Assignment Solutions | 2D Arrays - 1 | Week 6

1. Write a program to store 10 at every index of a 2D matrix with 5 rows and 5 columns.

Solution :

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

int main(){
    int matrix[5][5];

    for(int i=0;i<5;i++){
        for(int j=0;j<5;j++){
            matrix[i][j] = 10;
        }
    }

    for(int i=0;i<5;i++){
        for(int j=0;j<5;j++){
            cout << matrix[i][j] << "  ";
        }
        cout<<endl;
    }
}
```

2. Write a program to add two matrices and save the result in one of the given matrices.

Input 1:

1 2 3

4 5 6

7 8 9

4 5 8

0 0 8

1 2 0

Output 1:

```
5 7 11
```

```
4 5 14
```

```
8 10 9
```

Solution :

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

int main(){

    int n , m;
    cout << "Enter the number of rows : ";
    cin >> n;

    cout << "Enter the number of columns : ";
    cin >> m;

    int a[n][m];
    cout << "Enter the first matrix : "<<endl;
    for(int i = 0 ; i < n ; i++){
        for(int j = 0 ; j < m ; j++){
            cin >> a[i][j];
        }
    }

    int b[n][m];
    cout << "Enter the second matrix : "<<endl;
    for(int i = 0 ; i < n ; i++){
```

Q3: Given a matrix ‘A’ of dimension n x m and 2 coordinates (l1, r1) and (l2, r2). Return the sum of the rectangle from (l1,r1) to (l2, r2).

Input 1:

1 2 -3 4

0 0 -4 2

1 -1 2 3

-4 -5 -7 0

l1 = 1, r1 = 2 , l2 = 3 , r2 = 3

Output 1: `−4`

Input 2:

1 2 -3 4

0 0 -4 2

1 -1 2 3

-4 -5 -7 0

l1 = 1, r1 = 0 , l2 = 0 , r2 = 3

Output 1: `2`

Solution :

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

int main(){

    int n,m;
    cout << "Enter the number of rows : ";
    cin >> n;
    cout << "Enter the number of columns : ";
    cin >> m;

    int a[n][m];
    cout << "Enter the matrix element : ";
    for(int i = 0 ; i < n ; i++){
        for(int j = 0 ; j < m ; j++){
            cin >> a[i][j];
        }
    }

    int l1 , l2 , r1 , r2;

    cout << "Enter the value of l1 coordinate : ";
    cin >> l1;
```

Q4: Write a C++ program to find the largest element of a given 2D array of integers.

Input 1:

1 3 4 6

2 4 5 7

3 5 6 8

4 6 7 9

Output 1: `9`

Solution :

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

int main(){

    int n , m;
    cout << "Enter the number of rows : ";
    cin >> n;

    cout << "Enter the number of columns : ";
    cin >> m;

    int a[n][n];
    cout << "Enter the matrix elements : ";
    for(int i = 0 ; i < n ; i++){
        for(int j = 0 ; j < m ; j++){
            cin >> a[i][j];
        }
    }

    int maximum = -1000000;

    for(int i = 0 ; i < n ; i++){
```

Q5: Write a program to print the row number having the maximum sum in a given matrix.

Input 1:

1 3 5 7

3 4 7 8

1 4 12 3

Output 1: `2`

Explanation : The 2nd row has the maximum sum i.e. 1+4+12+3 = 20

Solution :

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

int main(){

    int n , m;
    cout << "Enter the number of rows : ";
    cin >> n;

    cout << "Enter the number of columns : ";
    cin >> m;

    int a[n][n];
    cout << "Enter the matrix elements : ";
    for(int i = 0 ; i < n ; i++){
        for(int j = 0 ; j < m ; j++){
            cin >> a[i][j];
        }
    }

    int maximum = -1000000;
    int rowNumber = -1;
```

Q6: Write a function which accepts a 2D array of integers and its size as arguments and displays the elements of middle row and the elements of middle column.

[Assuming the 2D Array to be a square matrix with odd dimensions i.e. 3x3, 5x5, 7x7 etc...]

Input 1:

1 2 3 4 5

3 4 5 6 7

7 6 5 4 3

8 7 6 5 4

1 2 37 8 0

Output 1:

3

5

`7 6 5 4 3`

6

`37`

Solution :

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

int main(){

    int n;
    cout << "Enter the number of rows : ";
    cin >> n;

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

  cout << "The elements of the middle row and middle column are as follows :
"<<endl;
    int i,j;
        for(i = 0 ; i < n ; i++){
          for(int j = 0 ; j < n ; j++){
              if(i == n/2 or j == n/2)cout<<a[i][j]<<" ";
```
