

## DATA STRUCTURE – 1

### LAB-2

S.Praveen kumar  
ch.en.u4aie22048

### 2-d array declare and initialize

#### Program:

```
main.c
1 //S.Praveen kumar
2 //AIE ch.en.u4aie22048
3 // Lab-2
4
5 //declare and initialize
6
7 #include <stdio.h>
8 int main()
9 {
10     int m,n,i,j;
11     printf("Enter the row size of the array: ");
12     scanf("%d",&m);
13     printf("Enter the column size of the array: ");
14     scanf("%d",&n);
15     int a[m][n]; //declare
16     for(i=0;i<m;i++)
17     {
18         for(j=0;j<n;j++)
19         {
20             printf("Enter the element a[%d][%d]: ",i,j); //initialing
21             scanf("%d",&a[i][j]);
22         }
23     }
24     printf("The 2d array is -----\\n");
25     for(i=0;i<m;i++)
26     {
27         for(j=0;j<n;j++)
28         {
29             printf(" %d ",a[i][j]);
30             printf("\\n");
31         }
32     }
33
34     return 0;
35 }
36
```

#### 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
1 //S.Praveen Kumar
2 //AIE ch.en.u4aie22048
3 //Data structures Lab 2
4
5 //sum of 3x3 matrix
6 #include<stdio.h>
7 int main()
8 {
9     int i,j,row,col,e,ele,posi,posj;
10    printf("Enter row size: ");
11    scanf("%d",&row);
12    printf("Enter column size: ");
13    scanf("%d",&col);
14    int a[row][col];
15    printf("Enter the elements of array: \n");
16    for(i=0; i<row; i++)
17    {
18        for(j=0; j<col; j++)
19        {
20            printf("a[%d][%d]: ",i,j);
21            scanf("%d",&a[i][j]);
22        }
23    }
24    printf("\nEnter the element: ");
25    scanf("%d",&ele);
26    printf("\nEnter the row positions : ");
27    scanf("%d",&posi);
28    printf("\nEnter the col positions : ");
29    scanf("%d",&posj);
30    for(i=row-1;i>=posi;i--)
31    {
32        for(j=col-1;j>=posj;j--)
33        {
34            a[i+1][j+1] = a[i][j];
35            a[posi][posj] = ele;
36        }
37    }
38    for(i=0; i<row; i++)
39    {
40        for(j=0; j<col; j++)
41        {
42            printf("%d",a[i][j]);
43        }
44    }
45
46    return 0;
47 }
48
49
50
51
```

### 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
1 //S.Praveen kumar
2 //AIE ch.en.udate22048
3 // Lab-2
4
5 //updating a 2d array
6
7 #include <stdio.h>
8 int main()
9 {
10     int m,n,i,j,num,nm,nn;
11     printf("Enter the row size of the array: ");
12     scanf("%d",&m);
13     printf("Enter the column size of the array: ");
14     scanf("%d",&n);
15     int a[m][n],a1[m][n];
16     for(i=0;i<m;i++)
17     {
18         for(j=0;j<n;j++)
19         {
20             printf("Enter the element a[%d][%d]: ",i,j);
21             scanf("%d",&a[i][j]);
22         }
23     }
24     for(i=0; i<m ;i++)
25     {
26         for(j=0; j<n ;j++)
27         {
28             a1[i][j]=a[i][j];
29         }
30     }
31     printf("Enter the element to update: ");
32     scanf("%d",&num);
33     printf("Enter the position of element to update: ");
34     scanf("%d %d",&nm,&nn);
35     for(i=0; i<m ;i++)
36     {
37         for(j=0; j<n ;j++)
38         {
39             if(i==nm-1 && j==nn-1)
40             {
41                 a1[i][j]=num;
42             }
43         }
44     }
45     printf("After the updating-----\n");
46     for(i=0; i<m ;i++)
47     {
48         for(j=0; j<n ;j++)
49         {
50             printf("%d ",a1[i][j]);
51         }
52         printf("\n");
53     }
54     return 0;
55 }
```

