

[每日 LeetCode] 840. Magic Squares In Grid

作者: [Hanseltu](#)

原文链接: <https://ld246.com/article/1551711385169>

来源网站: [链滴](#)

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Description:

A 3 x 3 magic square is a 3 x 3 grid filled with distinct numbers **from 1 to 9** such that each row, column, and both diagonals all have the same sum.

Given an **grid** of integers, how many 3 x 3 "magic square" subgrids are there? (Each subgrid is contiguous).

Example 1:

Input: $\begin{bmatrix} 4 & 3 & 8 & 4 \\ 9 & 5 & 1 & 9 \\ 2 & 7 & 6 & 2 \end{bmatrix}$

Output: 1

Explanation:

The following subgrid is a 3 x 3 magic square:

438
951
276

while this one is not:

384
519
762

In total, there is only one magic square inside the given grid.

Note:

- 1 <= grid.length <= 10
- 1 <= grid[0].length <= 10
- 0 <= grid[i][j] <= 15

思路：题目要求找出高维数组中的魔方数，暂时能做的方法就是从第二行开始依次遍历高维数组，以点为中心判断是否符合魔方数规则，特别注意元素下标。魔方数规则如下（第三条容易不注意）：

- 中间的数是5
- 每行每列交叉8组数的和为15
- 9个数的和为45且积为362880

(此条规则可排除特殊用例：[[5,5,5],[5,5,5],[5,5,5]])

我的C++代码

```
class Solution {
public:
    bool magic(vector<vector<int>>& g, int x, int y) {
        int a = 0, b = 1;
        for(int i = 0; i < 3; i++) {
```

```

        for(int j = 0; j < 3; j++) {
            int c = g[i+x][j+y];
            a += c;
            b *= c;
        }
    }
    return
        a == 45 && b == 362880 &&
        g[x][y] + g[x][y+1] + g[x][y+2] == 15 &&
        g[x+1][y] + g[x+1][y+1] + g[x+1][y+2] == 15 &&
        g[x+2][y] + g[x+2][y+1] + g[x+2][y+2] == 15 &&
        g[x][y] + g[x+1][y] + g[x+2][y] == 15 &&
        g[x][y+1] + g[x+1][y+1] + g[x+2][y+1] == 15 &&
        g[x][y+2] + g[x+1][y+2] + g[x+2][y+2] == 15 &&
        g[x][y] + g[x+1][y+1] + g[x+2][y+2] == 15 &&
        g[x+2][y] + g[x+1][y+1] + g[x][y+2] == 15;
    }

int numMagicSquaresInside(vector<vector<int>>& grid) {
    int m = grid.size(), n = grid[0].size();
    int result = 0;
    for(int i = 0; i + 2 < m; i++) {
        for(int j = 0; j + 2 < n; j++) {
            if(magic(grid, i, j)) result++;
        }
    }
    return result;
}
};

```

运行时间: 4ms

运行内存: 9.2M