_05)_Rotate_Matrix_by_90_Degree.cpp

```cpp
#include<iostream>
using namespace std;

const int R=4, C=4, n=4;
void rotate90(int mat[R][C])
{
    int temp[n][n];
    for(int i=0; i<n; i++)
        for(int j=0; j<n; j++)
            temp[n-j-1][i] = mat[i][j];

    for(int i=0; i<n; i++)
        for(int j=0; j<n; j++)
            mat[i][j] = temp[i][j];

    for(int i=0; i<n; i++)
        {
            for(int j=0; j<n; j++)
                cout<<mat[i][j]<<" ";
            cout<<endl;
        }
}

int main()
{
    cout<<"90 deg Rotated Matrix = \n";
    int mat[4][4] = {{1, 2, 3, 4},
                     {5, 6, 7, 8},
                     {9, 10, 11, 12},
                     {13, 14, 15, 16}};

    rotate90(mat);
    cout<<endl;
}
```

```
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90 deg Rotated Matrix =
4 8 12 16
3 7 11 15
2 6 10 14
1 5 9 13


Process returned 0 (0x0)   execution time : 0.120 s
Press any key to continue.
```

_06)_Rotate_Matrix_by_90_Degree.cpp

```cpp
const int R=4, C=4, n=4;
void rotate90(int mat[R][C])
{
    for(int i=0; i<n; i++)
        for(int j=i+1; j<n; j++)
            swap(mat[i][j], mat[j][i]);

    for(int i=0; i<n; i++)
    {
        int low=0, high=n-1;
        while(low < high)
        {
            swap(mat[low][i], mat[high][i]);
            low++;
            high--;
        }
    }

    for(int i=0; i<n; i++)
        {
            for(int j=0; j<n; j++)
                cout<<mat[i][j]<<" ";
            cout<<endl;
        }
}

int main()
{
    cout<<"90 deg Rotated Matrix = \n";
    int mat[4][4] = {{1, 2, 3, 4},
                     {5, 6, 7, 8},
                     {9, 10, 11, 12},
                     {13, 14, 15, 16}};

    rotate90(mat);
    cout<<endl;
}
```

```
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90 deg Rotated Matrix =
4 8 12 16
3 7 11 15
2 6 10 14
1 5 9 13


Process returned 0 (0x0)   execution time : 0.106 s
Press any key to continue.
```

_07)_Spiral_Traversal_of_Matrix.cpp

```cpp
#include<iostream>
using namespace std;

const int R=4, C=4;
void printSpiral(int mat[R][C], int R, int C)
{
    int top=0, left=0, bottom=R-1, right=C-1;
    while(top <= bottom && left <= right)
    {
        for(int i=left; i<=right; i++)
            cout<<mat[top][i]<<" ";
            cout<<endl;
        top++;

        for(int i=top; i<=bottom; i++)
            cout<<mat[i][right]<<" ";
            cout<<endl;
        right--;

        if(top <= bottom)
        {
            for(int i=right; i>=left; i--)
            cout<<mat[bottom][i]<<" ";
            cout<<endl;
        bottom--;
        }

        if(left <= right)
        {
            for(int i=bottom; i>=top; i--)
            cout<<mat[i][left]<<" ";
            cout<<endl;
        left++;
        }
    }
}
```

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```
Spiral Matrix Traversal =
1 2 3 4
8 12 16
15 14 13
9 5
6 7
11
10



Process returned 0 (0x0)   execution time : 0.133 s
Press any key to continue.
```

_08)_Search_in_RowWise_and_ColumnWise.cpp

```cpp
#include<iostream>
using namespace std;

const int R=4, C=4;
void Row_Column_search(int mat[R][C], int x)
{
    for(int i=0; i<R; i++)
    {
        for(int j=0; j<C; j++)
        {
            if(mat[i][j] == x)
            {
                cout<<"Found at index ("<< i << "," << j << ")";
                return;
            }
        }
    }
    cout<<"Not Found";
}

int main()
{
    cout<<"Search in Row Wise & Column Wise = \n";
    int x=11;
    int mat[4][4] = {{1, 2, 3, 4},
                     {5, 6, 7, 8},
                     {9, 10, 11, 12},
                     {13, 14, 15, 16}};

    Row_Column_search(mat, x);
    cout<<endl;
}
```

```
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Search in Row Wise & Column Wise =
Found at index (2,2)

Process returned 0 (0x0)   execution time : 0.096 s
Press any key to continue.
```

_09)_Search_in_RowWise_and_ColumnWise.cpp

```cpp
#include<iostream>
using namespace std;

const int R=4, C=4;
void Row_Column_search(int mat[R][C], int x)
{
    int i=0, j=C-1;
    while(i<R && j>=0)
    {
        if(mat[i][j] == x)
        {
            cout<<"Found at index ("<< i << "," << j << ")";
            return;
        }
        else if(mat[i][j] > x)
            j--;
        else
            i++;
    }
    cout<<"Not Found";
}

int main()
{
    cout<<"Search in Row Wise & Column Wise = \n";
    int x=11;
    int mat[4][4] = {{1, 2, 3, 4},
                     {5, 6, 7, 8},
                     {9, 10, 11, 12},
                     {13, 14, 15, 16}};

    Row_Column_search(mat, x);
    cout<<endl;
}
```

```
Select "C:\Users\Akash Singh\Documents\Coding\' CHALLENGE '\365-Days-of-Code\177). Complete DSA (2D_Array[5-9])\_09)_...
Search in Row Wise & Column Wise =
Found at index (2,2)

Process returned 0 (0x0)   execution time : 0.114 s
Press any key to continue.
```