#### 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
1 //S.Praveen kumar
2 //AIE ch.en.u4aie22048
3 // Lab-2
4
5 //delete a row
6
7 #include <stdio.h>
8 int main()
9 {
10     int m,n,i,j,num;
11     printf("Enter the row size of the array: ");
12     scanf("%d",&m);
13     printf("Enter the column size of the array: ");
14     scanf("%d",&n);
15     int a[m][n],a1[m][n];
16     for(i=0;i<m;i++)
17     {
18         for(j=0;j<n;j++)
19         {
20             printf("Enter the element a[%d][%d]: ",i,j);
21             scanf("%d",&a[i][j]);
22         }
23     }
24     for(i=0;i<m;i++)
25     {
26         for(j=0;j<n;j++)
27         {
28             a1[i][j]=a[i][j];
29         }
30     }
31     printf("Enter the row to delete: ");
32     scanf("%d",&num);
33     m--;
34     for(i=0;i<m;i++)
35     {
36         for(j=0;j<n;j++)
37         {
38             if(i==num-1)
39                 a1[i+1][j]=a[i][j];
40         }
41     }
42     printf("After the deltion -----\\n");
43     for(i=0;i<m;i++)
44     {
45         for(j=0;j<n;j++)
46         {
47             printf(" %d ",a1[i][j]);
48         }
49         printf("\\n");
50     }
51     return 0;
52 }
53
54
```

### 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
1 //S.Praveen Kumar
2 //AIE ch.en.u4aie22048
3 //Data structures Lab 2
4
5 //sum of 3x3 matrix
6 #include <stdio.h>
7 int main()
8 {
9     int row,col,array1,row1,col1,arr1,arr2,i,j,k;
10    printf("Enter the size of row: ");
11    scanf("%d",&row);
12    printf("Enter the size of col: ");
13    scanf("%d",&col);
14    printf("Enter the size of array1: ");
15    scanf("%d",&arr1);
16    printf("Enter the size of row1: ");
17    scanf("%d",&row1);
18    printf("Enter the size of col: ");
19    scanf("%d",&col1);
20    printf("Enter the size of array2: ");
21    scanf("%d",&arr2);
22    int a[row][col][arr1],b[row1][col1][arr2],sum[row][col1][arr2];
23    printf("Enter the elements of the array: ");
24    for(i=0;i<row;i++)
25    {
26        for(j=0;j<col;j++)
27        {
28            for(k=0;k<arr1;k++)
29            {
30                printf("a[%d][%d][%d]: ",i,j,k);
31                scanf("%d",&a[i][j][k]);
32            }
33        }
34    }
35    printf("enter the 2nd array values: \n");
36    for(i=0;i<row1;i++)
37    {
38        for(j=0;j<col1;j++)
39        {
40            for(k=0;k<arr1;k++)
41            {
42                printf("b[%d][%d][%d]: ",i,j,k);
43                scanf("%d",&b[i][j][k]);
44            }
45        }
46    }
47    for(i=0;i<row;i++)
48    {
49        for(j=0;j<col1;j++)
50        {
51            for(k=0;k<arr2;k++)
52            {
53                sum[i][j][k]=a[i][j][k]+b[i][j][k];
54            }
55        }
56    }
57    printf("Sum of 3x3 array is-----: \n");
58    for(i=0;i<row1;i++)
59    {
60        for(j=0;j<col1;j++)
61        {
62            for(k=0;k<arr1;k++)
63            {
64                printf("%d ",sum[i][j][k]);
65            }
66            printf("\n");
67        }
68    }
69    return 0;
70 }
```

### 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
1 //S.PRAVEEN KUMAR
2 //AIE ch.en.u4aie22048
3 //Lab -2
4
5 //SORTING row wise and column wise
6 #include <stdio.h>
7
8 void main () {
9
10     static int ma[10][10],mb[10][10];
11
12     int i,j,k,a,m,n;
13
14     printf ("Enter the size of the matrix \n");
15
16     scanf ("%d %d", &m,&n);
17
18     printf ("Enter element of the matrix \n");
19
20     for (i=0;i<m;i++)
21     {
22         for (j=0;j<n;j++)
23         {
24             scanf ("%d",&ma[i][j]);
25             mb[i][j] = ma[i][j];
26         }
27     }
28
29     printf ("The given matrix is \n");
30
31     for (i=0;i<m;i++)
32     {
33         for (j=0;j<n;j++)
34         {
35             printf (" %d",ma[i][j]);
36         }
37         printf ("\n");
38     }
39
40     printf ("After arranging rows in ascending order\n");
41
42     for (i=0;i<m;i++) {
43         for (j=0;j<n;j++) {
44             for (k=j+1;k<n;k++) {
45                 if (ma[i][j] > ma[i][k]) {
46                     a = ma[i][j];
47                     ma[i][j] = ma[i][k];
48                     ma[i][k] = a;
49                 }
50             }
51         }
52     }
53
54     for (i=0;i<m;i++)
55     {
56         for (j=0;j<n;j++)
57         {
58             printf (" %d",ma[i][j]);
59         }
60         printf ("\n");
61     }
62     printf ("After arranging the columns in descending order \n");
63     for (j=0;j<n;j++)
64     {
65         for (i=0;i<m;i++)
66         {
67             for (k=i+1;k<m;k++)
68             {
69                 if (mb[i][j] < mb[k][j])
70                 {
71                     a = mb[i][j];
72                     mb[i][j] = mb[k][j];
73                     mb[k][j] = a;
74                 }
75             }
76         }
77     }
78     for (i=0;i<m;i++) {
79         for (j=0;j<n;j++) {
80
81             printf (" %d",mb[i][j]);
82
83         }
84
85         printf ("\n");
86     }
87
88 }
89
90 }
```

### 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.
```