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**2D-Array Questions**

Ques.1 Write a C program to add two matrices.

Sol.

#include <stdio.h>

int main()

{

int n,m;

scanf("%d %d",&n,&m);

int a[n][m],b[n][m],i,j;

printf("enter elements in an array1 \n");

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

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

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

}

}

printf("enter elements in an array2 \n");

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

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

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

}

}

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

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

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

}

printf("\n");

}

return 0;

}

Ques.2 Write a C program to subtract two matrices.

Sol.

#include <stdio.h>

int main()

{

int n,m;

scanf("%d %d",&n,&m);

int a[n][m],b[n][m],i,j;

printf("enter elements in an array1 \n");

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

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

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

}

}

printf("enter elements in an array2 \n");

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

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

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

}

}

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

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

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

}

printf("\n");

}

return 0;

}

Ques.3 Write a C program to perform scalar matrix mutliplication.

Sol.

#include <stdio.h>

int main()

{

int n,m;

scanf("%d %d",&n,&m);

int a[n][m],i,j;

printf("enter elements in an array \n");

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

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

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

}

}

int k;

printf("enter the scalar element");

scanf("%d",&k);

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

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

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

}

printf("\n");

}

return 0;

}

Ques.4 Write a C program to perform multiply two matrices.

Sol.

#include <stdio.h>

int main()

{

int x,y,i,j,p,q,k;

printf("Enter Number of rows 1st matrix");

scanf("%d",&x);

printf("Enter Number of cols 1st matrix");

scanf("%d",&y);

printf("Enter Elements of 1st matrix");

int a[x][y];

for(i=0;i<x;i++){

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

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

}

}

printf("Enter Number of rows 2nd matrix");

scanf("%d",&p);

printf("Enter Number of cols 2nd matrix");

scanf("%d",&q);

printf("Enter Elements of 2nd matrix");

int b[p][q];

for(i=0;i<x;i++){

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

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

}

}

if(y==p){

printf("\n");

printf("product of matrice is \n");

int c[x][q];

for(i=0;i<x;i++){

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

c[i][j]=0;

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

{c[i][j]=a[i][k]\*b[k][j]+c[i][j];}

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

}

printf("\n");

}

}

else{

printf("product not possible");

}

return 0;

}

Ques.5 Write a C program to check whether two matrices are equal or not.

Sol.

#include <stdio.h>

int main()

{

int x,y,i,j,p,q,flag;

printf("Enter Number of rows 1st matrix");

scanf("%d",&x);

printf("Enter Number of cols 1st matrix");

scanf("%d",&y);

printf("Enter Elements of 1st matrix");

int a[x][y];

for(i=0;i<x;i++){

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

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

}

}

printf("Enter Number of rows 2nd matrix");

scanf("%d",&p);

printf("Enter Number of cols 2nd matrix");

scanf("%d",&q);

printf("Enter Elements of 2nd matrix");

int b[p][q];

for(i=0;i<x;i++){

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

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

}

}

if(x==p && y==q){

for(i=0;i<x;i++){

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

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

flag=1;

}

}

}

else{

flag=0;

}

if(flag==1){

printf("equal matrices");

}

else{

printf("not equal matrices");

}

return 0;

}

Ques.6 Write a C program to find sum of main diagonal elements of a matrix.

Sol.

#include <stdio.h>

int main()

{

int x,i,j,sum=0;

printf("Enter order of the matrix");

scanf("%d",&x);

printf("Enter Elements of matrix");

int a[x][x];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

for(i=0;i<x;i++){

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

if(i==j)

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

}

}

printf("%d",sum);

return 0;

}

Ques.7 Write a C program to find sum of minor diagonal elements of a matrix.

Sol.

#include <stdio.h>

int main()

{

int x,i,j,sum=0;

printf("Enter order of the matrix");

scanf("%d",&x);

printf("Enter Elements of matrix");

int a[x][x];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

for(i=0;i<x;i++){

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

if(i+j==(x-1))

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

}

}

printf("sum is %d",sum);

return 0;

}

Ques.8 Write a C program to find sum of each row and column of a matrix.

Sol.

#include <stdio.h>

int main()

{

int x,y,i,j,sum1=0,sum2=0;

printf("Enter rows of the matrix");

scanf("%d",&x);

printf("Enter coulmns of the matrix");

scanf("%d",&y);

printf("Enter Elements of matrix");

int a[x][y];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

for(i=0;i<x;i++){

sum1=0;

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

sum1=sum1+a[i][j];

}

printf("sum of rows is %d \n",sum1);

}

for(i=0;i<y;i++){

sum2=0;

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

sum2=sum2+a[j][i];

}

printf("sum of columns is %d \n",sum2);

}

return 0;

}

Ques.9 Write a C program to interchange diagonals of a matrix.

