DATA STRUCTURE – 1

LAB-2

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2-d array declare and initialize

Program:

main.c

```c
//S.Praveen kumar
//AIE ch.en.u4aie22048
// lab-2

//declare and initialize

#include <stdio.h>
int main()
{
    int m,n,i,j;
    printf("Enter the row size of the array: ");
    scanf("%d",&m);
    printf("Enter the column size of the array: ");
    scanf("%d",&n);
    int a[m][n];//declare
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            printf("Enter the element a[%d][%d]: ",i,j);//initialing
            scanf("%d",&a[i][j]);
        }
    }
    printf("The 2d array is ----------\n");
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            printf(" %d ",a[i][j]);
        }
        printf("\n");
    }

    return 0;
}

```

Output:

```
Enter the row size of the array: 3
Enter the column size of the array: 3
Enter the element a[0][0]: 1
Enter the element a[0][1]: 2
Enter the element a[0][2]: 3
Enter the element a[1][0]: 4
Enter the element a[1][1]: 5
Enter the element a[1][2]: 6
Enter the element a[2][0]: 7
Enter the element a[2][1]: 8
Enter the element a[2][2]: 9
The 2d array is ----------
 1  2  3
 4  5  6
 7  8  9


...Program finished with exit code 0
Press ENTER to exit console.
```

INSERTING IN 2D ARRAY

Program

main.c

```c
//S.Praveen Kumar
//AIE ch.en.u4aie22048
//Data structures lab 2

//sum 0f 3x3 matrix
#include<stdio.h>
int main()
{
    int i,j,row,col,ele,posi,posj;
    printf("Enter row size:  ");
    scanf("%d",&row);
    printf("Enter column size: ");
    scanf("%d",&col);
    int a[row][col];
    printf("Enter the elements of array: \n");
    for(i=0; i<row; i++)
    {
       for(j=0; j<col; j++)
        {
            printf("a[%d][%d]: ",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    printf("\nEnter the element: ");
    scanf("%d",&ele);
    printf("\nEnter the row positions : ");
    scanf("%d",&posi);
    printf("\nEnter the  col positions : ");
    scanf("%d",&posj);
    for(i=row-1;i>=posi;i--)
    {
        for(j=col-1;j>=posj;j--)
        {
            a[i+1][j+1] = a[i][j];
            a[posi][posj] = ele;
        }
    }
    for(i=0; i<row; i++)
    {
       for(j=0; j<col; j++)
        {
            printf("%d",a[i][j]);
        }
    }

    return 0;
 }
```

Output

input

```
Enter row size:  2
Enter column size: 2
Enter the elements of array:
a[0][0]: 1
a[0][1]: 2
a[1][0]: 3
a[1][1]: 5

Enter the element: 4

Enter the row positions : 1

Enter the  col positions : 1
1234

...Program finished with exit code 0
Press ENTER to exit console.
```

3.Updating in 2-d

Program

main.c

```c
//S.Praveen kumar
//AIE ch.en.u4aie22048
// lab-2

//updating a 2d array

#include <stdio.h>
int main()
{
    int m,n,i,j,num,nm,nn;
    printf("Enter the row size of the array: ");
    scanf("%d",&m);
    printf("Enter the column size of the array: ");
    scanf("%d",&n);
    int a[m][n],a1[m][n];
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            printf("Enter the element a[%d][%d]: ",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    for(i=0; i<m ;i++)
    {
        for(j=0; j<n ;j++)
        {
            a1[i][j]=a[i][j];
        }
    }
    printf("Enter the element to update: ");
    scanf("%d",&num);
    printf("Enter the position of element to update: ");
    scanf("%d %d",&nm,&nn);
    for(i=0; i<m ;i++)
    {
        for(j=0; j<n ;j++)
        {
            if(i==nm-1 && j==nn-1)
            {
                a1[i][j]=num;
            }
        }
    }
    printf("After the updating---------\n");
    for(i=0; i<m ;i++)
    {
        for(j=0; j<n ;j++)
        {
            printf("%d ",a1[i][j]);
        }
        printf("\n");
    }
    return 0;
}
```

