Two linear particle accelerators ***A*** and ***B***, placed opposite to each other at a distance ***L*** apart, are propelling elementary particles. ***A*** is shooting ***x***-particles, while ***B*** is shooting ***y***-particles. The two kinds of particles are flying one opposing the other, and when an ***x***-particle meets a ***y***-particle, they collide and annihilate. One should be aware that an ***x***-particle could overtake other ***x***-particles, as well as a ***y***-particle could overtake other ***y***-particles without any consequences for the particles.

Like so, in a given moment of time, which we assume to be zero, a shooting of ***N*** ***x***-particles and ***N*** ***y***-particles starts from the two accelerators. Each particle moves with its own *constant* speed. The particles are numbered in the order of their shooting from 1 to ***N***, this holds true for both the ***x***-particles and the ***y***-particles.

Remark: For time t, a particle with speed v travels distance $s = vt$.

The shooting time moments for the ***x***-particles are $0 = tx_1 < tx_2 < tx_3 < \ldots < tx_N$, and their speeds are $vx_1, vx_2, vx_3, \ldots, vx_N$.

Correspondingly, for the ***y***-particles the moments are denoted by $0 = ty_1 < ty_2 < ty_3 < \ldots < ty_N$, and their speeds by $vy_1, vy_2, vy_3, \ldots, vy_N$.

The shooting is executed in a way to guarantee the fulfillment of the following conditions:

- Each particle will collide a particle of the opposite type;
- When two particles collide, all other particles will be at a distance greater than or equal to 1 from the collision point. This is guarantee for the first ***K*** collisions.

Task

Write a program **particles** to determine the first ***K*** collisions between particles of the two kinds.

Input

The three space separated positive integers ***N***, ***L***, and ***K*** are read from the first line of the standard input.

The following ***N*** lines contain two space separated non-negative integers tx_i and vx_i each: the shooting moment and the speed of the corresponding ***x***-particle.

The last ***N*** input lines contain, respectively, each the shooting moment ty_i and the speed vy_i of the corresponding ***y***-particle in the same format.

Output

The program must print to the standard output ***K*** lines, each containing two space separated positive integers: the numbers of the ***x***-particle and ***y***-particle, which are involved in the corresponding collision. Lines are output increasingly by the order of collisions – from the first one to the K^{th}.

Constraints

- $1 \le N \le 50\,000$
- In 30% of the tests $N \le 1000$
- $1 \le L \le 10^9$

- $1 \le \boldsymbol{K} \le 100$, $\boldsymbol{K} \le \boldsymbol{N}$
- $0 \le \boldsymbol{tx_i}, \boldsymbol{ty_i} \le 10^9$
- $1 \le \boldsymbol{vx_i}, \boldsymbol{vy_i} \le 10^9$

Example

Sample input	*Sample output*
4 100 2 0 1 2 3 3 2 6 10 0 5 3 10 5 1 7 20	4 2 2 4