# Lab 09 –Arrays 2-D

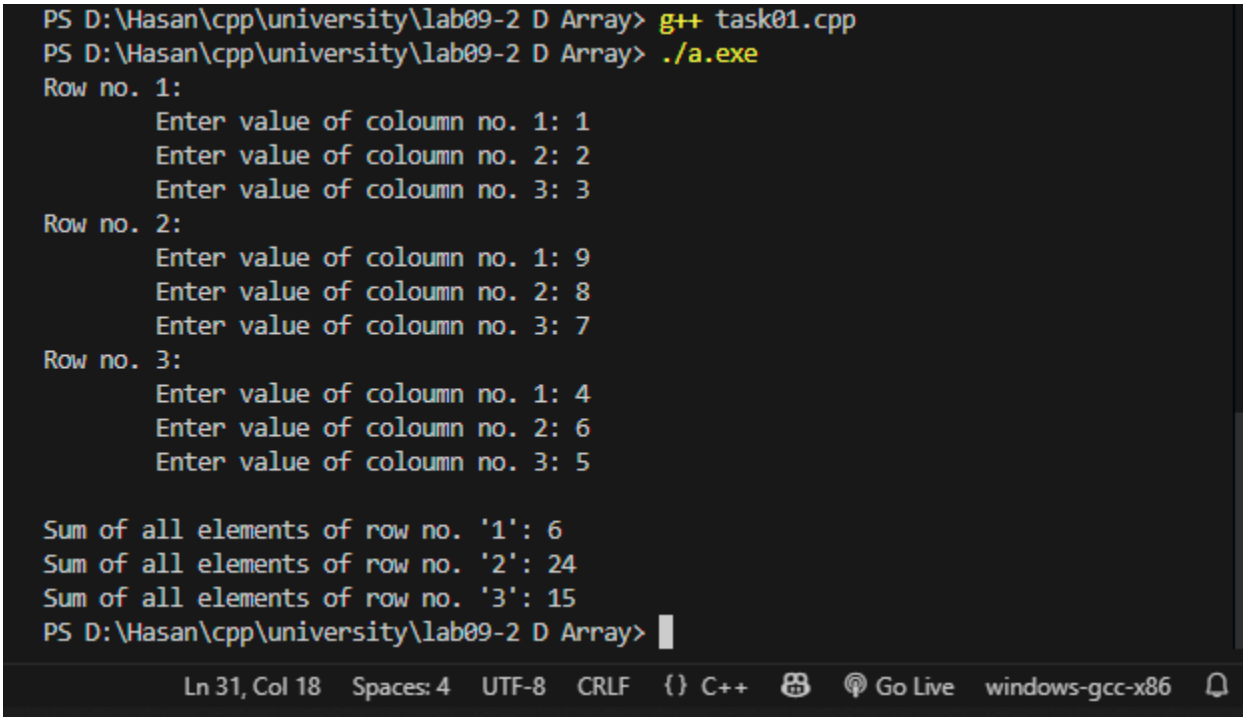
**Task 01:**

Write a program to create a 2D array of size 3x3. The program takes input for each cell in the array and then calculates and displays the sum of each row.

**Code:**

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


int main(){
    int a[3][3];
    int rowSum[3] = {0};
    for(int i = 0; i < 3; i++){
        cout << "Row no. " <<(i+1)<<": " << endl;
        for(int j = 0; j < 3; j++){
            cout << "Enter value of coloumn no. "<<(j+1)<<": ";
            cin >> a[i][j];
        }
    }

    for(int i = 0; i < 3; i++){
        for(int j = 0; j < 3; j++){
            rowSum[i] += a[i][j];
        }
    }

