Painting Pavements

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

There is a long strip of pavement, segmented into N individual cells (cell $1, 2, \ldots, N$). Stuart wants to paint each cell with a colour. Each colour of paint can be represented by a positive integer. He will use C colours of paint (colours $1, 2, \ldots, C$), but he has not decided what C should be. Formally, he paint each cell i with colour P_i, where $1 \leq P_i \leq C$.

Qirui will appraise Stuart's painting. Q times, Qirui will walk from the L_i-th cell to the R_i-th cell ($1 \leq i \leq Q$). He will be happy only if, for every two (not necessarily adjacent) cells he walks over, they are painted in **different** colours. Formally, $P_a \neq P_b$ for all $L_i \leq a < b \leq R_i$, otherwise Qirui will be unhappy.

Kai will also appraise Stuart's painting. K times, Kai will walk from the X_j-th cell to the Y_j-th cell ($1 \leq j \leq K$). He will be happy only if, for every two (not necessarily adjacent) cells he walks over, they are painted in the **same** colour. Formally, $P_a = P_b$ for all $X_j \leq a < b \leq Y_j$, otherwise Kai will be unhappy.

Stuart wants both Qirui and Kai to be happy, but he also doesn't want to use too many different colours of paint. Output any way that Stuart can fulfil both Qirui's and Kai's conditions while minimising C. If this is not possible, output `-1`.

Input

The first line of input contains 3 space-separated integers — N, Q and K.

The following Q lines of input contains 2 space-separated integers — L_i and R_i. ($1 \leq i \leq Q$)

The following K lines of input contains 2 space-separated integers — X_j and Y_j ($1 \leq j \leq K$).

Output

The first line of output should contain N space-separated integers — $P_1, P_2, \ldots, P_N$. P_i is the colour of paint that cell i should be painted with. If there are multiple valid answers which minimise C, output any of them.

If there exists no P that fulfils both Qirui's and Kai's conditions, output `-1`.

Scoring

For all subtasks, it is guaranteed that:

- $1 \leq N \leq 200\,000$
- $0 \leq Q, K \leq 200\,000$
- $Q + K \geq 1$
- $1 \leq L_i \leq R_i \leq N$ for all $1 \leq i \leq Q$
- $1 \leq X_j \leq Y_j \leq N$ for all $1 \leq j \leq K$

Subtask	Score	N	Q	K	Additional constraints
1	0	Sample test cases			
2	6	—	$Q = 0$	—	—
3	9	—	—	$K = 0$	$R_i < L_{i+1}$ for all $1 \leq i < Q$
4	13	—	—	$K = 0$	—
5	32	$N \leq 2000$	$Q \leq 2000$	$K \leq 2000$	—
6	40	—	—	—	—

Examples

standard input	standard output
5 2 2 1 2 2 3 4 5 3 4	1 2 1 1 1
7 5 0 3 5 4 5 1 3 2 4 1 1	2 1 3 2 1 1 2
5 1 2 2 4 2 3 1 2	-1

Note

For the first sample test case, one other answer will be accepted: $[2, 1, 2, 2, 2]$.

The second sample test case satisfies the constraints of Subtask 4. Other answers exist for this test case, for example $[3, 2, 1, 3, 2, 1, 1]$.