# 048. Rotate Image

## **048** Rotate Image

- arrav
- Onion-rotate

### **Description**

You are given an n x n 2D matrix representing an image.

Rotate the image by 90 degrees (clockwise).

#### Note:

You have to rotate the image **in-place**, which means you have to modify the input 2D matrix directly. **DO NOT** allocate another 2D matrix and do the rotation.

#### Example 1:

```
Given input matrix =
[
   [1,2,3],
   [4,5,6],
   [7,8,9]
],

rotate the input matrix in-place such that it becomes:
[
   [7,4,1],
   [8,5,2],
   [9,6,3]
]
```

#### Example 2:

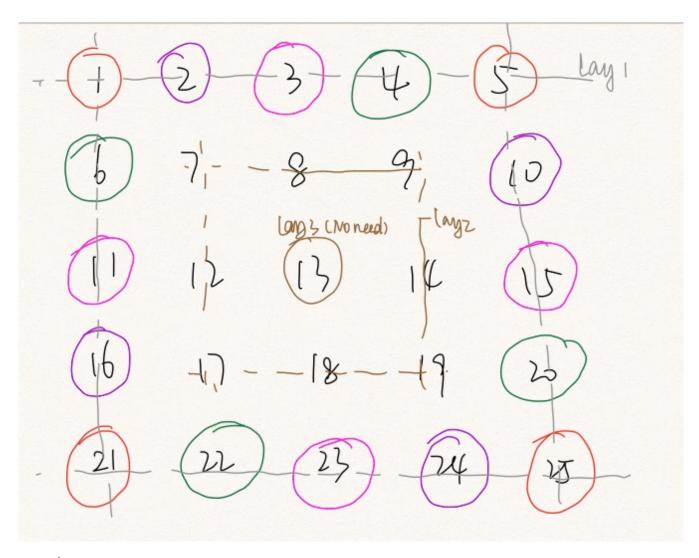
```
Given input matrix =

[
    [5, 1, 9,11],
    [2, 4, 8,10],
    [13, 3, 6, 7],
    [15,14,12,16]
],

rotate the input matrix in-place such that it becomes:

[
    [15,13, 2, 5],
    [14, 3, 4, 1],
    [12, 6, 8, 9],
    [16, 7,10,11]
]
```

#### 1. Thought line



#### 2. Onion-rotate

```
1 class Solution {
 2 public:
 3
       void rotate(vector<vector<int> > &matrix) {
 4
           int start = 0, end = matrix.size()-1;
 5
           while(start<end) {</pre>
 6
               for(int i=start; i<end; i++) { // rotate a layer
 7
                   int offset = i - start;
 8
                   int temp = matrix[start][i];
                  matrix[start][i] = matrix[end-offset][start];
 9
                   matrix[end-offset][start] = matrix[end][end-offset];
10
11
                   matrix[end][end-offset] = matrix[start+offset][end];
                   matrix[start+offset][end] = temp;
12
13
14
               start++;
15
               end--;
16
17
18 };
```