

VASAVI COLLEGE OF ENGINEERING

(AUTONOMOUS)

(Affiliated to Osmania University)

Hyderabad - 500031

DEPARTMENT OF CSE

NAME OF LABORATORY PPS LAB

Name: K'SREE INDIRA SIVANI Roll No: 1602-21-733-052 Page No: 104

PRELAB QUESTIONS: 8

1) How to pass a 2D array to a function? Explain with an example.

Ans: ~~returntype~~ functionname (datatype arrname[r][c]);
function call: functionname (arrayname); not mandatory

Example:

```
#include <stdio.h>
```

```
void fun(int a[ ][ ]);
```

```
int main()
```

```
{
```

```
    fun(a);
```

```
    return 0; }
```

```
void fun(int a[ ][c])
```

column count

is mandatory.

```
{
```

```
    statements;
```

```
}
```

2) How do you pass 1D array to the function?

Ans: ~~returntype~~ functionname (datatype arrname[r]);
functionname (arrayname); → Function call.

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3) Give the syntax to declare a 2D array.

Ans: Returntype functionname (datatype arrayname [rows][columns]);

⇒ Syntax:

datatype arrayname [rows][columns];

4) How do you initialize a 2D array?

Ans: datatype arrayname [rows][columns] = { { a, b, c }
{ d, e, f } };

5) List the parameter passing techniques:

- Call by value.
- Call by reference.

6) Declare an array to store a matrix of 4 rows and 6 columns and initialize it 0.

Ans: int matrix [4][6];

7) Differentiate b/w bubble sort and Selection sort.

→ Bubble Sort: It compares the adjacent elements of an array and sort them one by one till the whole array is sorted.

→ Selection Sort: It checks for least / smallest element in the array and put its in the first place. And repeats the same in the remaining unsorted array.

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2D ARRAY: PRELAB PROGRAMS - 8

```
1) #include <stdio.h>
void print(int a[][5], int r, int c)
{
    int i, j;
    for(i=0; i<r; i++)
    {
        for(j=0; j<c; j++)
        {
            scanf("%d", &a[i][j]);
        }
    }

    for (i=0; i<r; i++)
    {
        for(j=0; j<c; j++)
        {
            printf("%d\t", a[i][j]);
        }
        printf("\n");
    }
}

int main()
{
    int i, j, k, r1, r2, c1, c2;
    int M1[5][5];
    int M2[5][5];
    int product[5][5];
```

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```
printf("Enter the no. of rows in first matrix:");  
scanf("%d", &r1);  
printf("Enter the no. of columns in first matrix:");  
scanf("%d", &c1);  
  
printf("Enter the no. of rows in second matrix:");  
scanf("%d", &r2);  
printf("Enter the no. of columns in second matrix:");  
scanf("%d", &c2);  
printf("\n"); if(c1 == r2) {  
    printf("MATRIX:1\n");  
    print(M1, r1, c1);  
    printf("MATRIX:2\n");  
    print(M2, r2, c2);  
    printf("PRODUCT OF TWO MATRICES:\n");  
    if(c1 == r2)  
        { for(i=0; i<r1; i++)  
            { for(j=0; j<c2; j++)  
                { product[i][j] = 0;  
                    for(k=0; k<c1; k++)  
                        { product[i][j] += M1[i][k] * M2[k][j]; }  
                    printf("%d\t", product[i][j]); }  
                printf("\n"); }  
        else printf("Can't Multiply");  
    return 0; }
```

→ OUTPUT:

- 1) Enter the no. of rows in first matrix: 2
Enter the no. of columns in ~~first~~ matrix: 3
Enter the no. of rows in second matrix: 3
Enter the no. of columns in second matrix: 2

182
83

MATRIX: 1

3
6
9
12
15
18

3 6 9
12 15 18

MATRIX: 2

4
8
12
16
20
24
~~4~~
4 8
12 16
20 24
~~4~~

PRODUCT OF TWO MATRICES:

264 336
588 768

- 2) Enter the no. of rows in first matrix: 2
Enter the no. of columns in first matrix: 2
Enter the no. of rows in second matrix: 3
Enter the no. of columns in second matrix: 3

Can't Multiply

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- 2) Program to copy the 2D array elements into a 1D array.

