

# Rotating Rings

Any square grid can be viewed as one or more rings, one inside the other. For example, as shown in figure (a), a  $5 \times 5$  grid is made of three rings, numbered 1, 2 and 3 (from outside to inside.) A square grid of size  $N$  is said to be sorted, if it includes the values from 1 to  $N^2$  in a row-major order, as shown in figure (b) for  $N = 4$ . We would like to determine if a given square grid can be sorted by only rotating its rings. For example, the grid in figure (c) can be sorted by rotating the first ring two places counter-clockwise, and rotating the second ring one place in the clockwise direction.

1	1	1	1	1
1	2	2	2	1
1	2	3	2	1
1	2	2	2	1
1	1	1	1	1

Figure (a)

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Figure (b)

9	5	1	2
13	7	11	3
14	6	10	4
15	16	12	8

Figure (c)

## Input

Your program will be tested on one or more test cases. The first input line of a test case is an integer  $N$  which is the size of the grid.  $N$  input lines will follow, each line made of  $N$  integer values specifying the values in the grid in a row-major order. Note that  $N > 0$

The end of the test cases is identified with a dummy test case with  $N = 0$ .

## Output

For each test case, output the result on a single line using the following format:

k. result

Where  $k$  is the test case number (starting at 1,) and result is "YES" or "NO" (without the double quotes.) and single space between "." and "result".

## Sample

**Input:**

```
4
9 5 1 2
13 7 11 3
14 6 10 4
15 16 12 8
3
1 2 3
5 6 7
8 9 4
0
```

**Output:**

- 1. YES
- 2. NO