



problem solving using computers

CSE 1051

2 D A R R A Y S

S14_2

Objectives

To learn and appreciate the following concepts

- Programs using 2D arrays

Session outcome

At the end of session student will be able to

→ Write programs using 2D array

Syntax Recap

Declaration:

```
data-type array_name[row_size][column_size];
```

Initialization of two dimensional arrays:

```
type array-name [row size] [col size ] ={list of values};
```

Reading a Matrix:

```
int a[100][100];
for(i=0;i<m;i++)
{
    for(j=0;j<n;j++)

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

Display a Matrix:

```
int a[100][100];
for(i=0;i<m;i++)
{
    for(j=0;j<n;j++)
        printf("%d",a[i][j]);
    printf(" ");
    printf("\n");
}
```

Row Sum & Column Sum of a matrix

```
int a[10][10];  
  
int rowsum[10], colsum[10];  
  
printf("enter dimension for a \n");  
  
scanf("%d %d",&m, &n);  
  
//Reading  
  
printf("enter elements for a \n");  
for (i=0;i<m;i++){  
    for(j=0;j<n;j++){  
        scanf("%d", &a[i][j]);  
    }  
}
```

```
//Row sum  
  
for(i=0;i<m;i++){  
    {  
        rowsum[i]=0;  
        for(j=0;j<n;j++){  
            rowsum[i]=rowsum[i]+a[i][j];  
        }  
    }  
  
    printf("\n");  
}
```

Row Sum & Column Sum of a matrix

```
//Column sum
```

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

```
{
```

```
    colsum[j]=0;
```

```
    for(i=0;i<m;i++)
```

```
        colsum[j]=colsum[j]+a[i][j];
```

```
}
```

```
//Display
```

```
for(i=0;i<m;i++) {
```

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

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

```
    printf("->")
```

```
    printf("%d\n",rowsum[i]);
```

```
}
```

```
printf("\n");
```

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

```
    printf("\t %d",colsum[i]);
```

Row Sum & Column Sum of a matrix

```
C:\Users\Admin\Desktop\Programs\2.exe  
enter dimension for a  
3 3  
enter elements for a  
1 2 3 4 5 6 7 8 9  
  
      1      2      3->6  
      4      5      6->15  
      7      8      9->24  
  
      12      15      18
```




Go to posts/chat box for the link to the question **PQn. S14.2**

submit your solution in next 2 minutes

The session will resume in 3 minutes

Multiplication of two Matrices

```
#include <stdlib.h>

int main(){ int i, j, m, n, p, q;

int a[10][10], b[10][10],c[10][10];

printf("enter dimension for a \n");

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

printf("\n enter dimension for b\n");

scanf("%d %d", &p,&q);

if(n!=p){

    printf("not multiplicable \n");

    exit(0); // Terminate the execution

}
```

```
printf("enter elements for a \n");
```

```
for (i=0;i<m;i++)
```

```
{
```

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

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

```
}
```

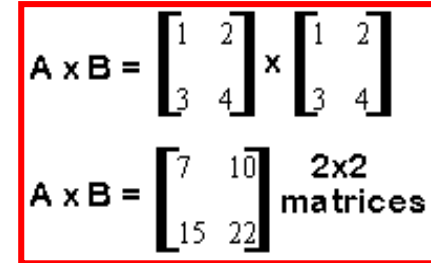
```
printf("\n enter elements for b\n");
```

```
for(i=0;i<p;i++)
```

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

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

```
}
```


$$A \times B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

$A \times B = \begin{bmatrix} 7 & 10 \\ 15 & 22 \end{bmatrix}$ 2x2 matrices

Multiplication of two Matrices

```
for(i=0;i<m;i++) {  
    for(j=0;j<q;j++) {  
        c[i][j]=0;  
        for(k=0;k<n;k++)  
            c[i][j]=c[i][j]+a[i][k]*b[k][j];  
    }  
}
```

$$\mathbf{A} \times \mathbf{B} = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$
$$\mathbf{A} \times \mathbf{B} = \begin{bmatrix} 7 & 10 \\ 15 & 22 \end{bmatrix} \text{ 2x2 matrices}$$

```
printf("\n The product matrix is \n");  
for(i=0;i<m;i++){  
    for(j=0;j<q;j++)  
        printf("%d\t",c[i][j]);  
    printf("\n");  
}
```



Summary

- Write programs using 2D array