

Problem I. Is It a p-drome?

Input file: standard input
Output file: standard output
Time limit: 3 seconds
Memory limit: 256 megabytes

Let's suppose that we have fixed a permutation p with length n . We say that a string t is a p -drome if it has the length n , and for all the characters of this string, it is true that $t_i = t_{p_i}$.

You have a string s and a permutation p . For each substring of s of length n , you have to find out if it is a p -drome or not.

Input

On the first line, you are given three integers n , m , and c : the length of the permutation, the length of the string and the size of the alphabet of the string ($1 \leq n \leq m \leq 500\,000$; $1 \leq c \leq 500\,000$).

On the second line, you are given n integers p_i : the permutation itself ($1 \leq p_i \leq n$; $p_i \neq p_j$ if $i \neq j$).

On the third line, you are given m integers s_i : the initial string ($1 \leq s_i \leq c$).

Output

Print $m - n + 1$ characters without spaces: i -th character must be "1" if substring $s_i \dots s_{i+n-1}$ is a p -drome, and "0" otherwise.

Examples

standard input	standard output
3 5 1 1 2 3 1 1 1 1 1	111
3 7 3 3 2 1 1 2 1 3 1 2 1	10101