

The WormWold puzzle was initially proposed by Cliff Pickover in the Discover Magazine, issue of November 1994 (a visit to his home page is highly recommended!). The WormWorld is a grid of numbers and it is a tough place to live in. The worms that inhabit it are all born with nasty allergies. The first time they come in contact with a number, their immune systems are overstimulated; if they are exposed to that number a second time, they die of anaphylactic shock.

A worm can start crawling on any square in WormWorld, and it can then move horizontally or vertically but not diagonally. In this scenario, what is the longest path a worm can take without dying? An example is illustrated in the following figure.

Write a program that determines the largest path a worm can take for a given grid.

6	8	18	15	24	20	2	20
6	2	15	2	17	15	3	7
0	11	18	16	20	15	1	11
6	2	6	13	4	17	20	16
5	12	7	2	3	5	18	23
7	13	3	2	2	11	4	23
16	23	10	2	4	12	5	20
17	12	10	1	13	12	6	20

Input

The input begins with a single positive integer on a line by itself indicating the number of the cases following, each of them as described below. This line is followed by a blank line, and there is also a blank line between two consecutive inputs.

The first input line is the size N of the grid ($0 < N \leq 12$). This is followed by N input lines, each one with N positive integer values separated by blank spaces (as a simplification, we will only use grid values less than 1000).

Output

For each test case, the output must follow the description below. The outputs of two consecutive cases will be separated by a blank line.

The output is the size (in terms of the number of squares) of the largest path that a worm can take.

Sample Input

```
1
3
1 2 1
2 3 4
3 2 1
```

Sample Output

```
4
```