Output:

```
Enter the row size of the array: 2
Enter the column size of the array: 2
Enter the element a[0][0]: 2
Enter the element a[0][1]: 2
Enter the element a[1][0]: 3
Enter the element a[1][1]: 2
Enter the element to update: 2
Enter the position of element to update: 2 1
After the updating---------
2 2
2 2


...Program finished with exit code 0
Press ENTER to exit console.
```

Deletion at row

Program:

main.c

```c
//S.Praveen kumar
//AIE ch.en.u4aie22048
// lab-2

//delete a row

#include <stdio.h>
int main()
{
    int m,n,i,j,num;
    printf("Enter the row size of the array: ");
    scanf("%d",&m);
    printf("Enter the column size of the array: ");
    scanf("%d",&n);
    int a[m][n],a1[m][n];
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            printf("Enter the element a[%d][%d]: ",i,j);
            scanf("%d",&a[i][j]);
        }
    }
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            a1[i][j]=a[i][j];
        }
    }
    printf("Enter the row to delete: ");
    scanf("%d",&num);
    m--;
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            if(i==num-1)
            a1[i+m][j+n+1]=a[i][j];
        }
    }
    printf("After the deltion  ----------\n");
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            printf(" %d ",a1[i][j]);
        }
        printf("\n");
    }

    return 0;
}
```

Output:

```
Enter the row size of the array: 2
Enter the column size of the array: 2
Enter the element a[0][0]: 1
Enter the element a[0][1]: 2
Enter the element a[1][0]: 3
Enter the element a[1][1]: 4
Enter the row to delete: 2
After the deltion  ----------
 1  2


...Program finished with exit code 0
Press ENTER to exit console.
```

Sum of 3x3 matrix

Program

main.c

```c
//S.Praveen Kumar
//AIE ch.en.u4aie22048
//Data structures Lab 2

//sum 0f 3x3 matrix
#include <stdio.h>
int main()
{
    int row,col,array1,row1,col1,arr1,arr2,i,j,k;
    printf("Enter the size of row: ");
    scanf("%d",&row);
    printf("Enter the size of col: ");
    scanf("%d",&col);
    printf("Enter the size of array1: ");
    scanf("%d",&arr1);
    printf("Enter the size of row1: ");
    scanf("%d",&row1);
    printf("Enter the size of col: ");
    scanf("%d",&col1);
    printf("Enter the size of array2: ");
    scanf("%d",&arr2);
    int a[row][col][arr1],b[row1][col1][arr2],sum[row][col1][arr2];
    printf("Enter the elements of the array: ");
    for(i=0;i<row;i++)
    {
        for(j=0;j<col;j++)
        {
            for(k=0;k<arr1;k++)
            {
                printf("a[%d][%d][%d]: ",i,j,k);
                scanf("%d",&a[i][j][k]);
            }

        }
    }
    printf("enter the 2nd array values: \n");
    for(i=0;i<row1;i++)
    {
        for(j=0;j<col1;j++)
        {
            for(k=0;k<arr1;k++)
            {
                printf("b[%d][%d][%d]: ",i,j,k);
                scanf("%d",&b[i][j][k]);
            }

        }
    }
     for(i=0;i<row;i++)
    {
        for(j=0;j<col1;j++)
        {
            for(k=0;k<arr2;k++)
            {
                sum[i][j][k]=a[i][j][k]+b[i][j][k];
            }

        }
    }
     printf("Sum of 3x3 array is---------: \n");
     for(i=0;i<row1;i++)
    {
        for(j=0;j<col1;j++)
        {
            for(k=0;k<arr1;k++)
            {
                printf("%d ",sum[i][j][k]);
            }
            printf("\n");
        }

    }


    return 0;
}
```

Output:

input

```
Enter the size of row: 2
Enter the size of col: 2
Enter the size of array1: 2
Enter the size of row1: 2
Enter the size of col: 2
Enter the size of array2: 2
Enter the elements of the array: a[0][0][0]: 1
a[0][0][1]: 2
a[0][1][0]: 3
a[0][1][1]: 4
a[1][0][0]: 5
a[1][0][1]: 6
a[1][1][0]: 7
a[1][1][1]: 8
enter the 2nd array values:
b[0][0][0]: 1
b[0][0][1]: 2
b[0][1][0]: 3
b[0][1][1]: 4
b[1][0][0]: 5
b[1][0][1]: 6
b[1][1][0]: 7
b[1][1][1]: 8
Sum of 3x3 array is---------:
2 4
6 8
10 12
14 16


...Program finished with exit code 0
Press ENTER to exit console.
```

