**DS lab**

**2D operations**

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#include<math.h>

#include <stdio.h>

void create();

void rowtraverse(int a[20][20],int row,int col);

void coltraverse(int a[20][20],int row,int col);

void add();

void mul();

void sub();

void transpose();

void divi();

void main()

{

int ch;

char op;

label:

printf("what you want to perform?\n1) traverse a 2D matrix\n2) Add two 2D matrix\n3) multiplication of two 2D matrix\n4)subbtraction of two 2D array\n5)transpose\n6)division\n");

scanf("%d",&ch);

switch (ch){

case 1:

create();

break;

case 2:

add();

break;

case 3:

mul();

break;

case 4:

sub();

break;

case 5:

transpose();

break;

case 6:

divi();

break;

default:

printf("invaid");

break;

}

printf("type y to continue");

scanf("%c",&op);

if(op=='y'){ goto label;}

}

void create()

{

int r=0,c=0,row,col,a[20][20],ch;

printf("how many row and column you want to eter\n");

scanf("%d %d",&row,&col);

printf("now enter them\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a[r][c]);

}

}

rowtraverse(a,row,col);

coltraverse(a,row,col);

}

void rowtraverse(int a[20][20],int row,int col)

{

printf("row major traverse\n");

for(int r=0;r<row;r++)

{

for(int c=0;c<col;c++)

{

printf("%d ",a[r][c]);

}

printf("\n");

}

}

void coltraverse(int a[20][20],int row,int col)

{

printf("column major traverse\n");

for(int c=0;c<col;c++)

{

for(int r=0;r<row;r++)

{

printf("%d ",a[r][c]);

}

printf("\n");

}

}

void add()

{

int r=0,c=0,a1[20][20],a2[20][20],ch,row,col,a3[20][20],m,n;

printf("how many row and column you want to eter \n ");

scanf("%d %d",&row,&col);

printf("enter MATRIX 1\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a1[r][c]);

}

}

printf("enter MATRIX 2\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a2[r][c]);

}

}

printf("addition is \n");

for(int r=0;r<row;r++)

{

for(int c=0;c<col;c++)

{

a3[r][c]=a1[r][c]+a2[r][c];

printf("%d ",a3[r][c]);

}

printf("\n");

}

}

void mul(){

int r=0,c=0,a1[20][20],a2[20][20],ch,row,col,a3[20][20],m,n;

printf("how many row and column you want to eter \n ");

scanf("%d %d",&row,&col);

printf("enter MATRIX 1\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a1[r][c]);

}

}

printf("enter MATRIX 2\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a2[r][c]);

}

}

printf("multiplication is \n");

for(int r=0;r<row;r++)

{

for(int c=0;c<col;c++)

{

a3[r][c]=a1[r][c] \* a2[r][c];

printf("%d ",a3[r][c]);

}

printf("\n");

}

}

void sub(){

int r=0,c=0,a1[20][20],a2[20][20],ch,row,col,a3[20][20],m,n;

printf("how many row and column you want to eter \n ");

scanf("%d %d",&row,&col);

printf("enter MATRIX 1\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a1[r][c]);

}

}

printf("enter MATRIX 2\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a2[r][c]);

}

}

printf("subtraction is \n");

for(int r=0;r<row;r++)

{

for(int c=0;c<col;c++)

{

a3[r][c]=a1[r][c] - a2[r][c];

printf("%d ",a3[r][c]);

}

printf("\n");

}

}

void transpose(){

int r=0,c=0,row,col,a[20][20],transpose[20][20] ;

printf("how many row and column you want to eter\n");

scanf("%d %d",&row,&col);

printf("now enter the\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a[r][c]);

}

}

for (int i = 0; i < row; ++i)

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

transpose[j][i] = a[i][j];

}

printf("\nTranspose of the matrix:\n");

for (int i = 0; i < c; ++i)

for (int j = 0; j < r; ++j) {

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

if (j == row - 1)

printf("\n");

}

}

void divi(){

int r=0,c=0,a1[20][20],a2[20][20],ch,row,col,a3[20][20],m,n;

printf("how many row and column you want to eter \n ");

scanf("%d %d",&row,&col);

printf("enter MATRIX 1\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a1[r][c]);

}

}

printf("enter MATRIX 2\n");

for(r=0;r<row;r++)

{

for(c=0;c<col;c++)

{

scanf("%d",&a2[r][c]);

}

}

printf("division is \n");

for(int r=0;r<row;r++)

{

for(int c=0;c<col;c++)

{

a3[r][c]=a1[r][c] / a2[r][c];

printf("%d ",a3[r][c]);

}

printf("\n");}}

