Impact

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

In the year 3025, RUN is hosting the 1015th KAIST ICPC Mock Competition! To give the N participants a fresh impact, the organizers have prepared a total of N different flavors of pudding for them. Since each participant has a unique taste preference distinct from others, the flavor each person desires is different and corresponds to one of the N flavors prepared by the organizers. For each of the N flavors, there are exactly 2 puddings available, resulting in a total of $2N$ puddings.

The organizers of this year wanted to display the puddings as beautifully as possible. Therefore, they prepared a total of 2 special containers to hold the puddings. Each container is designed to stack puddings in layers, with each container able to hold up to $N + 1$ puddings. The organizers want the flavors of the puddings in the first container to be $1, 2, \cdots, N$ from the bottom up, and the flavors of the puddings in the second container to also be $1, 2, \cdots, N$ from the bottom up.

The organizers asked the AI to fulfill this request, but the AI ignored the flavor conditions and randomly placed $2N$ puddings into each container! Therefore, the organizers wish to arrange the puddings as desired using the following operation.

1. Select a container A containing at least one pudding and a container B capable of holding at least one additional pudding. Note that even if $A = B$, B must have space for at least one more pudding.
2. Move the pudding at the bottommost of container A to the topmost of container B. After this, the pudding that was originally the ith from the bottom in container A becomes the $(i-1)$-th from the bottom.

The staff has limited time, so they want to perform the given operation no more than $200,000$ times to place all puddings into containers by flavor. Help the staff by writing a program that outputs a method to perform the operations.

Input

The first line contains a positive integer N.

The next two lines contain the flavors of pudding in each container, separated by spaces. The first number n_i on the ith line represents the number of puddings in the ith container. Following the first number on the ith line, n_i integers are given. The jth number among these represents the flavor of the jth pudding from the bottom of the ith container.

Output

The first line outputs the number of operations M to be performed.

The next M lines each output two integers A and B. This signifies performing an operation where the pudding on bottom of the A-th container is moved to the top of the B-th container. It must hold that $1 \leq A, B \leq 2$. Container A must have contained at least one pudding, and container B must not have been completely full of puddings.

After all operations are complete, each container must have puddings arranged so that their flavors are $1, 2, \cdots, N$ from the bottom.

Scoring

- $1 \leq N \leq 100$

Examples

standard input	standard output
1 2 1 1 0	9 1 2 1 2 2 1 2 1 1 2 1 2 2 1 1 2 2 1
2 2 2 1 2 2 1	6 1 1 2 2 1 2 2 1 1 2 2 1

Note

The number of operations need not be minimized.