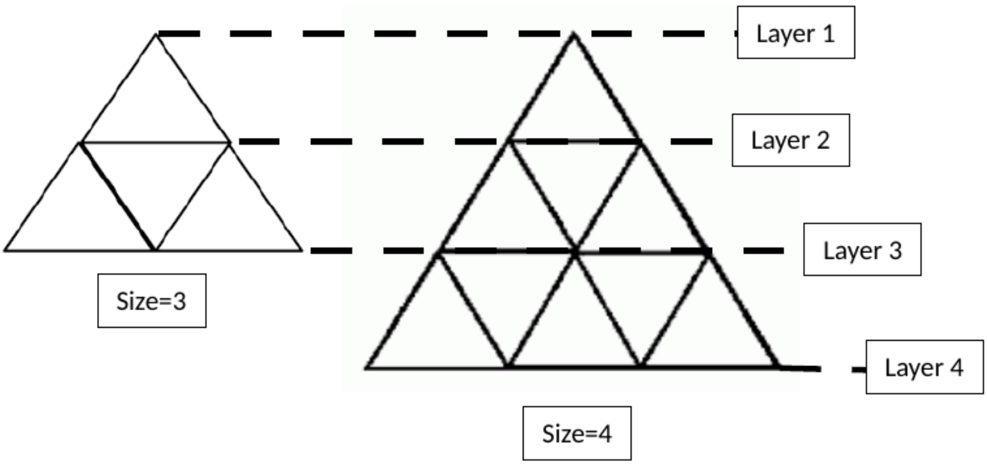
We invented a new kind of puzzle.

It is played on triangle towers.

The structure of the triangle towers is as shown below. The i-th layer has i cross points.



There is one number on every cross point. Denote the j-th number on the i-th layer as $p(i,j)$. We can see each triad $p(i,j)$, $p(i+1,j)$, $p(i+1,j+1)$ form a regular triangle. An operation rotates the numbers in a single triad $p(i,j)$, $p(i+1,j)$, $p(i+1,j+1)$ in counterclockwise direction for 120 degrees.

The puzzle is, given two triangle towers of the same size with numbers on them, can the first tower become exactly the same with the second one by some operations?

Please note that this problem is special judged.

Input

There are no more than 20 test cases.

For each test case, the first line contains a integer N, indicating the number of layers of the two towers. Then N lines follow, the i-th line contains i numbers, the j-th number indicates $p(i,j)$ of the first triangle tower. The following N lines describe the second triangle tower in the same format. $(1 \le N \le 100,\ 0 \le p(i,j) < 2^{31})$.

Output

For each test case, if the solution does not exist, output a single line '`-1`'. Otherwise, output the number of used operations M in the first line. The following M lines describe the solution, each line with two numbers i, j separated by a single space, indicating rotating $p(i,j)$, $p(i+1,j)$, $p(i+1,j+1)$ in counterclockwise direction for 120 degrees. You should guarantee that $1 \le j \le i < N, M \le N^3$.

Sample Input

```
3
1
2 3
4 5 6
6
5 3
4 2 1
1
2
2
1
2
3
```

Sample Output

```
12
2 2
1 1
2 1
2 2
2 2
2 2
2 1
2 2
2 2
2 1
2 2
2 2
0
-1
```