

Problem 11. Captivating process

Input file: `input.txt`
Output file: `output.txt`
Time limit: 2 seconds
Memory limit: 512 megabytes

Yulia wrote the number x on the blackboard, and Zakhar wrote y . The kids are bored and have come up with an extremely captivating activity. Once every minute, they erase their numbers simultaneously and write new numbers instead. Yulia writes new numbers according to the following rule: if her number equaled i , it is substituted by f_i . Zakhar does the same, but the rule is different: if his number equaled i , it is substituted by g_i .

They will stop when their numbers match. This could happen right away (if $x = y$), or later, or maybe never. Your task is to determine for different values of x and y , if the kids will ever end writing out numbers.

Input

The first line contains two integers: N and Q ($1 \leq N, Q \leq 10^5$).

The second line contains N numbers separated by spaces: $f_1, \dots, f_N$.

The third line contains numbers in the same format: $g_1, \dots, g_N$.

In the j th of the following Q lines there are the initial numbers x_j and y_j .

It is guaranteed that the numbers f_i, g_i, x_j, y_j are all integers and fall within the range of 1 through N .

Output

Print Q lines: in the j th line, print YES, if the process that started from the numbers x_j and y_j ends, and NO otherwise.

Examples

input.txt	output.txt
3 2 2 3 1 2 3 1 1 2 1 1	NO YES
4 2 2 3 4 2 2 4 4 1 1 2 1 4	NO YES