

## Problem I. Inversion Revisit

Input file: *standard input*  
Output file: *standard output*  
Time limit: 2 seconds  
Memory limit: 1024 mebibytes

Given a permutation  $f$  of  $[1, N]$  (all integers from 1 to  $N$ , inclusive), define  $\text{inv}(f)$  as the set of pairs of indices  $(i, j)$  that form an inversion. Formally,

$$\text{inv}(f) := \{(i, j) \mid 1 \leq i < j \leq N, f_i > f_j\}.$$

In other words,  $\text{inv}(f)$  represents all the index pairs where an inversion occurs in permutation  $f$ .

A pair of permutations  $(p, q)$  of  $[1, N]$  is called an *incredible permutation pair* if either  $\text{inv}(p) \subseteq \text{inv}(q)$  or  $\text{inv}(q) \subseteq \text{inv}(p)$ .

You have received a pair of permutations  $(p, q)$  as a gift. Being passionate about permutations, you want to determine if the pair  $(p, q)$  forms an incredible permutation pair.

### Input

The first line contains a single integer  $T$ , the number of test cases ( $1 \leq T \leq 5 \cdot 10^5$ ). The test cases follow.

For each test case:

- The first line contains one integer  $N$ , the size of the permutation ( $1 \leq N \leq 5 \cdot 10^5$ ).
- The second line contains  $N$  integers  $p_1, p_2, \dots, p_N$ , representing the permutation  $p$ .
- The third line contains  $N$  integers  $q_1, q_2, \dots, q_N$ , representing the permutation  $q$ .

The sequences  $p$  and  $q$  are valid permutations of  $[1, N]$ .

The sum of  $N$  across all test cases does not exceed  $5 \cdot 10^5$ .

### Output

For each test case, if  $(p, q)$  is an incredible permutation pair, print “Yes” on a single line. Otherwise, print “No” on a single line.

### Example

<i>standard input</i>	<i>standard output</i>
3	No
3	No
2 1 3	Yes
1 3 2	
5	
5 3 1 4 2	
3 4 5 2 1	
6	
3 4 5 6 1 2	
6 3 5 4 2 1	