Yet Another Contest 9 P4 - Grid Push

Time limit: 3.0s **Memory limit:** 512M

You have a $N \times N$ grid of integers G which is initially filled with 0s. You are also given arrays A and B of length N. You can perform the following two operations any number of times and in any order on the grid:

1. Push A onto the first column of G. All columns move to the right by one, with the last column being deleted. Formally, if G' is the grid after the operation is completed, then for all $1 \leq r \leq N$, $G'_{r,1} = A_r$ and for all $2 \leq c \leq N$, $G'_{r,c} = G_{r,c-1}$.
2. Push B onto the first row of G. All rows move down by one, with the last row being deleted. Formally, if G' is the grid after the operation is completed, then for all $1 \leq c \leq N$, $G'_{1,c} = B_c$ and for all $2 \leq r \leq N$, $G'_{r,c} = G_{r-1,c}$.

What is the number of distinct grids with no 0s that can be created? Since the answer may be very large, output it modulo $10^9 + 7$.

Constraints

$1 \leq N \leq 10^6$

$1 \leq A_i, B_i \leq 2N$

Subtask 1 [30%]

$1 \leq N \leq 2000$

$A_i = 1$ and $B_i = 2$

Subtask 2 [40%]

$1 \leq N \leq 2000$

Subtask 3 [30%]

No additional constraints.

Input Specification

The first line contains a single integer, N.

The second line will contain N space-separated integers, $A_1, A_2, \ldots, A_N$.

The third line will contain N space-separated integers, $B_1, B_2, \ldots, B_N$.

Output Specification

Output a single integer representing the number of distinct grids that can be created modulo $10^9 + 7$.

Sample Input 1

```
1
1
1
```

Sample Output 1

```
1
```

Sample Input 2

```
1
1
2
```

Sample Output 2

```
2
```

Sample Input 3

```
2
1 1
1 2
```

Sample Output 3

```
3
```