American Computer Science League

2020-2021 ● Contest 3: Multiple Arrays ● Senior Division

PROBLEM: Given a set of two dimensional arrays, each having the same shape, traverse the arrays starting in the upper-left corner, stopping when you reach a cell location that you've already visited. At each location, look at the adjacent locations in all arrays. Adjacent locations are to the right, left, up, down, or diagonally in any direction. Move to the location of the largest unique value which we guarantee will exist. Find the smallest value in each cell along the traversed path and output the sum of these values..

Array A			
6	2	7	4
6	1	5	7
5	6	7	8

Array B			
4	8	6	4
4	5	7	2
7	6	5	4

Array C			
3	6	9	2
4	8	2	6
3	2	1	4

Array D			
4	3	5	7
6	8	9	1
2	9	3	5

In the example above with four 3x4 arrays:

Step 1: Start at location (0,0) in all 4 arrays. The adjacent locations in array A are 2, 6 and 1; in array B they are 8, 4, and 5; in array C they are 6, 4, and 8; and in array D they are 3, 6, and 8. largest unique value within the set of {2, 6, 1, 8, 4, 5, 6, 4, 8, 3, 6, 8} is 5, so we go to location (1,1).

Step 2: At location (1,1), the set of values in all of the adjacent locations in array A is {6,2,7,6,5,5,6,7}; in array B the set of values is {4,8,6,4,7,7,6,5}; in array C the set of values is {3,6,9,4,2,3,2,1}; and in array D the set of values is {4,3,5,6,9,2,9,3}. The largest unique value is 8, so we go to location (0,1).

Step 3: At location (0,1), the values in the adjacent locations in array A are {6,7,6,1,5}; in array B they are {4,6,4,5,7}; in array C they are {3,9,4,8,2}; and in array D they are {4,5,6,8,9}. The largest unique value is 3, so we go to location (0,0).

Step 4: Stop at location (0,0) because it was visited before. The traversed path is locations (0,0), (1,1), and (0,1). The smallest value in each of the cell locations along the path is 3, 1, and 2, which sums to 6.

INPUT: Your program will receive a single set of data, the first line of which will contain two integers for the number of rows and columns in each array. Following that, there will be one line with a single integer, N, representing the number of arrays that will follow. The following N lines will contain the integer values in each array separated by a single space in row-major order starting with location (0,0) in the upper left corner.

OUTPUT: Print the sum of the smallest value in each location along the traversed path.

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SAMPLE INPUT (http://…):

```
3 4
4
6 2 7 4 6 1 5 7 5 6 7 8
4 8 6 4 4 5 7 2 7 6 5 4
3 6 9 2 4 8 2 6 3 2 1 4
4 3 5 7 6 8 9 1 2 9 3 5
4 4
3
5 2 8 3 1 8 5 3 0 7 1 7 9 5 8 6
5 4 0 9 5 4 6 2 8 1 8 2 8 1 7 2
2 7 1 8 2 8 5 8 2 8 4 5 9 0 4 5
5 3
5
9 9 9 8 8 8 7 7 7 6 6 6 5 5 5
5 6 7 8 5 5 6 7 8 9 5 6 7 8 9
5 6 3 2 1 9 4 3 2 1 5 4 3 2 1
5 5 5 6 6 6 7 7 7 8 8 8 9 9 9
1 2 3 4 5 6 7 8 9 8 7 6 5 4 3
```

EXPECTED OUTPUT

```
6

12

6
```

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TEST INPUT:

```
3 5
3
5 3 4 5 6 7 8 9 8 7 6 5 4 3 2
1 3 5 7 9 7 5 9 1 2 4 3 8 6 4
3 2 4 5 1 6 5 8 9 2 3 8 1 4 6
5 3
5
8 6 4 2 5 2 4 6 8 7 8 6 4 2 0
7 9 7 5 3 8 3 6 7 9 1 9 7 5 3
5 2 3 4 8 6 7 8 9 5 2 3 4 5 6
9 4 9 2 3 9 1 8 7 6 5 4 3 2 8
1 5 4 7 8 9 3 2 1 4 5 6 9 8 7
5 6
6
3 1 4 1 5 9 2 6 5 3 5 8 9 7 9 3 2 3 8 4 6 2 6 4 3 3 8 3 2 7
7 2 3 8 3 3 4 6 2 6 4 8 3 2 3 9 7 9 8 5 3 5 6 2 9 5 1 4 1 3
6 2 8 3 1 8 5 3 6 7 1 8 6 2 5 3 1 8 5 3 4 7 6 8 6 2 8 3 1 8
2 7 1 8 2 8 1 8 2 8 4 6 2 7 1 8 2 8 1 8 2 8 4 6 2 7 1 8 2 8
1 4 1 5 9 2 6 5 3 5 8 9 7 9 3 2 3 8 4 6 2 6 4 3 3 8 3 2 7 3
4 1 5 9 2 6 5 3 5 8 9 7 9 3 2 3 8 4 6 2 6 4 3 3 8 3 2 7 3 1
5 4
4
11 12 13 14 15 16 17 18 19 20 11 12 13 14 15 16 17 18 19 20
21 22 23 24 24 14 16 18 20 18 28 38 10 12 14 12 12 12 14 14
12 11 23 13 15 25 17 27 19 29 11 11 13 13 15 15 17 17 19 19
21 31 15 27 11 23 27 19 23 29 31 19 18 17 16 15 14 13 12 11
4 5
7
-2 -1 -4 -1 -5 -9 -2 -6 -5 -3 -5 -4 -9 -7 -9 -3 -2 -3 -8 -4
-6 -2 -6 -4 -3 -3 -8 -3 -2 -7 -1 -2 -4 -8 -4 -2 -1 -1 -3 -9
-2 -4 -6 -8 -6 -5 -2 -3 -3 -5 -7 -9 -7 -5 -3 -5 -2 -3 -5 -7
-4 -5 -2 -6 -9 -1 -3 -6 -8 -9 -1 -2 -5 -6 -2 -9 -6 -5 -3 -2
-3 -1 -4 -1 -5 -9 -2 -6 -5 -3 -5 -8 -9 -7 -9 -3 -2 -3 -8 -4
-6 -2 -6 -4 -3 -3 -8 -3 -2 -7 -3 -1 -8 -1 -5 -9 -2 -6 -5 -3
-5 -8 -9 -7 -9 -3 -2 -3 -8 -4 -6 -2 -6 -4 -3 -3 -8 -3 -2 -7
```

EXPECTED OUTPUT:

```
17
9
14
60
-48
```