

Lecture 8

**Programs for Single dimensional
and 2D Array**



Even & odd number in array

```
#include <stdio.h>
void main()
{
int array[100], i, num;
printf("Enter the size of an array \n");
scanf("%d", &num);
printf("Enter the elements of the array \n");
for (i = 0; i < num; i++)
{
scanf("%d", &array[i]);
}
printf("Even numbers in the array are - ");
for (i = 0; i < num; i++)
{
if (array[i] % 2 == 0)
{
printf("%d \t", array[i]);
}
}
printf("\n Odd numbers in the array are -");
for (i = 0; i < num; i++)
{
if (array[i] % 2 != 0)
{
printf("%d \t", array[i]);
}
}
}
```

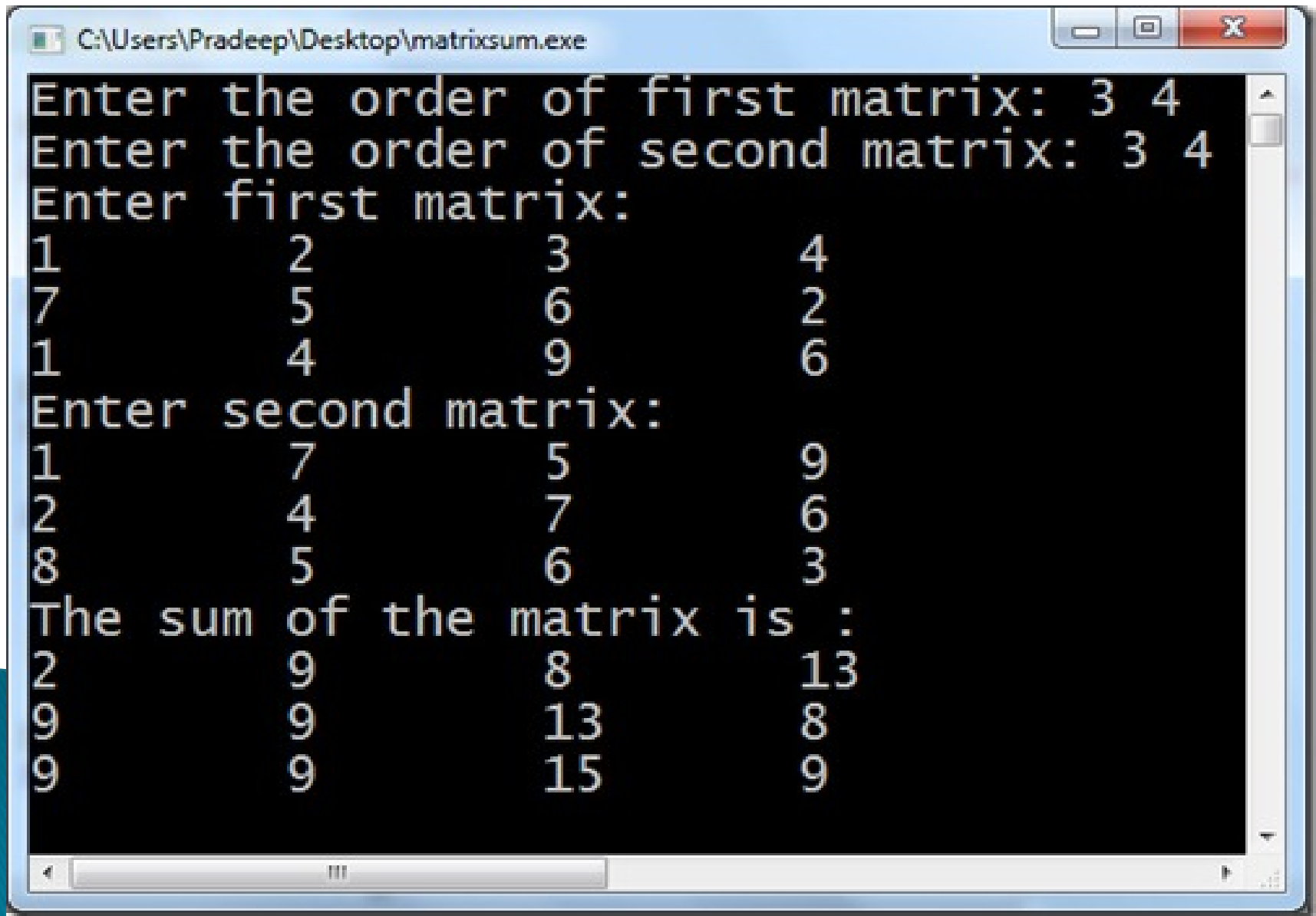
//Sum of two matrices using two dimensional array

```
#include<stdio.h>
#include<stdlib.h>
int main(){
    int matrix1[10][10], matrix2[10][10],
    sum[10][10], i, j, m,n,p,q;
    printf("Enter the order of first matrix: ");
    scanf("%d%d",&m,&n);
    printf("Enter the order of second matrix: ");
    scanf("%d%d",&p,&q);
    if(m!=p && n!=q){
        printf("Order of matrix did not
matched!!");
        exit(0);
    }
    printf("Enter first matrix: \n");
    for(i = 0 ; i < m; i++){
        for(j = 0; j < n; j++)
            scanf("%d", &matrix1 [i][j]);
    }
    printf("Enter second matrix: \n");
    for(i = 0 ; i < p; i++){
        for(j = 0; j < q; j++)
            scanf("%d", &matrix2[i][j]);
    }
}
```

```
for(i = 0 ; i < m; i++){
    for(j = 0; j < n; j++){
        sum[i][j] = matrix1 [i][j] +
matrix2[i][j];
    }

printf("The sum of the matrix is :\n");
for(i = 0 ; i < m; i++){
    for(j = 0; j < n; j++){
        printf("%d", sum[i][j]);
        printf("\t");
    }
    printf("\n");
}
return 0;
}
```