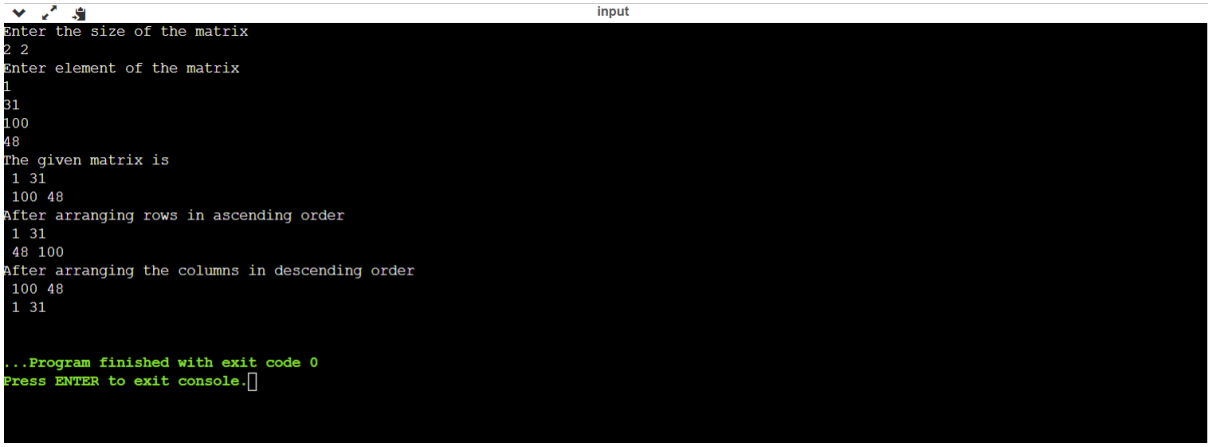
SORTING IN 2D ARRAY

PROGRAM:

main.c

```c
//S.PRAVEEN KUMAR
//AIE ch.en.u4aie22048
//Lab -2

//SORTING row wise and column wise
#include <stdio.h>

void main () {

    static int ma[10][10],mb[10][10];

    int i,j,k,a,m,n;

    printf ("Enter the size of the matrix \n");

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

    printf ("Enter element of the matrix \n");

    for (i=0;i<m;i++)
    {
        for (j=0;j<n;j++)
        {
            scanf ("%d",&ma[i][j]);
            mb[i][j] = ma[i][j];
        }
    }
    printf ("The given matrix is \n");

    for (i=0;i<m;i++)
    {
        for (j=0;j<n;j++)
        {
            printf (" %d",ma[i][j]);
        }

        printf ("\n");

    }

    printf ("After arranging rows in ascending order\n");

    for (i=0;i<m;i++) {
        for (j=0;j<n;j++) {
            for (k=(j+1);k<n;k++) {
                if (ma[i][j] > ma[i][k]) {
                    a = ma[i][j];
                    ma[i][j] = ma[i][k];
                    ma[i][k] = a;
                }
            }
        }
    }
    for (i=0;i<m;i++)
    {
        for (j=0;j<n;j++)
        {
            printf (" %d",ma[i][j]);
        }
        printf ("\n");
    }
    printf ("After arranging the columns in descending order \n");
    for (j=0;j<n;++j)
    {
        for (i=0;i<m;++i)
        {
            for (k=i+1;k<m;++k)
            {
                if (mb[i][j] < mb[k][j])
                {
                    a = mb[i][j];
                    mb[i][j] = mb[k][j];
                    mb[k][j] = a;
                }
            }
        }
    }
    for (i=0;i<m;++i) {

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

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

        }

        printf ("\n");

    }

}
```

OUTPUT:


input
Enter the size of the matrix
2 2
Enter element of the matrix
1
31
100
48
The given matrix is
1 31
100 48
After arranging rows in ascending order
1 31
48 100
After arranging the columns in descending order
100 48
1 31
...Program finished with exit code 0
Press ENTER to exit console.