

Lect. No : 8 Concept of Arrays: One-Dimensional - Two Dimensional Arrays

An array is a group of related data items that share a common name. For instance, we can define array name salary to represent a set of salary of a group of employees. A particular value is indicated by writing a number called *index* number or *subscript* in brackets after the array name.

Array is a derived data type.

Eg: salary[10]

ONE / SINGLE DIMENSIONAL ARRAY

An array with a single (one) subscript is known as one dimensional array. A list of items can be given one variable name using only one subscript and such a variable is called a single – subscripted variable or a one-dimensional array.

Eg: int age[5];

and the computer reserves five storage locations as shown below

	age [0]
	age [1]
	age [2]
	age [3]
	age [4]

The values to array elements can be assigned as follows.

```
age[0] = 17;  
age[1] = 18;  
age[2] = 17;  
age[3] = 19;  
age[4] = 20;
```

This would cause the array age to store the values as shown below:

age [0]	17
age [1]	18
age [2]	17
age [3]	19
age [4]	20

Declaration of One (Single) Dimensional Array

The general form of array declaration is

data_type array-name[size];

The type specifies the type of element that will be contained in the array, such as int, float, or char and the size indicates the maximum number of elements that can be stored inside the array.

Eg: 1) int age[50];
2) float height[50];

The C language treats character strings simply as arrays of characters.

Example: char name[10];
values to array elements can be assigned as follows

strcpy(name,"Raj Kumar");

name[0]	'R'
name[1]	'a'
name[2]	'j'
name[3]	' '
name[4]	'K'
name[5]	'u'
name[6]	'm'
name[7]	'a'
name[8]	'\0'
name[9]	'\0'

Note :

When the compiler sees a character string, it terminates it with an additional null character ('\0') at the end

Initialization of One Dimensional Arrays

The general form of initialization of arrays is:

static data_type array-name[size] = {list of values};

Eg:1 static int number[3] = {0,0,0};

Eg:2 static float total [5] = {0.0,12.50,-15};

Will initialize the first three elements to 0.0, 12.50 and -15.0 and the remaining two elements to zero.

Eg: 3 static int count[] = {1,1,1,1};

If size may be omitted, the compiler allocates enough space for all initialized elements.

Eg: 4 static char name [] = {'T','N','A','U','\0'};

Exercise 1: Write a C program to read last year rain forecast and find minimum, maximum rain fall and total and average rain fall.

Exercise 2 : Write a C program to Check whether the given element is Present or Not in a given set of elements (Linear Search)

Exercise 3 : Write a 'C' programs to perform Bubble sort

TWO-DIMENSIONAL ARRAYS

An array with two subscripts is known as two dimensional array.

Declaration of Two-Dimensional Array

Two-dimensional arrays are declared as follows

data_type array-name[row_size][column_size];

Example 1 : int a[3][3];

	Column 0	Column 1	Column 2
Row 0 □	a[0][0]	a[0][1]	a[0][2]
Row 1 □	a[1][0]	a[1][1]	a[1][2]
Row 2 □	a[2][0]	a[2][1]	a[2][2]

Example 2: float b[5][5];

3: char name[5][20];

Initialization of Two – Dimensional Arrays

The general form of initialization of arrays is:

static data_type array-name[row_size][column_size] = {list of values};

Eg: 1) static int number[2][3] = {0,0,0,1,1,1};
 Or
 static int number[2][3] = { {0,0,0},{1,1,1} };
 Or
 static int number[2][3] = {
 {0,0,0},
 {1,1,1}
 };

Exercise 1: Write a C program to find the maximum and minimum, total and average sales of the following sales table.

Food product Sales analysis in TNAU cafeteria , Coimbatore.

Days	Bread	Cookies	Jam
Monday	13	21	8
Tuesday	20	25	11
Wednesday	19	22	5
Thursday	23	15	10
Friday	18	26	17

Exercise 2 : Write a C program to add two Matrices

Multidimensional Arrays:

C allows arrays of three or more dimensions. The exact limit is determined by the compiler.

The general form of a multidimensional array is

data_type array-name[S1][S2][S3] [Sn];

where S1 is the size of the 1st dimension, S2 is the size of the 2nd dimension, S3 is the size of the 3rd dimension and so on.

Example :

```
int survey [3][5][12];
```

The array `survey` may represent a survey data of rainfall during the last three years from January to December in five cities.