    for(int i = 0; i < 3; i++){
        cout << "Sum of all elements of row no. '"<<(i+1)<<"': " <<rowSum[i] <<
endl;
    }
}
```

**Output:**


PS D:\Hasan\cpp\university\lab09-2 D Array> g++ task01.cpp
PS D:\Hasan\cpp\university\lab09-2 D Array> ./a.exe
Row no. 1:
Enter value of coloumn no. 1: 1
Enter value of coloumn no. 2: 2
Enter value of coloumn no. 3: 3
Row no. 2:
Enter value of coloumn no. 1: 9
Enter value of coloumn no. 2: 8
Enter value of coloumn no. 3: 7
Row no. 3:
Enter value of coloumn no. 1: 4
Enter value of coloumn no. 2: 6
Enter value of coloumn no. 3: 5
Sum of all elements of row no. '1': 6
Sum of all elements of row no. '2': 24
Sum of all elements of row no. '3': 15
PS D:\Hasan\cpp\university\lab09-2 D Array>
Ln 31, Col 18 Spaces: 4 UTF-8 CRLF {} C++ Go Live windows-gcc-x86

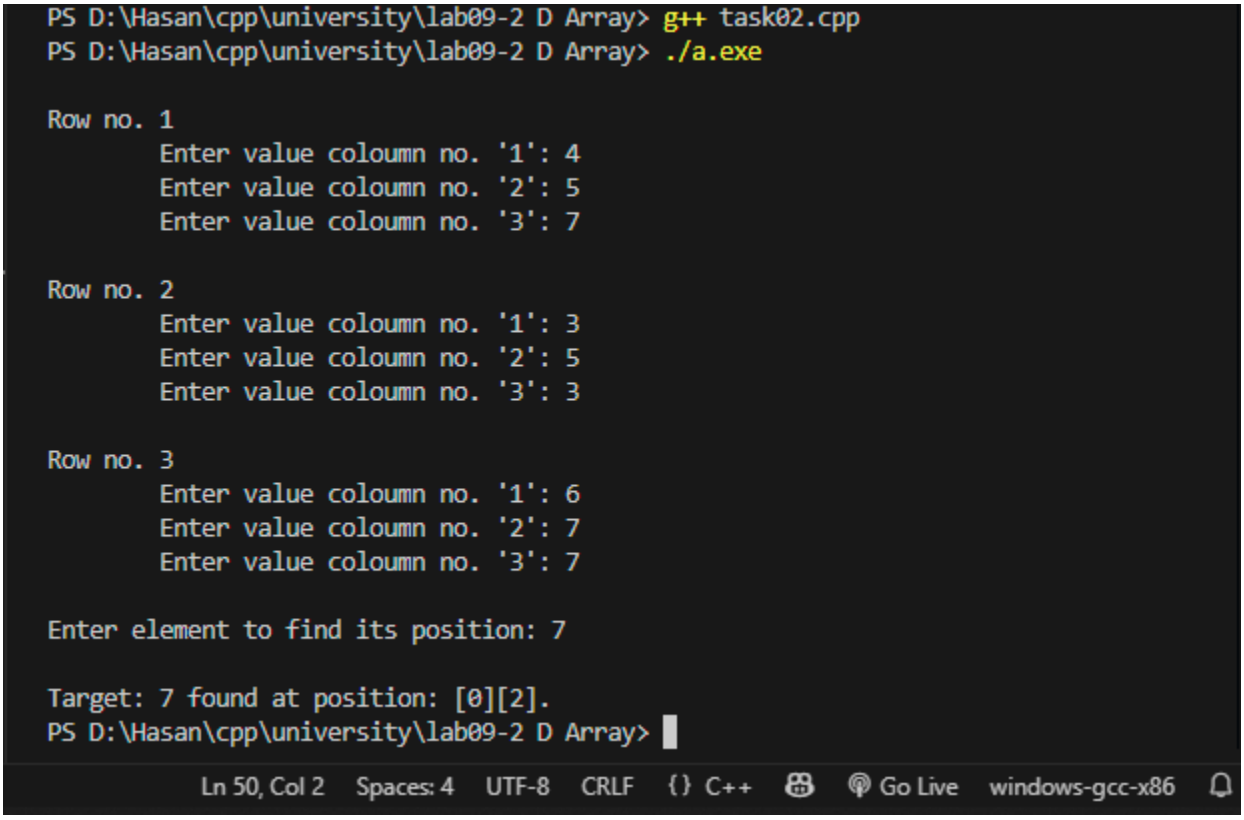
**Task 02:**

Write a program that takes a 3x3 matrix as input and asks for a number entered and prints out its position in the matrix. It displays not found if the number is not in the matrix.

**Code:**

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

int main(){
    int a[3][3];
    int target = 0;
    bool found = false;

    for(int i = 0; i < 3; i++){
        cout << "\nRow no. " << (i+1) << endl;
        for(int j = 0; j < 3; j++){
            cout << "\tEnter value coloumn no. '"<<(j+1)<<"': ";
            cin >> a[i][j];
        }
    }

    cout << "\nEnter element to find its position: ";
    cin >> target;

    int i, j;
    for(i = 0; i < 3; i++){
        for(j = 0; j < 3; j++){
            if(target == a[i][j]){
                found = true;
                break;
            }
        }
        if(found){
            break;
        }
    }
    if(found){
        cout << "\nTarget: " <<target<<" found at position: ["<<i<<"]["<<j<<"]."
<< endl;
    }
    else{
        cout << "\nTarget not found." << endl;
    }
}
```

