Problem K. Relay Jump

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

- jump toward some other frog j ($1 \le j \le n$, $j \ne i$) 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 $P_1, P_2, \ldots, P_n$ and their final positions $Q_1, Q_2, \ldots, Q_n$ 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 ($2 \le n \le 10^5$) and s ($1 \le s \le n$), 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 ($-10^9 \le px_i, py_i, qx_i, qy_i \le 10^9$), 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 $P_1, P_2, \ldots, P_n$ are pairwise distinct. All final positions $Q_1, Q_2, \ldots, Q_n$ are pairwise distinct as well, and correspond to some sequence of at most 2×10^5 stimulations following the described rules.

Output

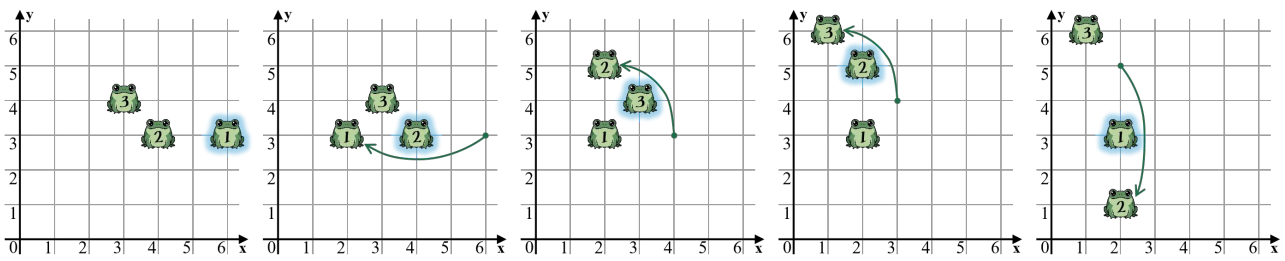
Output a single integer t, denoting the index of the frog that was last stimulated.

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 $[1, 2, 3, 2, 1]$.



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