2023 KNIFE

The spies of *Alpha Complex* and *Beta Complex* enjoy a healthy rivalry. Many a quarrel between the two has been settled by the losing complex catering an extravagant dinner for the winner. Many a table has been turned by incomprehensible etiquette leading to the dining spies being unable to indulge in the feast.

A long rectangular dining table has been set up, with n evenly spaced seats on two opposite sides. At every position on the table is an impressive choice of m items of cutlery; the same for each position. One spy sits at each position at the table, holding in their hand a single piece of cutlery and contemplating whether it is the correct one to use to eat their starter, whilst aiming to look suave, sophisticated and not too desperate.

Each spy carefully watches their neighbours: the spy immediately on either side and the spy directly across the table. Spies trust only the opinion of neighbours who hold the same piece of cutlery as themselves. If they see a trusted neighbour switch to a different piece of cutlery they will immediately follow their example and switch to the same. Spies are very hungry so any cascading effect happens instantaneously.

The spies intend to present a unified front and will not begin to eat until they all agree on the same piece of cutlery. They wish to start eating as soon as possible. Only the first spy in the first row is brave enough to change their mind without following the example of a neighbour.

For example, suppose that the cutlery initially selected by our spies is
```
1333
2121
```

- If the first spy changes their mind 1→2→1→2→1→3 the table will change
```
1333   2333   1333   2333   1333   3333
2121 → 2121 → 1121 → 2221 → 1111 → 3333
```
- If the first spy changes their mind 1→3→2→1 the table will change
```
1333   3333   2222   1111
2121 → 2121 → 2121 → 1111
```

The first line of the input will consist of two integers, n ($1 \leq n \leq 2^{20}$) then m ($1 \leq m \leq 2n$), indicating the number of seats (on each side) and items of cutlery respectively. The next 2 lines will each consist of n integers (each between 1 and m), indicating the item of cutlery that the spy in each seat has initially picked up.

You should output a single integer, indicating the minimum number of times the first spy needs to change their mind for the spies to be able to start eating.

British Informatics Olympiad Final