Sol.

#include <stdio.h>

int main()

{

int x,y,i,j,t;

printf("Enter Number of rows matrix");

scanf("%d",&x);

printf("Enter Number of cols matrix");

scanf("%d",&y);

printf("Enter Elements of matrix");

int a[x][y];

for(i=0;i<x;i++){

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

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

}

}

printf("Matrix is\n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

// printf("\n");

for(i=0;i<x;i++){

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

if(i==j)

{

t=a[i][j];

a[i][j]=a[i][y-j-1];

a[i][y-j-1]=t;

}

}}

printf("Matrix digonal swapped\n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

return 0;

}

Ques.10 Write a C program to find upper triangular matrix.

Sol.

#include <stdio.h>

int main()

{

int x,i,j;

printf("Enter order of the matrix");

scanf("%d",&x);

printf("Enter Elements of matrix");

int a[x][x];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

printf("upper traingular matrix is: \n");

for(i=0;i<x;i++){

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

if(i>j)

a[i][j]=0;

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

}

printf("\n");

}

return 0;

}

Ques.11 Write a C program to find lower triangular matrix.

Sol.

#include <stdio.h>

int main()

{

int x,i,j;

printf("Enter order of the matrix");

scanf("%d",&x);

printf("Enter Elements of matrix");

int a[x][x];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

printf("upper traingular matrix is: \n");

for(i=0;i<x;i++){

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

if(i<j)

a[i][j]=0;

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

}

printf("\n");

}

return 0;

}

Ques.12 Write a C program to find sum of upper triangular matrix.

Sol.

#include <stdio.h>

int main()

{

int x,i,j,sum=0;

printf("Enter order of the matrix");

scanf("%d",&x);

printf("Enter Elements of matrix");

int a[x][x];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

printf("upper traingular matrix is: \n");

for(i=0;i<x;i++){

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

if(i>j)

a[i][j]=0;

else

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

}

}

printf("%d",sum);

return 0;

}

Ques.13 Write a C program to find sum of lower triangular matrix.

Sol.

#include <stdio.h>

int main()

{

int x,i,j,sum=0;

printf("Enter order of the matrix");

scanf("%d",&x);

printf("Enter Elements of matrix");

int a[x][x];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

printf("upper traingular matrix is: \n");

for(i=0;i<x;i++){

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

if(i<j)

a[i][j]=0;

else

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

}

}

printf("%d",sum);

return 0;

}

Ques.14 Write a C program to find transpose of a matrix.

Sol.

#include <stdio.h>

int main()

{

int x,y,i,j;

printf("Enter rows of the matrix");

scanf("%d",&x);

printf("Enter columns of the matrix");

scanf("%d",&y);

printf("Enter Elements of matrix");

int a[x][y],t[y][x];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

for(i=0;i<x;i++){

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

t[j][i]=a[i][j];

}

}

printf("transpose of matrix is: \n");

for(i=0;i<y;i++){

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

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

}

printf("\n");

}

return 0;

}

Ques.16 Write a C program to check identity matrix.

Sol.

#include <stdio.h>

int main()

{

int x,i,j,flag=0;

printf("Enter order of the matrix");

scanf("%d",&x);

printf("Enter Elements of matrix");

int a[x][x];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

for(i=0;i<x;i++){

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

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

flag=1;

else if(i!=j && a[i][j]!=0)

flag=1;

}

}

if(flag==0)

printf("identity");

else

printf("not");

return 0;

}

Ques.17 Write a C program to check sparse matrix.

Sol.

#include <stdio.h>

int main()

{

int x,y,i,j,count=0;

printf("Enter rows of the matrix");

scanf("%d",&x);

printf("Enter columns of the matrix");

scanf("%d",&y);

printf("Enter Elements of matrix");

int a[x][y];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

for(i=0;i<x;i++){

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

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

count++;

}

}

if(count>(x\*y)/2)

printf("sparse");

else

printf("not");

return 0;

}

Ques.18 Write a C program to check symmetric matrix.

Sol.

#include <stdio.h>

int main()

{

int x,i,j,flag=0;

printf("Enter order of the matrix");

scanf("%d",&x);

printf("Enter Elements of matrix");

int a[x][x],t[x][x];

for(i=0;i<x;i++){

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

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

}

}

printf("matrix is: \n");

for(i=0;i<x;i++){

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

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

}

printf("\n");

}

for(i=0;i<x;i++){

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

t[j][i]=a[i][j];

}

}

for(i=0;i<x;i++){

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

if(t[i][j]!=a[i][j])

flag=-1;

}

}

if(flag==0)

printf("symmetric");

else

printf("not");

return 0;

}