

7a. Sum of two 2-D arrays

```
#include <stdio.h>
int main()
{
    int a[100][100], b[100][100], result[100][100], r, c;
    printf("Enter the number of row=");
    scanf("%d", &r);
    printf("Enter the number of column=");
    scanf("%d", &c);
    // Taking input using nested for loop
    printf("Enter elements of 1st matrix\n");
    for (int i = 0; i < r; i++)
    {
        for (int j = 0; j < c; j++)
        {
            scanf("%d", &a[i][j]);
        }
    }
    // Taking input using nested for loop
    printf("Enter elements of 2nd matrix\n");
    for (int i = 0; i < r; i++)
    {
        for (int j = 0; j < c; j++)
        {
            scanf("%d", &b[i][j]);
        }
    }
    // adding corresponding elements of two matrices
    for (int i = 0; i < r; i++)
        for (int j = 0; j < c; j++)
        {
            result[i][j] = a[i][j] + b[i][j];
        }

    // Displaying the sum
    printf("Sum Of Matrix:\n");

    for (int i = 0; i < r; ++i)
```

```

    {
        for (int j = 0; j < c; ++j)
        {
            printf("%d\t", result[i][j]);
        }
        printf("\n");
    }
    return 0;
}

```

OUTPUT :

```

Enter the number of row=4
Enter the number of column=4
Enter elements of 1st matrix
12 34 56 76 98 1 2 3 4 5 6 7 8 9 8 7
Enter elements of 2nd matrix
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Sum Of Matrix:
13    36    59    80
103   7     9     11
13    15    17    19
21    23    23    23

```

7b. Multiplication of two 2-D arrays

```

#include<stdio.h>
int main()
{
    int a[10][10],b[10][10],mul[10][10],r,c,i,j,k;

    printf("Enter the number of row=");
    scanf("%d",&r);
    printf("Enter the number of column=");
    scanf("%d",&c);

    printf("Enter the first matrix element=\n");

```

```

for(i=0;i<r;i++)
{
    for(j=0;j<c;j++)
    {
        scanf("%d",&a[i][j]);
    }
}
printf("Enter the second matrix element=\n");
for(i=0;i<r;i++)
{
    for(j=0;j<c;j++)
    {
        scanf("%d",&b[i][j]);
    }
}

printf("Multiplication of the matrix=\n");
for(i=0;i<r;i++)
{
    for(j=0;j<c;j++)
    {
        mul[i][j]=0;
        for(k=0;k<c;k++)
        {
            mul[i][j]+=a[i][k]*b[k][j];
        }
    }
}

//for printing result
for(i=0;i<r;i++)
{
    for(j=0;j<c;j++)
    {
        printf("%d\t",mul[i][j]);
    }
    printf("\n");
}
return 0;
}

```

OUTPUT :

```
Enter the number of row=3
Enter the number of column=3
Enter the first matrix element=
1 2 3 4 5 6 7 8 9
Enter the second matrix element=
9 8 7 6 5 4 3 2 1
Multiplication of the matrix=
30    24    18
84    69    54
138   114    90
```

7c. Transpose of a Matrix

```
#include<stdio.h>
int main()
{
    int i, j, mat[100][100], trans[100][100], ROW, COL;
    printf("Enter the number of rows = ");
    scanf("%d", &ROW);
    printf("Enter the number of columns = ");
    scanf("%d", &COL);
    printf("Enter matrix:\n ");
    // input matrix
    for(i = 0; i < ROW; i++)
    {
        for(j = 0; j < COL; j++)
        {
            scanf("%d", &mat[i][j]);
        }
    }
    // create transpose
    for(i = 0; i < ROW; i++)
    {
        for(j = 0; j < COL; j++)
        {
```

```

        trans[j][i] = mat[i][j];
    }
}
printf("Transpose matrix:\n ");
// print transpose
for(i = 0; i < COL; i++)
{
    for(j = 0; j < ROW; j++)
    {
        printf("%d\t ", trans[i][j]);
    }
    printf("\n ");
}
return 0;
}

```

Output:

```

Enter the number of rows = 3
Enter the number of columns = 3
Enter matrix:
1 2 3 4 5 6 7 8 9
Transpose matrix:
1      4      7
2      5      8
3      6      9

```

7d. Trace of a Matrix

```

#include <stdio.h>
int main()
{
    int i, j, rows, columns, trace = 0 ,Tra_arr[rows][columns];
    printf("Enter Matrix Rows = ");
    scanf("%d", &rows);
    printf("Enter Matrix Columns = ");
    scanf("%d",&columns);
    printf("Please Enter the Matrix Items = \n");
    for (i = 0; i < rows; i++)
    {
        for (j = 0; j < columns; j++)
        {

```

```

        scanf("%d", &Tra_arr[i][j]);
        printf("%d\t",Tra_arr[i][j]);
    }
    printf("\n");
}

for (i = 0; i < rows; i++)
{
    for (j = 0; j < columns; j++)
    {
        if (i == j)
        {
            trace = trace + Tra_arr[i][j];
        }
    }
}

printf("The Trace Of the Matrix = %d\n",trace);
}

```

OUTPUT :

```

Enter Matrix Rows = 3
Enter Matrix Columns = 3
Please Enter the Matrix Items =
1 2 3 4 5 6 7 8 9
1    2    3
4    5    6
7    8    9
The Trace Of the Matrix = 15

```

7e.Lower Triangular.

```

#include <stdio.h>
int main()
{
    int i,j;
    int Max_Row;
    int Max_Column;

    printf("Enter the Number of Rows: ");
    scanf("%d", &Max_Row);

    printf("Enter the Number of Columns: ");
    scanf("%d", &Max_Column);
}

```

```

int M[Max_Row][Max_Column];

printf("Enter the Elements in the Matrix: \n");
for (i = 0; i < Max_Row; i++)
{
    for (j = 0; j < Max_Column; j++)
    {
        scanf("%d",&M[i][j]);
    }
}

// Lower Triangular Matrix Logic
for (i = 0; i < Max_Row; i++)
{
    for (j = 0; j < Max_Column; j++)
    {
        if (i < j)
        {
            M[i][j] = 0;
        }
    }
}

printf("The Lower Traingular Matrix is: \n");
for (i = 0; i < Max_Row; i++)
{
    for (j = 0; j < Max_Column; j++)
    {
        printf("%d ", M[i][j]);
    }
    printf("\n");
}

return 0;
}

```

Output:

```

Enter the Number of Rows: 3
Enter the Number of Columns: 3
Enter the Elements in the Matrix:
1 2 3 4 5 6 7 8 9
The Lower Traingular Matrix is:
1 0 0
4 5 0
7 8 9

```