**Array:**

Array is a group of variables of similar data types.

In Programming language Array is a collection of similar data items stored at contiguous memory locations.

**Types of Array**

1.Single Dimensional Array

2.Two-Dimensional Array

3.Multi-Dimensional Array

**C++ Single Dimensional Array Declaration**

**Syntax:** dataType arrayName[arraySize];

**Ex:** int x [7];

x[0] x[1] x[2] x[3] x[4] x[5] x[6] <- Array Index (Indices)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 40 | 45 | 70 | 12 | 32 | 98 | 84 |

0 1 2 3 4 5 6 <- Array Index (Indices)

**Why we used Array?**

Suppose a class has 27 students, and we need to store the total of all of them. Instead of creating 27 separate variables, we can simply create an array

**Ex:** int total [27];

## Access Elements in C++ Array

  In Array each element is associated with a number. The number is known as an array index. We can access elements of an array by using those indices.

**Syntax:** array[index];

**Ex:** x [2];

## Few Things to Remember

## The size of the array should be mentioned while declaring it

* Array elements are always counted from zero (0) onward.
* Array elements can be accessed using the position of the element in the array.

## The array can have one or more dimensions.

## Advantages:

* we can retrieve or sort the data efficiently.
* We can get any data located at an index position.

## Disadvantages:

* Size Limit: We can store only the fixed size of elements in the array. It doesn’t grow its size at runtime.

## Array declaration by initializing elements

**Ex : int arr[] = {10,45,23,56};**

## Array declaration by specifying the size and initializing elements

**Ex : int arr[6] = {10,45,23,56,84,30};**

## Two-Dimensional Arrays:

## The two dimensional(2D) array in CPP Programming is also known as matrix. A matrix can be represented as a table of rows and columns.

**Syntax:** dataType arrayName[row size] [column size];

**Ex:** int x [2][3]; // Declaration

**Ex:** int A [2][3] = {3,2,1,8,9,11}; // Declaration with initialization

Int A [2][3] = {{3,2,1}, {8,9,11}};

## Three-Dimensional Array in C

A three-dimensional array can be termed as an array of arrays that stores homogeneous data in tabular form.

**Syntax:** data\_type array\_name[size1][size2]....[sizeN];

**Ex:** int x[2][3][4] = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,

14, 15, 16, 17, 18, 19,20, 21, 22, 23};

**Ex:** int x [3][4][2] = {{{0,1,2,3}, {4,5,6,7}, {8,9,10,11}},

{{12,13,14,15}, {16,17,18,19}, {20,21,22,23}}};