B. Rooter's Song

Wherever the destination is, whoever we meet, let's render this song together.

On a Cartesian coordinate plane lies a rectangular stage of size $w \times h$, represented by a rectangle with corners $(0, 0)$, $(w, 0)$, (w, h) and $(0, h)$. It can be seen that no collisions will happen before one enters the stage.

On the sides of the stage stand n dancers. The i-th of them falls into one of the following groups:

- **Vertical**: stands at $(x_i, 0)$, moves in positive y direction (upwards);
- **Horizontal**: stands at $(0, y_i)$, moves in positive x direction (rightwards).

According to choreography, the i-th dancer should stand still for the first t_i milliseconds, and then start moving in the specified direction at 1 unit per millisecond, until another border is reached. It is guaranteed that no two dancers have the same group, position and waiting time at the same time.

When two dancers collide (i.e. are on the same point at some time when both of them are moving), they immediately exchange their moving directions and go on.

Dancers stop when a border of the stage is reached. Find out every dancer's stopping position.

Input

The first line of input contains three space-separated positive integers n, w and h ($1 \leq n \leq 100\,000$, $2 \leq w, h \leq 100\,000$) — the number of dancers and the width and height of the stage, respectively.

The following n lines each describes a dancer: the i-th among them contains three space-separated integers g_i, p_i, and t_i ($1 \leq g_i \leq 2$, $1 \leq p_i \leq 99\,999$, $0 \leq t_i \leq 100\,000$), describing a dancer's group g_i ($g_i = 1$ — vertical, $g_i = 2$ — horizontal), position, and waiting time. If $g_i = 1$ then $p_i = x_i$; otherwise $p_i = y_i$. It's guaranteed that $1 \leq x_i \leq w$ - 1 and $1 \leq y_i \leq h$ - 1. It is guaranteed that no two dancers have the same group, position and waiting time at the same time.

Output

Output n lines, the i-th of which contains two space-separated integers (x_i, y_i) — the stopping position of the i-th dancer in the input.

Examples

input

```
8 10 8
1 1 10
1 4 13
1 7 1
1 8 2
2 2 0
2 5 14
2 6 0
2 6 1
```

output

```
4 8
10 5
8 8
10 6
10 2
1 8
```

```
7 8
10 6
```

```
3 2 3
1 1 2
2 1 1
1 1 5
```

```
1 3
2 1
1 3
```

Note

The first example corresponds to the initial setup in the legend, and the tracks of dancers are marked with different colours in the following figure.

In the second example, no dancers collide.