PROBLEM 1 : Wave Form Traversal

Q1.cpp > main()

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

int main() {
    int N, M;
    cin >> N >> M;

    int arr[N][M];
    for(int i = 0; i < N; i++) {
        for(int j = 0; j < M; j++) {
            cin >> arr[i][j];
        }
    }
    for(int j = 0; j < M; j++) {
        if(j % 2 == 0) {

            for(int i = 0; i < N; i++) {
                cout << arr[i][j] << " ";
            }
        } else {
            for(int i = N-1; i >= 0; i--) {
                cout << arr[i][j] << " ";
            }
        }
    }

    return 0;
}
```

```
3
3
1
2
3
4
5
6
7
8
9
1 4 7
8 5 2
3 6 9
```

PROBLEM 2: Transpose Of a Matrix

Q2.cpp > main()

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

int main() {
    int arr[3][3];

    cout << "Enter elements of a 3x3 matrix:\n";
    for (int i = 0; i < 3; i++) {
        for (int j = 0; j < 3; j++) {
            cin >> arr[i][j];
        }
    }

    cout << "Your matrix is:\n";
    for (int i = 0; i < 3; i++) {
        for (int j = 0; j < 3; j++) {
            cout << arr[i][j] << " ";
        }
        cout << endl;
    }

    cout << "Transpose of your matrix is:\n";
    for (int i = 0; i < 3; i++) {
        for (int j = 0; j < 3; j++) {
            cout << arr[j][i] << " ";
        }
        cout << endl;
    }

    return 0;
}
```

```
Enter elements of a 3x3 matrix:
1
2
3
4
5
6
7
8
9
Your matrix is:
1 2 3
4 5 6
7 8 9
Transpose of your matrix is:
1 4 7
2 5 8
3 6 9
```

PROBLEM 3: Spiral Traversal of a Matrix

Q3.cpp > main()

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

int main() {
    int N, M;
    cin >>N>>M;

    int arr[100][100];
    for(int i = 0; i < N; i++)
        for(int j = 0; j < M; j++)
            cin >> arr[i][j];

    int top = 0, bottom = N - 1;
    int left = 0, right = M - 1;

    while(top <= bottom && left <= right) {

        for(int j = left; j <= right; j++)
            cout << arr[top][j] << " ";
        top++;

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

        if(top <= bottom) {
            for(int j = right; j >= left; j--)
                cout << arr[bottom][j] << " ";
            bottom--;
        }
        if(left <= right) {
            for(int i = bottom; i >= top; i--)
                cout << arr[i][left] << " ";
            left++;
        }
    }
    return 0;
}
```

```
3
3
1
2
3
4
5
6
7
8
9
1 2 3 6 9 8 7 4 5
```

PROBLEM 4: Rotate Matrix by 90deg clockwise

Q4.cpp > main()

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

int main() {
    int N;
    cin >> N;

    int arr[100][100];

    for(int i = 0; i < N; i++)
        for(int j = 0; j < N; j++)
            cin >> arr[i][j];

    for(int i = 0; i < N; i++) {
        for(int j = i + 1; j < N; j++) {
            swap(arr[i][j], arr[j][i]);
        }
    }
    for(int i = 0; i < N; i++) {
        int start = 0, end = N - 1;
        while(start < end) {
            swap(arr[i][start], arr[i][end]);
            start++;
            end--;
        }
    }
    for(int i = 0; i < N; i++) {
        for(int j = 0; j < N; j++)
            cout << arr[i][j] << " ";
        cout << endl;
    }

    return 0;
}
```