D. Artsem and Saunders

time limit per test: 2 seconds
memory limit per test: 512 megabytes
input: standard input
output: standard output

Artsem has a friend Saunders from University of Chicago. Saunders presented him with the following problem.

Let $[n]$ denote the set $\{1, ..., n\}$. We will also write $f: [x] \to [y]$ when a function f is defined in integer points $1, ..., x$, and all its values are integers from 1 to y.

Now then, you are given a function $f: [n] \to [n]$. Your task is to find a positive integer m, and two functions $g: [n] \to [m]$, $h: [m] \to [n]$, such that $g(h(x)) = x$ for all , and $h(g(x)) = f(x)$ for all , or determine that finding these is impossible.

Input

The first line contains an integer n ($1 \le n \le 10^5$).

The second line contains n space-separated integers — values $f(1), ..., f(n)$ ($1 \le f(i) \le n$).

Output

If there is no answer, print one integer `-1`.

Otherwise, on the first line print the number m ($1 \le m \le 10^6$). On the second line print n numbers $g(1), ..., g(n)$. On the third line print m numbers $h(1), ..., h(m)$.

If there are several correct answers, you may output any of them. It is guaranteed that if a valid answer exists, then there is an answer satisfying the above restrictions.

Examples

input
3 1 2 3
output
3 1 2 3 1 2 3

input
3 2 2 2
output
1 1 1 1 2

input
2 2 1
output
-1