Problem B
Binary Search
Time limit: 4 seconds

You are given an undirected graph with n vertices and m edges. Each vertex v has a number a_v written on it. This number is either 0 or 1. A *walk* is a sequence $v_1 v_2 \dots v_k$ of vertices in the graph such that any two consecutive vertices are connected by an edge. We call a binary sequence

$$s = s_1 s_2 \dots s_k$$

walkable if there is a walk $v_1 v_2 \dots v_k$ in the graph that satisfies $a_{v_1} a_{v_2} \dots a_{v_k} = s$.

In other words, a binary sequence is walkable if it is possible to obtain s by walking in the graph and writing down the binary numbers in the order that they are visited. An example is visualized in Figure B.1.

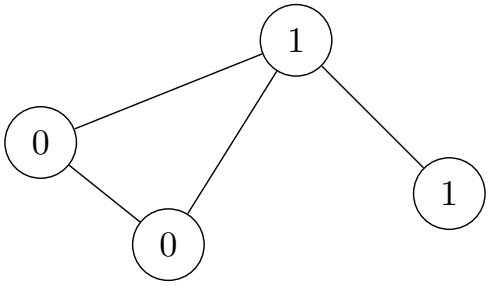


Figure B.1: Illustration of Sample Input 1. Every binary sequence of length at most 3 is walkable.

Your task is to find the length of a shortest binary sequence that is not walkable.

Input

The input consists of:

- One line with two integers n and m ($1 \le n \le 3 \cdot 10^5$, $0 \le m \le 3 \cdot 10^5$), the number of vertices and the number of edges.
- One line with n integers $a_1, \dots, a_n$ ($a_v \in \{0, 1\}$ for each v), where a_v is the number written on vertex v.
- m lines, each with two integers u and v ($1 \le u, v \le n$, $u \ne v$), denoting that the vertices u and v are connected by an edge. It is guaranteed that every pair of vertices is connected by at most one edge.

Output

If every binary sequence is walkable, output "`infinity`". Otherwise, output the length of a shortest binary sequence that is not walkable.

Sample Input 1

```
4 4
0 0 1 1
1 2
1 3
2 3
3 4
```

Sample Output 1

```
4
```

Sample Input 2

```
6 7
0 0 1 1 0 1
1 2
3 1
1 4
2 3
4 2
3 4
5 6
```

Sample Output 2

```
infinity
```

Sample Input 3

```
1 0
0
```

Sample Output 3

```
1
```