

2D ARRAYS

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]);
}</pre>
```

```
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");
}</pre>
```

Row Sum & Column Sum of a matrix

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

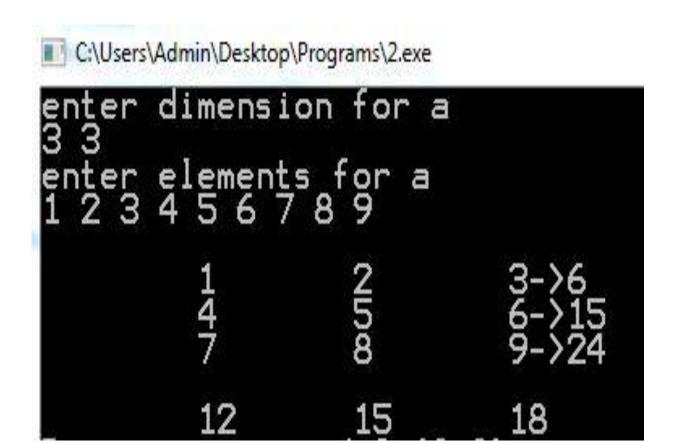
PIX

Row Sum & Column Sum of a matrix

```
//Display
                                               for(i=0;i<m;i++) {
//Column sum
                                                for(j=0;j< n;j++)
for(j=0;j< n;j++)
                                                  printf("\t %d",a[i][j]);
                                                 printf("->")
 colsum[j]=0;
                                               printf("%d\n",rowsum[i]);
 for(i=0;i<m;i++)
   colsum[j]=colsum[j]+a[i][j];
                                               printf("\n");
                                               for(i=0;i<n;i++)
                                               printf("\t %d",colsum[i]);
```

(A constituent unit of MAHE, Manipal)

Row Sum & Column Sum of a matrix





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][i]);
printf("\n enter elements for b\n");
for(i=0;i< p;i++)
\{ for(j=0;j<q;j++) \}
scanf("%d",&b[i][i]);
```





```
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} \quad \begin{array}{c} \mathbf{2} \times \mathbf{2} \\ \mathbf{matrices} \end{array}
```

```
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");
}</pre>
```



Summary

• Write programs using 2D array