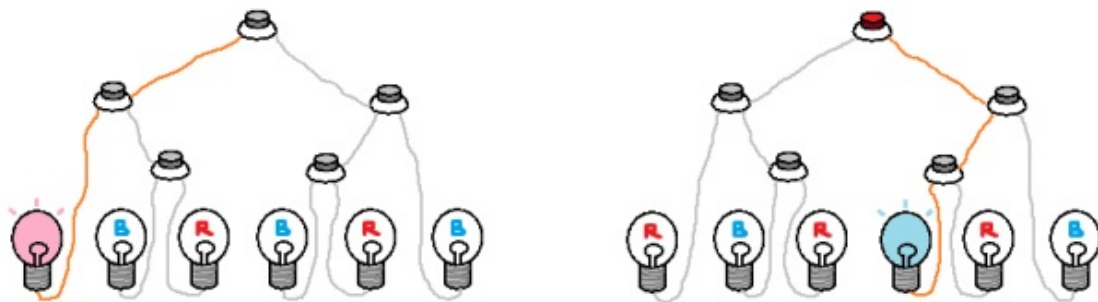


2-2. Bulb Game

Do you remember that Minhyung bought chicken dinner for Sunyoul after losing the game from the 2nd FunctionCup? After that, they argued on whether the game was unfair or not until Sunyoul finally said that he was sorry. To express his sincerity, Sunyoul suggested that this time they play a new game made by Minhyung. Minhyung happily accepted Sunyoul's suggestion and managed to design a brand new game out of bulbs, switches, and wires.



The description of the game board is as follows.

- The game board consists of N switches (numbered 0 through $N - 1$) and $N + 1$ bulbs.
- Each switch has one input terminal and two output terminals L and R.
- Each output terminal is connected to an input terminal of another switch or a bulb through an electronic wire.
- There are no cycles made by wires.
- The input terminal of switch 0 is directly connected with the battery. Thus, we can assume electric current always flows in through the input terminal of switch 0.
- The state of a switch is either 'on' or 'off.'
- Suppose that electric current flows through the input terminal of switch i . If the switch i is off, then electric current flows through the output terminal L. Otherwise, electric current flows through the output terminal R.
- If electronic current doesn't flow through the input terminal of switch i , no electronic current flows through any of the output terminals of the switch i .
- Each bulb has one input terminal. Each bulb is turned on if and only if electric current flows into the bulb through its input terminal.
- The color of each bulb (when turned on) is either red or blue, and is fixed and doesn't change.

Now let's talk about the game itself.

- Initially, all the switches are 'off.'
- Two players Minhyung and Sunyoul take turns, and Minhyung goes first. In each turn, the player should choose one of the N switches and change its state.
- The game is over immediately after both players take T turns. Minhyung wins if a red bulb is turned on, and Sunyoul wins if a blue bulb is turned on.

After designing this complicated thing, it suddenly came to Minhyung that maybe he cannot win this game even though he devised the entire game! Thus, before presenting the game to Sunyoul, Minhyung wants to know which player will win if both players play optimally. Help Minhyung and write a program that computes who wins.

Implementation details

You should implement the following function. It will be called by the grader once for each test case.

```
int FindWinner(int T, int[] L, int[] R)
```

- T : the number of turns each player will take.
- L, R : integer arrays of length N .
 - For each i ($0 \leq i \leq N - 1$),
 - if the output terminal L of switch i is connected to:
 - the input terminal of switch j , $L[i] = j$.
 - a red bulb, $L[i] = -1$.
 - a blue bulb, $L[i] = -2$.
 - if the output terminal R of switch i is connected to:
 - the input terminal of switch j , $R[i] = j$.
 - a red bulb, $R[i] = -1$.
 - a blue bulb, $R[i] = -2$.
- This function should return 1 if Minhyung wins, and 0 if Sunyoul wins.

Constraints

- $1 \leq N \leq 300\,000$
- $1 \leq T \leq 300\,000$
- The given game board satisfies all the conditions given in the problem description.

Subtasks

1. (11 points) $N \leq 1\,000$, $T = 1$.
2. (25 points) $N \leq 1\,000$, $T \leq 1\,000$.
3. (64 points) No additional constraints.

Example

Consider the following call.

```
FindWinner(2, [1, -1, 4, -2, -2], [2, 3, -2, -1, -1])
```

The correct answer is 0. (Sunyoul wins)

Sample grader

You can download the sample grader package on the same page you downloaded the problem statement. (scroll down if you don't see the attachment)

If you use IDEs like Visual Studio, Eclipse or Code:Blocks, then import `bulb.cpp`, `bulb.h` and `grader.cpp` into one project and you will be able to compile all these files at once.

If you want to compile by yourself, refer to the compilation commands in the statement page.

You should submit only `bulb.cpp`.

Input format

- line 1: $N T$
- line $2 + i$ ($0 \leq i \leq N - 1$): $L[i] R[i]$

Output format

Let the return value of `FindWinner` as X . The grader prints:

- Minhyung if $X = 1$
- Sunyoul if $X = 0$
- Wrong otherwise