

Problem A

Bromine playing Billiard

Time limit: 1.5s
Memory limit: 1GB

Bromine is playing on a rectangular billiard table whose sides are parallel to the coordinate axes. Its bottom-left corner is $(0.5, 0.5)$, and its top-right corner is $(n + 0.5, m + 0.5)$, so the table has dimensions $n \times m$. He places a cue ball of diameter 1 on the table, with its center initially at (x, y) .

Bromine strikes the cue ball, giving it an initial velocity vector of (v_x, v_y) . The components v_x and v_y describe the initial velocity of its center along the X - and Y -axes, respectively, in coordinate units per second.

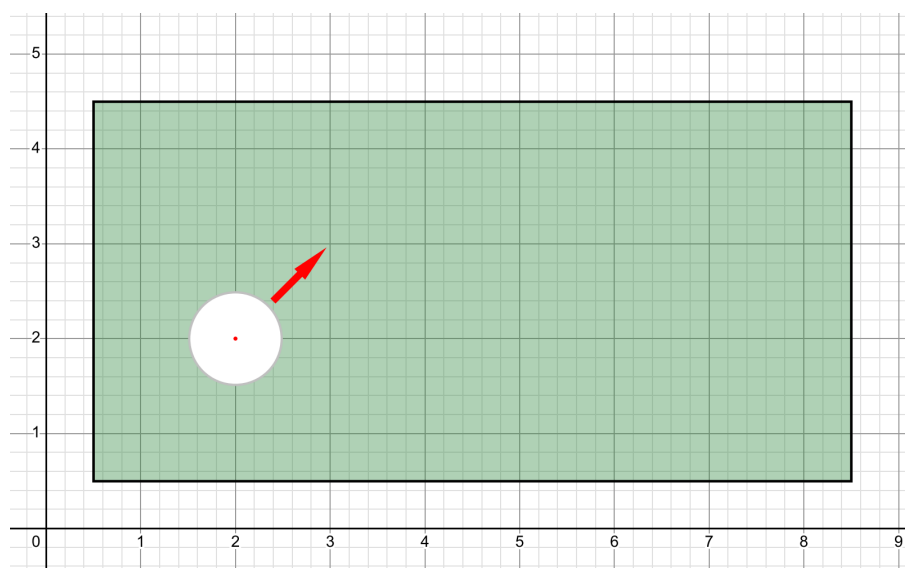


Figure 1: Bromine's billiard table. The cue ball's center is initially at $(2, 2)$, and its initial velocity is $(1, 1)$.

Assume that the ball moves indefinitely without losing any speed. Whenever it hits a table cushion, it undergoes a perfectly elastic collision. The reflection rules are:

- When the ball's center reaches $X = 1$ or $X = n$, it hits a vertical cushion, and the X -component of its velocity is negated.
- When the ball's center reaches $Y = 1$ or $Y = m$, it hits a horizontal cushion, and the Y -component of its velocity is negated.

If the ball hits two cushions simultaneously, both components of its velocity are negated. If the ball initially touches a cushion and its velocity points toward that cushion, it reflects immediately at time 0.

Bromine is an exceptionally skilled billiard player. He can make every shot and calculate where the cue ball will be for up to one billion seconds in the future.

Bromine is tired of not being able to find a rival, so to test if someone is worthy to play a game with him, Bromine will ask them this kind of question: "Given a time t , you need to determine the exact (X, Y) coordinates of the ball's center exactly t seconds after it was struck."

You want to have a game with Bromine. Thus, he asked you q queries, and you need to answer all of them quickly!

Input

- The first line contains six integers n, m, x, y, v_x, v_y ($2 \leq n, m \leq 10^9$, $1 \leq x \leq n$, $1 \leq y \leq m$, $-10^9 \leq v_x, v_y \leq 10^9$), the dimensions of the table, the initial coordinates of the ball's center, and its initial velocity vector.
- The second line contains a single integer q ($1 \leq q \leq 10^5$), the number of queries.
- Each of the next q lines contains a single integer t ($0 \leq t \leq 10^9$), the time in seconds for the query.

Output

Print q lines. The i -th line should contain two integers X_t and Y_t — the coordinates of the ball's center at t seconds for the i -th query. It can be shown that both coordinates of the ball's center are integers at every queried time.

Sample Input	Sample Output
8 4 2 2 1 1	2 2
5	3 3
0	4 4
1	5 3
2	6 2
3	
4	

Notes

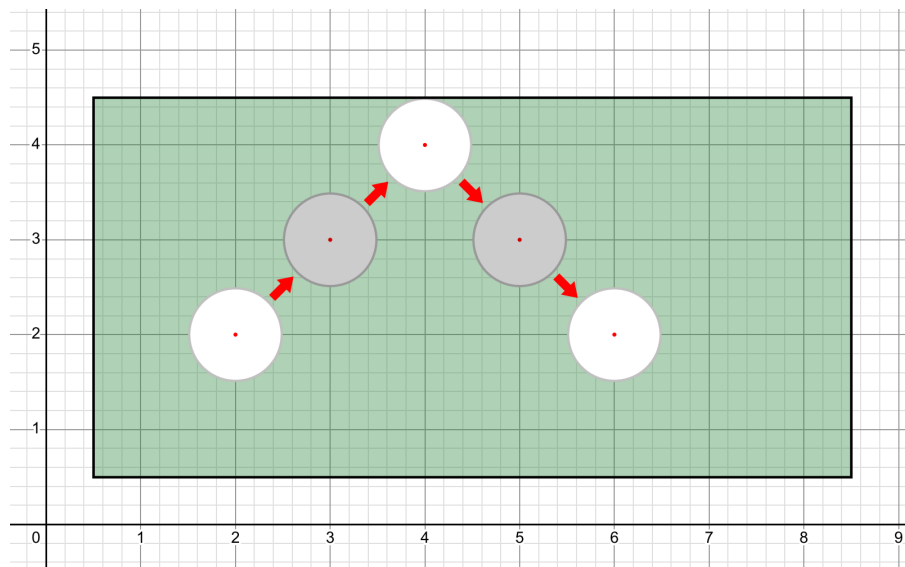


Figure 2: The positions of the cue ball's center at $t = 0, 1, 2, 3, 4$.