

Relay Jump

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 1024 megabytes

There are n frogs numbered 1 through n , each initially located at an integer lattice point in the Cartesian plane. An external disturbance suddenly stimulates one of the frogs, triggering a chain reaction in which the frogs act according to the rules below.

When frog i ($1 \leq i \leq n$) is *stimulated*, it can choose to either:

- jump toward some other frog j ($1 \leq j \leq n, j \neq i$) and instantly land at the reflection of its current position across the point currently occupied by frog j (if frog i coincides with frog j before the jump, then it lands at the coinciding point); immediately after this jump, frog j becomes the next and only frog to be stimulated;
- or stay where it is, in which case all jumps end and no frog remains stimulated.

A frog may be stimulated multiple times at different moments, while some frogs may never be stimulated.

You observe that the first stimulated frog is numbered s , but there are too many jumps for you to capture the entire process. Fortunately, you recognize every frog, so you record both their initial positions P_1, P_2, \dots, P_n and their final positions Q_1, Q_2, \dots, Q_n after all jumps have ended. You also notice that all initial positions are **pairwise distinct**, and the final positions are **pairwise distinct** as well.

Let t be the index of the last stimulated frog, i.e., the frog that chooses to stay still when stimulated, after which no more jumps occur. Please find t .

Input

The first line contains two integers n ($2 \leq n \leq 10^5$) and s ($1 \leq s \leq n$), denoting the number of frogs and the index of the first stimulated frog, respectively.

The i -th of the next n lines contains four integers px_i, py_i, qx_i , and qy_i ($-10^9 \leq px_i, py_i, qx_i, qy_i \leq 10^9$), where $P_i = (px_i, py_i)$ and $Q_i = (qx_i, qy_i)$ represent the initial and final positions of frog i in the plane.

It is guaranteed that all initial positions P_1, P_2, \dots, P_n are pairwise distinct. All final positions Q_1, Q_2, \dots, Q_n are pairwise distinct as well, and correspond to some sequence of at most 2×10^5 stimulations following the described rules.

Output

Output a single integer t , denoting the index of the frog that was last stimulated.

Example

standard input	standard output
3 1 6 3 2 3 4 3 2 1 3 4 1 6	1

Note

In the sample case, the corresponding sequence of stimulations is $[1, 2, 3, 2, 1]$.