```
#include<stdio.h>
void row(int a[])
{
    int i,j;
    for(i=0; i<3; i++)
    {
        printf("%d\t", a[i]);
    }
    printf("\n\n");
}

int main()
{
    int i,j;
    int array[3][3];
    printf("The terms in array are :\n");
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            scanf("%d", &array[i][j]);
        }
    }

    printf("2D ARRAY:\n");
    for(i=0; i<3; i++)
    {
        for(j=0; j<3; j++)
        {
            printf("%d\t", array[i][j]);
        }
        printf("\n");
    }

    printf("1D ARRAY:\n");
    for(i=0; i<3; i++)
    {
        row(array[i]);
    }
    return 0;
}
```

→ OUTPUT:

The terms in array are:

3
6
9
12
15
18
21
24
27

2D ARRAY:

3	6	9
12	15	18
21	24	27

1D ARRAY:

3	6	9
12	15	18
21	24	27

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→ AIM: Program to illustrate sorting :

SORT THE CGPA:

→ PROBLEM STATEMENT: Write a program to store the CGPA of Students, sort them and display them in ascending order of CGPA.

→ PROGRAM:

```
# include <stdio.h>
Void sorting (int a[*], int d);
int main()
{print int i,n;
 printf("Enter the class strength: ");
 scanf("%d",&n);
 { int cgpa[n];
   printf("Enter the CGPA of %d students :\n",n);
   for(i=0 ; i<n ; i++)
   { scanf("%d",&cgpa[i]);
     sorting (cgpa,n);
   printf("The sorted array :\n");
   for(i=0 ; i<n ; i++)
   { printf("%d\t",cgpa[i]); } }
   return 0; }
```

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void sorting(int a[], int d)

{ int i, j, t;

for(i=0; i<d-1; i++)

{

for(j=0; j<d-1; j++)

{

if(a[j]>a[j+1])

{

t=a[j];

a[j]=a[j+1];

a[j+1]=t;

}

}

return;

}

→ OUTPUT:

Enter the class strength: 5

Enter the CGPA of 5 students:

7

9

10

5

8

The sorted array:

5 7 8 9 10

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Name K. SREE INDIRA SIVANI Roll No. 1602-21-733-052 Page No. 112

→ AIM: Program to display 2D arrays:

..... ADD 2 MATRICES:

→ PROBLEM STATEMENT: Write a program to add 2 matrices

→ PROGRAM:

```
#include <stdio.h>
void print(int a[2][5])
{
    int i,j;
    for(i=0; i<2; i++)
    {
        for(j=0; j<5; j++)
        {
            printf("%d\t", a[i][j]);
        }
        printf("\n");
    }
}
int main()
{
    int i,j;
    int a[2][5] = { {20, 40, 60, 80, 100},
                    {15, 35, 55, 75, 95} };
    int b[2][5] = { {10, 30, 50, 70, 90},
                    {5, 25, 45, 85, 85} };

    printf("The numbers in first array are:\n");
    print(a);
    printf("The numbers in second array are:\n");
    print(b);
}
```

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```
printf("SUM:\n");
for(i=0; i<2; i++)
{
    for(j=0; j<5; j++)
    {
        printf("%d\t", a[i][j] + b[i][j]);
    }
    printf("\n");
}
printf("\n");
return 0;
}
```

→ OUTPUT:

The numbers in first array are:

20	40	50	80	100
15	35	55	75	95

The numbers in second array are:

10	30	50	70	90
5	25	45	65	85

SUM:

30	70	110	150	190
20	60	100	140	180

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3) Write a program to print transpose of a given matrix:

→ AIM: Program to illustrate 2D arrays:

