C. Design Tutorial: Make It Nondeterministic

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

A way to make a new task is to make it nondeterministic or probabilistic. For example, the hard task of Topcoder SRM 595, Constellation, is the probabilistic version of a convex hull.

Let's try to make a new task. Firstly we will use the following task. There are n people, sort them by their name. It is just an ordinary sorting problem, but we can make it more interesting by adding nondeterministic element. There are n people, each person will use either his/her first name or last name as a handle. Can the lexicographical order of the handles be exactly equal to the given permutation p?

More formally, if we denote the handle of the i-th person as h_i, then the following condition must hold: .

Input

The first line contains an integer n $(1 \le n \le 10^5)$ — the number of people.

The next n lines each contains two strings. The i-th line contains strings f_i and s_i $(1 \le |f_i|, |s_i| \le 50)$ — the first name and last name of the i-th person. Each string consists only of lowercase English letters. All of the given $2n$ strings will be distinct.

The next line contains n distinct integers: $p_1, p_2, ..., p_n$ $(1 \le p_i \le n)$.

Output

If it is possible, output "YES", otherwise output "NO".

Examples

input
3 gennady korotkevich petr mitrichev gaoyuan chen 1 2 3
output
NO

input
3 gennady korotkevich petr mitrichev gaoyuan chen 3 1 2
output
YES

input
2 galileo galilei nicolaus copernicus 2 1
output
YES

input

```
10
rean schwarzer
fei claussell
alisa reinford
eliot craig
laura arseid
jusis albarea
machias regnitz
sara valestin
emma millstein
gaius worzel
1 2 3 4 5 6 7 8 9 10
```

output

```
NO
```

input

```
10
rean schwarzer
fei claussell
alisa reinford
eliot craig
laura arseid
jusis albarea
machias regnitz
sara valestin
emma millstein
gaius worzel
2 4 9 6 5 7 1 3 8 10
```

output

```
YES
```

Note

In example 1 and 2, we have 3 people: tourist, Petr and me (cgy4ever). You can see that whatever handle is chosen, I must be the first, then tourist and Petr must be the last.

In example 3, if Copernicus uses "copernicus" as his handle, everything will be alright.