Task#01:-

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

int main()
{
    int row, col;
    cout<<"Enter Number of rows: ";
    cin>>row;
    cout<<"Enter Number of col: ";
    cin>>col;
    int arr[row][col];


    cout<<"Enter the Array: "<<endl;

    for(int i=0;i<row;i++)   //Loop to take input for matrix.
    {
        for(int j=0;j<col;j++)
        {
            cout<<"Enter the element at "<<i<<j<<" :";
            cin>>arr[i][j];
        }
        cout<<endl;
    }

    cout<<"Matrix Before Transpose: "<<endl;
    for(int i=0;i<row;i++)
    {
        for(int j=0;j<col;j++)
        {
            cout<<arr[i][j]<<" ";
        }
        cout<<endl;
    }

    cout<<"The transpose is: "<<endl;

    for ( int i=0 ; i<col ; i++ )
    {
        for ( int j=0 ; j<row ; j++ )
        {
```

```
            cout<<arr[j][i]<<" ";    //Interchanging rows and columns for
transpose.
        }
        cout<<endl;
    }
    return 0;
}
```

Screenshot(TASK : 01):

```
Enter Number of rows: 2
Enter Number of col: 3
Enter the Array:
Enter the element at 00 :1
Enter the element at 01 :2
Enter the element at 02 :3

Enter the element at 10 :4
Enter the element at 11 :5
Enter the element at 12 :6

Matrix Before Transpose:
1 2 3
4 5 6
The transpose is:
1 4
2 5
3 6
```

Please see next Page.

Task#02:-

```
#include<iostream>
using namespace std;
int main()
{
    int row=4, col=3;
    int total=0;
    int marks[row][col];
    int Total[4];

    for(int i=0;i<row;i++)   //Taking input for 2d array as marks for each
subject
    {
        total=0;
        cout<<"Enter The marks of Student "<< i+1 <<": "<<endl;
        for(int j=0;j<col;j++)
        {
            cout<<"Subject "<<j+1<<": ";
            cin>>marks[i][j];

            total += marks[i][j];
        }
        Total[i]=total;   //Calculating total marks for 3 subjects of 1 student.

        cout<<endl;
    }

    cout<<endl<<endl;
    for(int i=0;i<row;i++)
    {
        cout<<"Total Marks of Student "<<i+1<<" is: "<<Total[i]<<endl;
    }

    int high=marks[0][0],low=marks[0][0];

    for(int i=0;i<row;i++)  //Loop to find lowest and highest marks
    {
        for(int j=0;j<col;j++)
        {
            if(marks[i][j]>high)
            {
                high = marks[i][j];
            }
```

```
            if(marks[i][j]<low)
            {
                low=marks[i][j];
            }
        }
    }

    cout<<"The highest score is: "<<high<<endl;
    cout<<"The lowest score is: "<<low<<endl;



    return 0;
}
```

Screenshot(TASK : 02):

```
Enter The marks of Student 1:
Subject 1: 90
Subject 2: 98
Subject 3: 87

Enter The marks of Student 2:
Subject 1: 12
Subject 2: 57
Subject 3: 34

Enter The marks of Student 3:
Subject 1: 91
Subject 2: 70
Subject 3: 65

Enter The marks of Student 4:
Subject 1: 43
Subject 2: 89
Subject 3: 80



Total Marks of Student 1 is: 275
Total Marks of Student 2 is: 103
Total Marks of Student 3 is: 226
Total Marks of Student 4 is: 212
The highest score is: 98
The lowest score is: 12
```

Task#03:-

```
#include<iostream>
using namespace std;
int main()
{
    int order;
    cout<<"Enter Order of 2D Array: ";
    cin>>order;

    int arr[order][order];  //For square matrix, rows = columns.
    cout<<"Enter the elements of Array: "<<endl;

    for(int i=0;i<order;i++)   //Loop to take input for Array
    {
        for(int j=0;j<order;j++)
        {
            cin>>arr[i][j];
        }
    }

    int sumrows=0;
    int sumcol=0;
    int sumd1=0;   //Stores the sum of maindiagonal
    int sumd2=0;     //stores the sum of other diagonal;

    int SUMROWS[order];  //it will store sum of number of each row.
    int SUMCOL[order];  //it will store sum of number of each column.


    for(int i=0;i<order;i++)   //Loop to go through array.
    {
        sumrows=0;
        for(int j=0;j<order;j++) //Loop to sum each row.
        {
            sumrows += arr[i][j];
        }


        SUMROWS[i] = sumrows;
    }

    for(int i=0;i<order;i++)   //Loop to go through array.
    {
        sumcol=0;
```

```
        for(int j=0;j<order;j++)       //Loop to find sum of each column
            {
                sumcol+=arr[j][i];
            }

        SUMCOL[i]=sumcol;
    }

    for(int i=0;i<order;i++)   //   This loop calculates only the sum of main
diagonal(diagonal from left to right)
    {

        for(int j=0;j<order;j++)
        {
            if(i==j )    //for diagonal elements, row number = column number.
            {
                sumd1+=arr[i][j];
            }


        }

    }

    for(int i=0;i<order;i++)
    {
        for(int j=order-1;j>0;j--)
        {
            sumd2 += arr[i][j-i];
            break;  //Inner for loop breaks because we have to pick only one
element from each row.
        }
    }

    int checker=sumd2;  //This number will store the sum of this diagonal and we
will compare if all other are equal or not, to decide for magic square.


    bool check=true;

    for(int i=0;i<order;i++)
    {

        if(SUMCOL[i]!=checker || SUMROWS[i]!=checker)
        {
```

```
            check=false;
        }
    }

    if(sumd1!=checker)   //NO need to check for sum of other diagonal. Because
checker is that same thing.
    {
        check==false;
    }

    cout<<endl;

    if(!check)    //To decide if it is a magic box
    {
        cout<<"\n\n\tNot a Magic Box"<<endl;
    }
    else
        cout<<"\n\n\tMagic Box";

    return 0;
}
```

Screenshot#1(TASK : 03):

```
Enter Order of 2D Array: 4
Enter the elements of Array:
1 2 3 4
5 6 7 8
1 2 3 4
5 6 7 8



        Not a Magic Box
```

Screenshot#2(TASK : 03):

```
Enter Order of 2D Array: 3
Enter the elements of Array:
4 4 4
4 4 4
4 4 4



        Magic Box
```