**Assignment – 16**

**A Job Ready Bootcamp in C++, DSA and IOT**

**Multi-Dimensional Array in C Language**

1. Write a program to calculate the sum of two matrices each of order 3x3.

#include<stdio.h>

int main()

{

int a[3][3],b[3][3],c[3][3];

int i,j;

printf("Enter first array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&a[i][j]);

}

printf("\n");

printf("Enter second array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&b[i][j]);

}

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

c[i][j]=a[i][j]+b[i][j];

}

printf("\nSum of two array is=>\n");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

printf("%d ",c[i][j]);

}

printf("\n");

}

return 0;

}

1. Write a program to calculate the product of two matrices each of order 3x3.

#include<stdio.h>

int main()

{

int a[3][3],b[3][3],c[3][3];

int i,j,k,sum=0;

printf("Enter first array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&a[i][j]);

}

printf("\n");

printf("Enter second array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&b[i][j]);

}

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

for(k=0;k<3;k++)

{

sum=sum+(a[i][k]\*b[k][j]);

}

c[i][j]=sum;

sum=0;

}}

printf("\nProduct of two array is=>\n");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

printf("%d ",c[i][j]);

}

printf("\n");

}

return 0;

}

1. Write a program in C to find the transpose of a given matrix.

#include<stdio.h>

int main()

{

int a[3][3],b[3][3];

int i,j;

printf("Enter array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&a[i][j]);

}

printf("\n");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

b[i][j]=a[j][i];

}

printf("Transepose of array element is \n");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

printf("%d ",b[i][j]);

}

printf("\n");

}

return 0;

}

1. Write a program in C to find the sum of right diagonals of a matrix.

#include<stdio.h>

int main()

{

int a[3][3];

int i,j,sum=0;

printf("Enter array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&a[i][j]);

}

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

if(i==j)

{

sum=sum+a[i][j];

}

}

}

printf("Sum of right diagonal of a matrix is %d ",sum);

return 0;

}

1. Write a program in C to find the sum of left diagonals of a matrix.

6. Write a program in C to find the sum of rows and columns of a Matrix.

#include<stdio.h>

int main()

{

int a[3][3],r[3],c=1,sum=0;

int i,j;

printf("Enter array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&a[i][j]);

}

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

sum=sum+a[i][j];

}

printf("Sum of no.%d row is=>%d\n",c,sum);

c++;

sum=0;

}

printf("\n");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

sum=sum+a[j][i];

}

printf("Sum of no.%d column is=>%d\n",c,sum);

c++;

sum=0;

}

return 0;

}

7.Write a program in C to print or display the lower triangular of a given matrix.

#include<stdio.h>

int main()

{

int a[3][3];

int i,j;

printf("Enter array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&a[i][j]);

}

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

if(j>i)

{

a[i][j]=0;

printf("%d ",a[i][j]);

}

else{

printf("%d ",a[i][j]);

}

}

printf("\n");

}

return 0;

}

8. Write a program in C to print or display an upper triangular matrix.

#include<stdio.h>

int main()

{

int a[3][3];

int i,j;

printf("Enter array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&a[i][j]);

}

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

if(i>j)

{

a[i][j]=0;

printf("%d ",a[i][j]);

}

else{

printf("%d ",a[i][j]);

}

}

printf("\n");

}

return 0;

}

9. Write a program in C to accept a matrix and determine whether it is a sparse matrix.

#include<stdio.h>

int main()

{

int a[3][3];

int i,j,count=0;

float p;

printf("Enter array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&a[i][j]);

}

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

if(a[i][j]==0)

{

count++;

}

}

}

p=count/9\*100; //you can remove this line when you write if(count>9/2) condition

if(p<50) //here we can write => if(count>9/2)

printf("Spark matrix");

else

printf("Densee matrix");

return 0;

}

10. Write a program in C to find the row with maximum number of 1s

#include<stdio.h>

int main()

{

int a[3][3];

int i,j,max=0,sum=0;

float p;

printf("Enter array element");

for(i=0;i<3;i++)

{

for(j=0;j<3;j++)

scanf("%d",&a[i][j]);

}

for(i=0;i<3;i++)

{

for(j=0;j<3;j++){

if(a[i][j]==1)

{

sum=sum+a[i][j];

}if(sum>max)

{

max=sum;

index=i;

}

}

}printf("Maximum 1 is %d in the array",max);

return 0;

}