Program :



```
C:\Users\Pradeep\Desktop\matrixsum.exe
Enter the order of first matrix: 3 4
Enter the order of second matrix: 3 4
Enter first matrix:
1      2      3      4
7      5      6      2
1      4      9      6
Enter second matrix:
1      7      5      9
2      4      7      6
8      5      6      3
The sum of the matrix is :
2      9      8      13
9      9      13     8
9      9      15     9
```

MULTIPLICATION OF TWO MATRICES

```
#include<stdio.h>
int main()
int a[5][5],b[5][5],c[5][5],i,j,k,sum=0,m,n,o,p;
printf("\nEnter the row and column of first matrix");
scanf("%d %d",&m,&n);
printf("\nEnter the row and column of second matrix");
scanf("%d %d",&o,&p);
if(n!=o)
{
printf("Matrix mutiplication is not possible");
printf("\nColumn of first matrix must be same as row of second matrix");
}
Else
{
printf("\nEnter the First matrix->");
for(i=0;i<m;i++)
for(j=0;j<n;j++)
scanf("%d",&a[i][j]);
printf("\nEnter the Second matrix->");
for(i=0;i<o;i++)
for(j=0;j<p;j++)
scanf("%d",&b[i][j]);
printf("\nThe First matrix is\n");
for(i=0;i<m;i++)
{
printf("\n");
for(j=0;j<n;j++)
{
printf("%d\t",a[i][j]);
}
}
\t",b[i][j]);
}
```

```
printf("\nThe Second matrix is\n");
for(i=0;i<o;i++)
{
printf("\n");
for(j=0;j<p;j++)
{
("%d\t",b[i][j]);
}
for(i=0;i<m;i++)
for(j=0;j<p;j++)
c[i][j]=0;
for(i=0;i<m;i++)
{
//row of first matrix
for(j=0;j<p;j++)
{
//column of second matrix
sum=0;
for(k=0;k<n;k++)
sum=sum+a[i][k]*b[k][j];
c[i][j]=sum;
}
}
printf("\nThe multiplication of two matrix is\n");
for(i=0;i<m;i++)
{
printf("\n");
for(j=0;j<p;j++)
{
printf("%d\t",c[i][j]);
}
}
return 0;
}
```

Two Dimensional Array :

Multiplication of two matrixes:

Rule: Multiplication of two matrixes is only possible if first matrix has size $m \times n$ and other matrix has size $n \times r$.

Where m , n and r are any positive integer

Multiplication of two matrixes is defined as

$$[AB]_{i,j} = \sum_{s=1}^n A_{i,s} B_{s,j}$$

Where $1 \leq i \leq m$ and $1 \leq j \leq n$

Two Dimensional Array :

For example:

Suppose two matrixes A and B of size of 2 x 2 and 2 x 3 respectively.

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} \quad B = \begin{pmatrix} 5 & 6 & 7 \\ 8 & 9 & 10 \end{pmatrix}$$

Multiplication of two matrixes:

$$A * B = \begin{pmatrix} 1*5 + 2*8 & 1*6 + 2*9 & 1*7 + 2*10 \\ 3*5 + 4*8 & 3*6 + 4*9 & 3*7 + 4*10 \end{pmatrix}$$

$$A * B = \begin{pmatrix} 21 & 24 & 27 \\ 47 & 54 & 61 \end{pmatrix}$$

C program to find transpose of given matrix

```
#include<stdio.h>
int main(){
int a[10][10],b[10][10],i,j,k=0,m,n;
printf("\nEnter the row and column of matrix");
scanf("%d %d",&m,&n);
printf("\nEnter the First matrix->");
for(i=0;i<m;i++)
for(j=0;j<n;j++)
scanf("%d",&a[i][j]);
printf("\nThe matrix is\n");
for(i=0;i<m;i++){
printf("\n");
for(j=0;j<n;j++){
printf("%d\t",a[i][j]);
}
}
for(i=0;i<m;i++)
for(j=0;j<n;j++)
b[i][j]=0;
for(i=0;i<m;i++){
for(j=0;j<n;j++){
b[i][j]=a[j][i];
printf("\n%d",b[i][j]);
}
}
}
```

```
printf("\n\nTraspose of a matrix
is -> ");
for(i=0;i<m;i++){
printf("\n");
for(j=0;j<n;j++){
printf("%d\t",b[i][j]);
}
}
return 0;
}
```