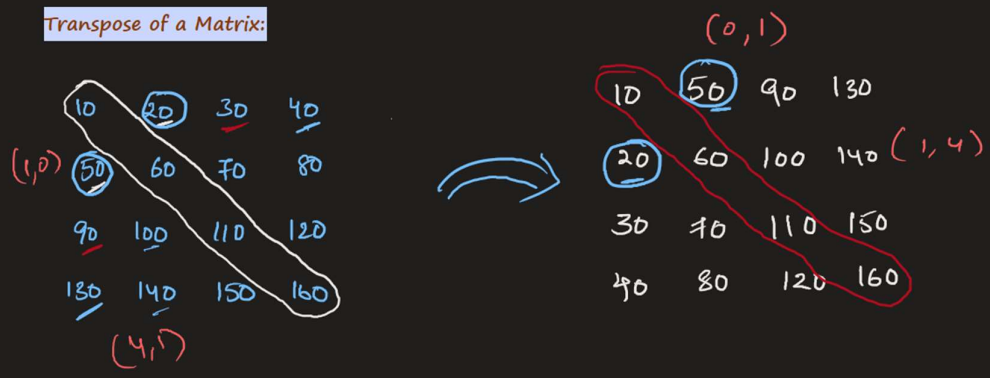
100-Days-of-DSA

Transpose of a Matrix:



* the value in (0,1) ⟶ changed to (1,0)

(1,0) ⟶ (0,1)

Transpose, is nothing but Swapping of (i,j) ⟶ (j,i)

```
for(int i=0; i<n; i++)
{
    for(int j=0; j<i; j++)
    {
        //Swap (i,j) with (j,i)
        int temp = arr[i][j];
        arr[i][j] = arr[j][i];
        arr[j][i] = temp;
    }
}
```

We need to change one half of traingle only to get transposed

Rotate the matrix By 90deg (clockwise)

Input

10	20	30	40
50	60	70	80
90	100	110	120
130	140	150	160

Transpose (1)

10	50	90	130
20	60	100	140
30	70	110	150
40	80	120	160

(2) reverse every row

130	90	50	10
140	100	60	20
150	110	70	30
160	120	80	40

final result

130	90	50	10
140	100	60	20
150	110	70	30
160	120	80	40

Same

* So, inorder to rotate this matrix By 90° (clockwise)

→ We need to know about transpose

* Step1 : Transpose; → Written above

Step2 : Reverse every row;

Reverse every row

```
for(int i=0; i<n/2; i++)
{
    int temp = arr[i];
    arr[i] = arr[n-i-1];
    arr[n-i-1] = temp;
}
```

This is inner loop of matrix

// iterate from 0 → n/2 (half)

// Swap 1st & last elements

i → n-i-1

(ith idx from first) (ith idx from last)

```
public void transpose(int[][] arr){
    int n = arr.length;
    for(int i = 0;i<n;i++){
        for(int j = 0;j<i;j++){
            int temp = arr[i][j];
            arr[i][j] = arr[j][i];
            arr[j][i] = temp;
        }
    }
}
```

```
public void reverse(int[][] arr){
    int n = arr.length;
    for(int i = 0;i<n;i++){
        for(int j = 0;j<n/2;j++){
            int temp = arr[i][j];
            arr[i][j] = arr[i][n-j-1];
            arr[i][n-j-1] = temp;
        }
    }
}
```

We have discussed above