world, it wraps around as if the world is toroidal. And, when waves collide, they cancel each other in that time instance (each wave still moves after that time instance in its previous direction). However, if more than two wave points collide, each pair of wave points cancels. Assume the bottom left cell of the world is index $(0, 0)$

Figure 1: Evolution of the waves. The small circle denotes the location of a dropped object at time 0 and filled squares denote wave points.



Inputs

The input is specified as follows:

1. The first line specifies three space-separated integers: width (w), height (h), and the number of dropped objects (n)
2. The next n lines each have three space separated integers: time (t_i), x-position (x_i), and y-position (y_i) of drop number i

3. The final line specifies the time of interest t_f

The following constraints are placed on the variables:

- $0 < w \leq 800$
- $0 < h \leq 600$
- $0 < n \leq 20$
- $0 \leq t_i < 500$
- $0 \leq x_i < w$
- $0 \leq y_i < h$
- $\max_i(t_i) < t_f$

Desired Output

Rather than printing the whole world at time t_f (because that could be quite large!), count the number of wave points present (and not canceled) at time t_f. In the example above, the output would be 12.

Samples

The sample from above is shown in Sample 0. Sample 1 shows a variation of Sample 0 with multiple drops, including one which occurs as t_f. Sample 2 shows a harder scenario like the ones which will be tested against. Each sample shows the verbatim input on the left side and the corresponding output on the right.

Sample 0

8 8 1 0 4 5 4	12

Sample 1

8 8 3 0 4 5 2 3 4 4 0 0 4	15

Sample 2

682 68 10 190 35 4 37 5 61 106 657 10 393 97 10 377 564 62 72 430 10 108 625 24 327 459 14 49 346 5 38 197 43 397	7916