# ARRAYS IN C LANGUAGE

What is an array?

→ An array is a group of variables of same datatype. When we define an array it allocates memory in a contiguous form or in a sequence. Each variable of the array is identified by a name and its index value or subscript-value.

Why do we need an array?

→ We need an array to store multiple variables of the same datatype.

Syntax:  data_type variable_name [size or number of element]

For example: int ar [10];

The above statement allocates 10 elements in the arrays.

The subscript value or the index value always starts from 0.

int ar→    0    1    2    3    4    5    6    7    8    9

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Types of array in C language:
- ➢ Single dimension array.
- ➢ Multi dimension array
  - • 2- dimensional array.
  - • n- dimensional array.

The name of array is a constant pointer. It keeps the address of the first cell of the array called the base address.
 If we declare an array, int ar [10]

int ar→    0    1    2    3    4    5    6    7    8    9

| | | | | | | | | | |
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**Note:**

- ar is a constant pointer it stores the base address of the array.
- The above declared array is of the integer datatype so each cell occupies a space of 4 bytes.
- ar [0] =100, base address is the address of the first element of the array.
- Address=base address + index value * size of datatype.
- Address of ar[2]=100+(4*2).

Input statement:

```c
#include <stdio.h>
int main()
{
    int i, elements;
    printf("Enter the number of elements");
    scanf("%d", &elements);
    int ar[elements];
    for (i = 0; i < elements; i++)
    {
        printf("Enter the value of ar[%d] ",i);
        scanf("%d", &ar[i]);
    }
}
```

TWO DIMENSIONAL ARRAYS:

Syntax: data_type variable_name [no. of rows][no. of columns]
int ar [3][3]

|  | Col 0 | Col 1 | Col 2 |
|---|---|---|---|
| Row 0 | 1 | 2 | 3 |
| Row 1 | 4 | 5 | 6 |
| Row 2 | 7 | 8 | 9 |

ar[0][0]=1  ar[0][1]=2  ar[2][2]=9

## Input statement:

```c
#include <stdio.h>
int main()
{
    int row, column, row_size, col_size;
    printf("Enter the number of rows and columns:");
    scanf("%d", &row_size);
    scanf("%d", &col_size);
    int ar[row_size][col_size];
    for (row = 0; row < row_size; row++)
    {
        for (column = 0; column < col_size; column++)
        {
            printf("Enter the value of ar[%d][%d]:", row, column);
            scanf("%d", &ar[row][column]);
        }
    }
}
```

int ar[3][3] = {{1,2,3},{4,5,6},{7,8,9}};

Similarly, we can have arrays of different dimensions.
Ex- Three dimensional array. int ar[2][3][4].
int ar ={{{1,2,3,4},{5,6,7,8},{9,10,11,12}},
      {13,14,15,16},{17,18,19,20},{21,22,23,24}}};