

Problem 3537: Fill a Special Grid

Problem Information

Difficulty: Medium

Acceptance Rate: 70.47%

Paid Only: No

Tags: Array, Divide and Conquer, Matrix

Problem Description

You are given a non-negative integer `n` representing a `2n x 2n` grid. You must fill the grid with integers from 0 to `22n - 1` to make it **special**. A grid is **special** if it satisfies **all** the following conditions:

- * All numbers in the top-right quadrant are smaller than those in the bottom-right quadrant.
- * All numbers in the bottom-right quadrant are smaller than those in the bottom-left quadrant.
- * All numbers in the bottom-left quadrant are smaller than those in the top-left quadrant.
- * Each of its quadrants is also a special grid.

Return the **special** `2n x 2n` grid.

****Note** :** Any 1x1 grid is special.

****Example 1:****

****Input:**** n = 0

****Output:**** [[0]]

****Explanation:****

The only number that can be placed is 0, and there is only one possible position in the grid.

****Example 2:****

****Input:**** n = 1

****Output:**** [[3,0],[2,1]]

****Explanation:****

The numbers in each quadrant are:

* Top-right: 0 * Bottom-right: 1 * Bottom-left: 2 * Top-left: 3

Since `0 < 1 < 2 < 3`, this satisfies the given constraints.

****Example 3:****

****Input:**** n = 2

****Output:**** [[15,12,3,0],[14,13,2,1],[11,8,7,4],[10,9,6,5]]

****Explanation:****

The numbers in each quadrant are:

* Top-right: 3, 0, 2, 1 * Bottom-right: 7, 4, 6, 5 * Bottom-left: 11, 8, 10, 9 * Top-left: 15, 12, 14, 13
`max(3, 0, 2, 1) < min(7, 4, 6, 5)` * `max(7, 4, 6, 5) < min(11, 8, 10, 9)` * `max(11, 8, 10, 9) < min(15, 12, 14, 13)`

This satisfies the first three requirements. Additionally, each quadrant is also a special grid. Thus, this is a special grid.

****Constraints:****

* `0 <= n <= 10`

Code Snippets

C++:

```
class Solution {
public:
vector<vector<int>> specialGrid(int n) {
    }
};
```

Java:

```
class Solution {
public int[][] specialGrid(int n) {
    }
}
```

Python3:

```
class Solution:
def specialGrid(self, n: int) -> List[List[int]]:
```