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2D Array Interview Questions - 2

\* Rotate Matrix by 90 clockwise:

1	2	3	4		13	9	5	1
5	6	7	8	$90^\circ$	14	10	6	2
9	10	11	12		15	11	7	3
13	14	15	16		16	12	8	4

⇒ So here, the pattern is -

$[0][0] \rightarrow [0][3]$   
 $[0][1] \rightarrow [1][3]$   
 $[0][2] \rightarrow [2][3]$   
 $[0][3] \rightarrow [3][3]$

$i + x = 3$

$= n-1$

$x = (n-1-i)$

⇒  $ans[j][n-1-i] = matrix[i][j];$

Code

for (int i = 0; i < n; i++)

for (int j = 0; j < n; j++) {

$ans[j][n-1-i] = matrix[i][j];$

}

T.C  $\rightarrow O(N^2)$

S.C  $\rightarrow O(N^2)$

⇒ So, we have to solve it in  $O(1) \rightarrow$  S.C.

⇒ Here, we have notice a pattern —  
(col → reverse) ⇒ Row.

⇒ So to do this, we can do transpose then reverse.

⇒ Transpose

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

Code

```
// Do Transpose
```

```
// Reverse the array
```

```
for (i = 0; i < n; i++) {
```

```
    start = 0, end = n - 1;
```

```
    while (start < end) {
```

```
        swap(matrix[start][i],
```

```
              matrix[i][end]);
```

```
        start++, end--;
```

```
    }
```

```
}
```

\*

Rotate Matrix 180

⇒

To do this, we can rotate the array  
2 times  $90^\circ \rightarrow 90^\circ + 90^\circ \rightarrow 180^\circ$



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=> ~~There~~ The another direct solution to solve this question is —

= The pattern is here that — first reverse all the column then all the rows.

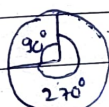
// Reverse column

=> `swap(matrix[start][j], matrix[end][j]);`

T.C  $\rightarrow O(N^2)$

\* Rotate Matrix  $90^\circ$  anticlockwise

=> The solution for this is  $90 + 90 + 90^\circ = 270^\circ$



=  $90^\circ$  anticlockwise =  $270^\circ$  clockwise

= The another solution —

First do transpose then reverse the each column.

\* Rotate Matrix by k Time:

= Here,  
1 time  $\rightarrow 90^\circ$   
2 time  $\rightarrow 180^\circ$   
3 time  $\rightarrow 270^\circ$   
4 time  $\rightarrow 360^\circ$

=> So, to find how many times we have to rotate  $\rightarrow$  do  $k \% 4$