**Output:**


PS D:\Hasan\cpp\university\lab09-2 D Array> g++ task02.cpp
PS D:\Hasan\cpp\university\lab09-2 D Array> ./a.exe
Row no. 1
Enter value coloumn no. '1': 4
Enter value coloumn no. '2': 5
Enter value coloumn no. '3': 7
Row no. 2
Enter value coloumn no. '1': 3
Enter value coloumn no. '2': 5
Enter value coloumn no. '3': 3
Row no. 3
Enter value coloumn no. '1': 6
Enter value coloumn no. '2': 7
Enter value coloumn no. '3': 7
Enter element to find its position: 7
Target: 7 found at position: [0][2].
PS D:\Hasan\cpp\university\lab09-2 D Array>
Ln 50, Col 2 Spaces: 4 UTF-8 CRLF {} C++ Go Live windows-gcc-x86

**Task 03:**

Write a program which calculates the transpose of a 3x3 matrix.

**Code:**

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


int main(){
    int a[3][3], aTrans[3][3];

    for(int i = 0; i < 3; i++){
        cout << "\nRow no. " << (i+1) << endl;
        for(int j = 0; j < 3; j++){
            cout << "\tEnter value coloumn no. '"<<(j+1)<<"': ";
            cin >> a[i][j];
        }
    }

    for(int i = 0; i < 3; i++){
        for(int j = 0; j < 3; j++){
            aTrans[i][j] = a[j][i];
        }
    }

    cout << "\nOriginal - Matrix" << endl;
    cout << "-------------------" << endl;
    for(int i = 0; i < 3; i++){
        for(int j = 0; j < 3; j++){
            cout << a[i][j] << " ";
        }
        cout << endl;
    }

    cout << "\nTranspose - Matrix" << endl;
    cout << "-------------------" << endl;
    for(int i = 0; i < 3; i++){
        for(int j = 0; j < 3; j++){
            cout << aTrans[i][j] << " ";
        }
        cout << endl;
    }
}
```

**Output:**

```
PS D:\Hasan\cpp\university\lab09-2 D Array> g++ task03.cpp
PS D:\Hasan\cpp\university\lab09-2 D Array> ./a.exe

Row no. 1
        Enter value coloumn no. '1': 4
        Enter value coloumn no. '2': 6
        Enter value coloumn no. '3': 89

Row no. 2
        Enter value coloumn no. '1': 4
        Enter value coloumn no. '2': 2
        Enter value coloumn no. '3': 5

Row no. 3
        Enter value coloumn no. '1': 7
        Enter value coloumn no. '2': 8
        Enter value coloumn no. '3': 9

Original - Matrix
------------------
4 6 89
4 2 5
7 8 9

Transpose - Matrix
------------------
4 4 7
6 2 8
89 5 9
PS D:\Hasan\cpp\university\lab09-2 D Array>
```

Ln 43, Col 2 Spaces: 4 UTF-8 CRLF {} C++ Go Live windows-gcc-x86