

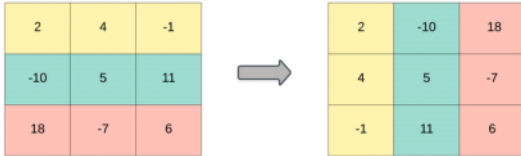
# Transpose Matrix :-

## 867. Transpose Matrix

Easy Topics Companies Hint

Given a 2D integer array `matrix`, return the **transpose** of `matrix`.

The **transpose** of a matrix is the matrix flipped over its main diagonal, switching the matrix's row and column indices.



### Example 1:

Input: `matrix = [[1,2,3],[4,5,6],[7,8,9]]`  
 Output: `[[1,4,7],[2,5,8],[3,6,9]]`

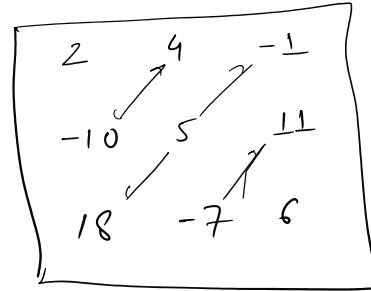
### Example 2:

Input: `matrix = [[1,2,3],[4,5,6]]`  
 Output: `[[1,4],[2,5],[3,6]]`

### Constraints:

- `m == matrix.length`
- `n == matrix[i].length`
- `1 <= m, n <= 1000`
- `1 <= m * n <= 105`
- `-109 <= matrix[i][j] <= 109`

So



## Approach 1: Copy Directly

### Intuition and Algorithm:-

The transpose of a matrix `A` with dimensions `RxC` is a matrix `ans` with dimensions `CxR` for which `ans[c][r] = A[r][c]`.

Let's initialize a new matrix `ans` representing the answer. Then we'll copy each entry of the matrix `ans` appropriately.

```

1 class Solution {
2 public:
3     vector<vector<int>> transpose(vector<vector<int>>&
matrix) {
4         int R=matrix.size(), C=matrix[0].size();
5         vector<vector<int>> ans(C, vector<int>(R));
6         for(int r=0;r<R;r++){
7             for(int c=0;c<C;c++){
8                 ans[c][r]=matrix[r][c];
9             }
10        }
11        return ans;
12    }
13 };
    
```

T.C :  $O(R \times C)$

T.C.  $O(RXC)$

S.C.  $O(RXC)$