

Problem J. Increasing or Decreasing

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 256 mebibytes

You are given two permutations A and B of size n . Both permutations contain integers from 1 to n . You want to transform A to B in no more than n operations of the following kind:

- Choose a subsegment $[l; r]$ of A and sort it in either increasing or decreasing order.

Note that you don't have to minimize the number of operations, any sequence of operations of length not more than n is fine.

Input

The first line contains one integer n ($1 \leq n \leq 500$) — the sizes of both permutations.

The second line contains the permutation A_1, A_2, \dots, A_n .

The third line contains the permutation B_1, B_2, \dots, B_n .

Output

On the first line print one integer m ($0 \leq m \leq n$) — the number of operations.

On the next m lines print the descriptions of operations. Each description should be formatted as $l_i \ r_i \ t_i$ ($1 \leq l_i \leq r_i \leq n$, t_i is 'I' or 'D') and means sorting the subsegment $[l_i; r_i]$ in (I)ncreasing or (D)ecreasing order.

If there are different solutions any one will be accepted. It is guaranteed that there is at least one solution.

Examples

standard input	standard output
5 2 4 5 1 3 5 4 3 2 1	1 1 5 D
5 5 4 3 2 1 3 2 5 1 4	4 2 5 I 1 4 I 1 3 D 3 4 D
5 3 1 4 5 2 3 1 4 5 2	0