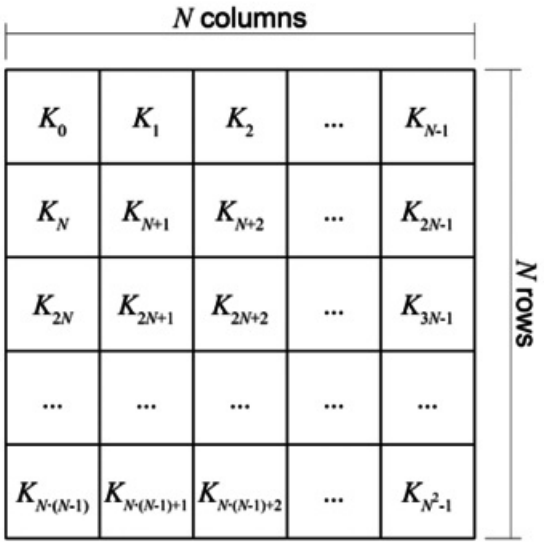
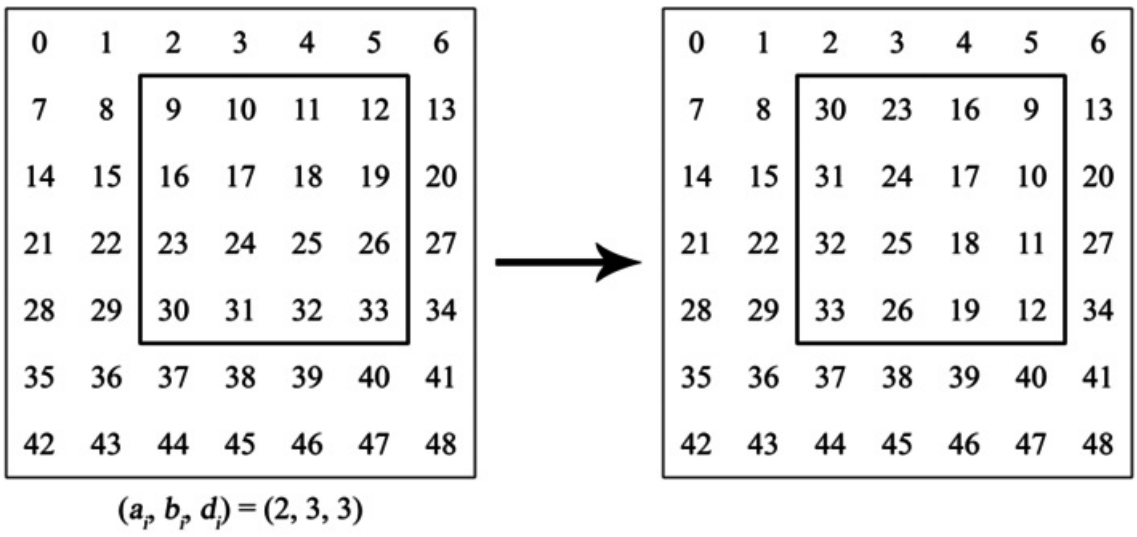
King Richard is leading a troop of N^2 knights into battle! Being very organized, he labels his knights $K_0, K_1, \ldots, K_{N^2-1}$ and arranges them in an $N \times N$ square formation, demonstrated below:



Before the battle begins, he wants to test how well his knights follow instructions. He issues S drill commands, where each command follows the format `a_i b_i d_i` and is executed like so:

- All knights in the square having the top-left corner at location (a_i, b_i) and the bottom-right corner at location $(a_i + d_i, b_i + d_i)$ rotate 90° in the clockwise direction. Recall that some location (r, c) denotes the cell located at the intersection of row r and column c. For example:



You must follow the commands sequentially. *The square for each command is completely contained within the square for the previous command*. Assume all knights follow the commands perfectly.

After performing all S drill commands, it's time for battle! King Richard chooses knights $K_{w_1}, K_{w_2}, \ldots, K_{w_L}$ for his first wave of attack; however, because the knights were reordered by the drill commands, he's not sure where his chosen knights are!

As his second-in-command, you must *find the locations of the knights*. For each knight K_{w_1}, $K_{w_2}, \ldots, K_{w_L}$, print the knight's *row* and *column* locations as two space-separated values on a new line.

Input Format

This is broken down into three parts:

1. The first line contains a single integer, N.
2. The second line contains a single integer, S.
    - Each line i of the S subsequent lines describes a command in the form of three space-separated integers corresponding to a_i, b_i, and d_i, respectively.
3. The next line contains a single integer, L.
    - Each line j of the L subsequent lines describes a knight the King wants to find in the form of a single integer corresponding to w_j.

Constraints

- $1 \leq S \leq 2 \cdot 10^5$
- $7 \leq N \leq 3 \cdot 10^7$
- $1 \leq a_i, b_i \leq N$
- $0 \leq d_i < N$
- $a_{i-1} \leq a_i$ and $a_i + d_i \leq a_{i-1} + d_{i-1}$
- $b_{i-1} \leq b_i$ and $b_i + d_i \leq b_{i-1} + d_{i-1}$
- $1 \leq L \leq 2 \cdot 10^5$
- $0 \leq w_j < N^2$

Subtask

- $7 \leq N \leq 3000$ for 25% of the maximum score.

Output Format

Print L lines of output, where each line j contains two space-separated integers describing the respective *row* and *column* values where knight K_{w_j} is located.

Sample Input

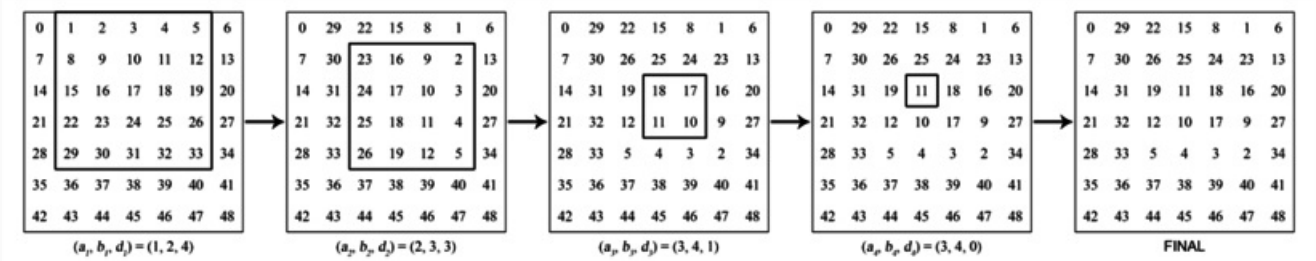
```
7
4
1 2 4
2 3 3
3 4 1
3 4 0
7
0
6
9
11
24
25
48
```

Sample Output

```
1 1
1 7
4 6
3 4
2 5
2 4
7 7
```

Explanation

The following diagram demonstrates the sequence of commands:



Click here to download a larger image.

In the final configuration:

- Knight K_0 is at location $(1, 1)$

- Knight K_{6} is at location $(1, 7)$
- Knight K_{9} is at location $(4, 6)$
- Knight K_{11} is at location $(3, 4)$
- Knight K_{24} is at location $(2, 5)$
- Knight K_{25} is at location $(2, 4)$
- Knight K_{48} is at location $(7, 7)$