2D Array - DS

Problem Submissions Leaderboard Editorial

Given a 6×6 2D Array, arr:

```
1 1 1 0 0 0
0 1 0 0 0 0
1 1 1 0 0 0
0 0 0 0 0 0
0 0 0 0 0 0
0 0 0 0 0 0
```

We define an hourglass in A to be a subset of values with indices falling in this pattern in arr's graphical representation:

```
a b c
  d
e f g
```

There are 16 hourglasses in arr, and an hourglass sum is the sum of an hourglass' values. Calculate the hourglass sum for every hourglass in arr, then print the maximum hourglass sum.

For example, given the 2D array:

```
-9 -9 -9  1 1 1
 0 -9  0  4 3 2
-9 -9 -9  1 2 3
 0  0  8  6 6 0
 0  0  0 -2 0 0
 0  0  1  2 4 0
```

We calculate the following 16 hourglass values:

```
-63, -34, -9, 12,
-10, 0, 28, 23,
-27, -11, -2, 10,
9, 17, 25, 18
```

Our highest hourglass value is 28 from the hourglass:

```
0 4 3
  1
8 6 6
```

Note: If you have already solved the Java domain's Java 2D Array challenge, you may wish to skip this challenge.

Function Description

Complete the function hourglassSum in the editor below. It should return an integer, the maximum hourglass sum in the array.

hourglassSum has the following parameter(s):

- arr: an array of integers

Input Format

Each of the 6 lines of inputs $arr[i]$ contains 6 space-separated integers $arr[i][j]$.

Constraints

- $-9 \leq arr[i][j] \leq 9$
- $0 \leq i, j \leq 5$

Output Format

Print the largest (maximum) hourglass sum found in arr.

Sample Input

```
1 1 1 0 0 0
0 1 0 0 0 0
1 1 1 0 0 0
0 0 2 4 4 0
0 0 0 2 0 0
0 0 1 2 4 0
```

Sample Output

```
19
```

Explanation

arr contains the following hourglasses:

```
1 1 1   1 1 0   1 0 0   0 0 0
  1       0       0       0
1 1 1   1 1 0   1 0 0   0 0 0

0 1 0   1 0 0   0 0 0   0 0 0
  1       1       0       0
0 0 2   0 2 4   2 4 4   4 4 0

1 1 1   1 1 0   1 0 0   0 0 0
  0       2       4       4
0 0 0   0 0 2   0 2 0   2 0 0

0 0 2   0 2 4   2 4 4   4 4 0
  0       0       2       0
0 0 1   0 1 2   1 2 4   2 4 0
```

The hourglass with the maximum sum (19) is:

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

Python 3

```
#!/bin/python3

import math
import os
import random
import re
import sys

# Complete the hourglassSum function below.
def hourglassSum(a):
    n=len(a)
    max=0
    count=0
    for i in range(1,n-1):
        for j in range(1,n-1):
            if (a[i][j]+a[i-1][j]+a[i+1][j]+a[i-1][j-1]+a[i+1][j+1]+a[i+1][j-1]+a[i-1][j+1])>max:
                max=a[i][j]+a[i-1][j]+a[i+1][j]+a[i-1][j-1]+a[i+1][j+1]+a[i+1][j-1]+a[i-1][j+1]
            count+=1;
    print(count)
    return max

if __name__ == '__main__':
    fptr = open(os.environ['OUTPUT_PATH'], 'w')

    arr = []

    for _ in range(6):
        arr.append(list(map(int, input().rstrip().split())))

    result = hourglassSum(arr)

    fptr.write(str(result) + '\n')

    fptr.close()
```

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Congratulations!

You have passed the sample test cases. Click the submit button to run your code against all the test cases.

Sample Test case 0

Input (stdin) Download

Sample Test case 1

```
1 1 1 0 0 0
0 1 0 0 0 0
1 1 1 0 0 0
0 9 2 -4 -4 0
0 0 0 -2 0 0
0 0 -1 -2 -4 0
```

Sample Test case 2

Your Output (stdout)

```
13
```

Expected Output

Download

```
13
```