

Transpose of a Matrix

Given a matrix of size $N \times M$, find the transpose of the matrix

Transpose of a matrix is obtained by changing rows to columns and columns to rows. In other words, transpose of $A[N][M]$ is obtained by changing $A[i][j]$ to $A[j][i]$.

Example:

$$\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

Input

$$\begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$$

Output

```
#include <bits/stdc++.h>
using namespace std;

#define N 4

// Converts A[][] to its transpose
void transpose(int A[][N])
{
    for (int i = 0; i < N; i++)
        for (int j = i + 1; j < N; j++)
            swap(A[i][j], A[j][i]);
}

int main()
{
    int A[N][N] = { { 1, 1, 1, 1 },
                    { 2, 2, 2, 2 },
                    { 3, 3, 3, 3 },
                    { 4, 4, 4, 4 } };
```

```

    transpose(A);

    printf("Modified matrix is \n");
    for (int i = 0; i < N; i++) {
        for (int j = 0; j < N; j++)
            printf("%d ", A[i][j]);
        printf("\n");
    }

    return 0;
}

```

Output

```

Modified matrix is
1 2 3 4
1 2 3 4
1 2 3 4
1 2 3 4

```

Here, the outer loop iterates through the columns of the matrix, and the inner loop iterates through the rows. For each element in the matrix, we swap the row and column indices to get the corresponding element in the transpose.