Print transpose of a given matrix:

→ PROGRAM:

```
#include <stdio.h>
void transpose(int a[5][5], int b[5][5], int r, int c);
int main()
{
    int r, c, i, j;
    int a[5][5];
    int b[5][5];
    printf("Enter the no. of rows: ");
    scanf("Enter the no. of columns: ");
    scanf("%d", &r);
    printf("Enter the no. of columns: ");
    scanf("%d", &c);
    printf("Enter the terms:\n");
    for(i=0; i<r; i++)
    {
        for(j=0; j<c; j++)
        {
            scanf("%d\n", &a[i][j]);
        }
    }
    printf("ARRAY:\n");
    for(i=0; i<r; i++)
    {
        for(j=0; j<c; j++)
        {
            b[j][i] = a[i][j];
        }
    }
    for(i=0; i<r; i++)
    {
        for(j=0; j<c; j++)
        {
            printf("%d ", b[j][i]);
        }
        printf("\n");
    }
}
```

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```
{ for(j=0; j<c; j++)
    { printf("%d\t", a[i][j]);
     } printf("\n");
}
transpose(a,b,r,c);
printf("TRANSPOSE :\n");
for(i=0; i<r; i++)
{
    for(j=0; j<c; j++)
        { printf("%d\t", b[i][j]);
         } printf("\n");
    } return 0;
}

void transpose(int a[5][5], int b[5][5], int r, int c)
{
    int i,j;
    for(i=0; i<r; i++)
    {
        for(j=0; j<c; j++)
        {
            b[i][j] = a[j][i];
        }
    }
}
```

→ OUTPUT:

Enter the no. of rows : 3

Enter the no. of columns : 3

Enter the terms :

15

18

19

20

21

26

28

27

26

24

ARRAY:

15 18 19

20 21 26

28 27 26

TRANSPOSE:

15 20 28

18 21 27

19 26 26

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→ AIM: Program to illustrate 2D arrays.
PRINT AVERAGE USING 2D ARRAYS:

→ PROBLEM STATEMENT:
Write a program to read internal-1 and internal-2 marks of PPS scored by 5 students. Print the average internal wise and print average of each student.

→ PROGRAM:

```
# include <stdio.h>
void read(float a[5][2])
{ int i,j;
for(i=0; i<5; i++)
{ for(j=0; j<2; j++)
{ scanf("%f", &a[i][j]); }
}
printf("CSE-A\n");
printf("Marks of PPS:\n");
for(i=0; i<5; i++)
{ for(j=0; j<2; j++)
{ printf("%f\t", a[i][j]); }
}
printf("\n"); }
```

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void average (float b[5][2])

```
{ int i,j;
    float sum=0;
    printf("class average for each internal :\n");
    for(j=0;j<2;j++)
    {
        for(i=0;i<5;i++)
        {
            sum+= b[i][j];
        }
        printf("Average of internal %.d = %.f\n",j+1,sum/5);
        sum=0;
    }
```

void student (float c[5][2])

```
{ int i,j;
    float sum=0;
    printf(" Average of each student :\n");
    for(i=0;i<5;i++)
    {
        for(j=0;j<2;j++)
        {
            sum+= c[i][j];
        }
        printf("Average of student = %.f\n",sum/2);
        sum=0;
    }
```

int main ()

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```
{ float In[5][2];  
    read(In);  
    average(In);  
    Student(In);  
    return 0;  
}
```

→ OUTPUT:

21
26
27
29
18
16
23
27
30
20

CSE-A

Marks of PPS:

21.000000	26.000000
27.000000	29.000000
18.000000	16.000000
23.000000	27.000000
30.000000	20.000000

Class average for each internal:

Average of internal 1 = 23.799999

Average of internal 2 = 23.600000

Average of each student :

Average of Student = 23.500000

Average of Student = 28.000000

Average of Student = 17.000000

Average of Student = 25.000000

Average of Student = 25.000000