4529 A Constrained Queen Game

Fig. 1 shows a well-known 8-queen problem solution in an 8×8 chess board. The problem is to place 8 queens in a chess board so that none of them is able to capture any other using the standard chess queen's moves.

Now, the chess board size can be $N \times N$ and you need to place N queens in the game. Besides, each square in the chess board has a score. The score is a positive integer (at most 5000) and is provided as part of the test data.

Let the score on square (i, j) be $score(i, j)$. The scores provided for a chess board follow a rule:

$$score(i, j) < score(s, t) \text{ if } (s > i \text{ and } t \geq j) \text{ or } (s \geq i \text{ and } t > j)$$

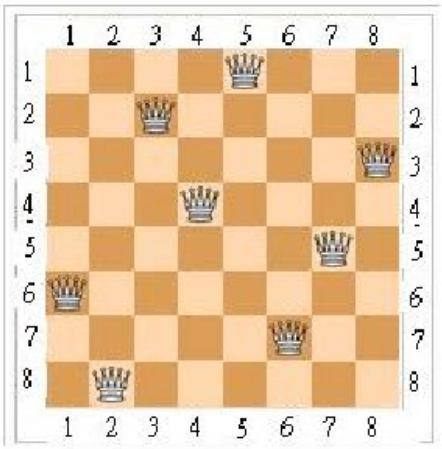

Figure 1: A solution to the 8-queen problem.

According to this rule, the scores on the board always increase toward right, bottom and right-bottom corner. A solution of N queens now has a total score, which is the sum of scores of N queens. Given an $N \times N$ chess board, please find the maximum total score that can be produced by a valid solution.

Technical Specification

1. $8 \leq N \leq 16$

Input

The first line of the input file contains an integer indicating the number of test cases (at most 10 cases) to follow. Each test case begins a number N which is the number of queens. Follwing N is $N \times N$ scores for all the squares. These scores are listed in row major. For example, in an 8×8 queen board, the first eight scores are for squares indexed $(1, 1), (1, 2), (1, 3), \ldots, (1, 8)$.

Output

For each test case, please output the maximum total score that can be produced by a valid solution.

Sample Input

```
1
8
1  2   3   4   5   6   7   8
2  4   6   8  10  12  14  16
3  6   9  12  15  18  21  24
4  8  12  16  20  24  28  32
5 10  15  20  25  30  35  40
6 12  18  24  30  36  42  48
7 14  21  28  35  42 500 550
8 16  24  32  40  48 550 999
```

Sample Output

1097