1. Arrays:

An array is a consecutive group of homogeneous memory locations. Each element (location) can be referred to using the array name along with an integer that denotes the relative position of that element within the array. The data items grouped in an array can be simple types like int or float, or can be user-defined types like structures and objects.

2. Array of One Dimension:

It is a single variable specifies each array element. The declaration of one dimensional arrays is:
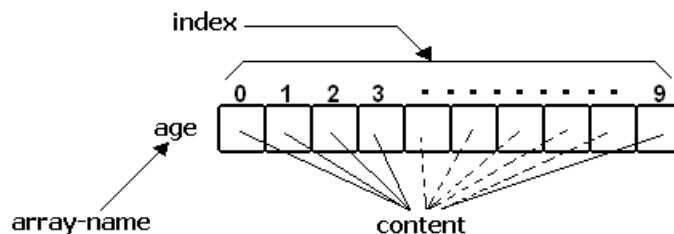
General Form of 1D-Array:

data-type Array-name [size];

Examples: int age [10];

Int num [30];

Float degree[5];

Char a [15];

The item in an array is called elements (in contrast to the items in a structure which are called members). The elements in an array are of the same type only the values vary.

3. Initializing Array Elements:

- The first element of array age:

age [0] = 18;

- The last element of array age:

age [9] = 19;

- All elements of array age:

age [9] = { 18, 17, 18 ,18 ,19, 20 ,17, 18 ,19 };

- int x [ ] = { 12, 3, 5, 0, 11, 7, 30, 100, 22 };

- int y [10] = { 8, 10, 13, 15, 0, 1, 17, 22};

4. Accessing Array Elements:

We access each array element by written name of array, followed by brackets delimiting a variable (or constant) in the brackets which are called the array index.

- Accessing the first element of array num to variable x:

x = num [0];

- Accessing the last element of array num to variable y:

y = num [9];

- cout << num [0] + num [9];

- num [0] = num [1] + num[2];

- num [7] = num [7] + 3; ⟷ num [7] += 3;

5. Read / Write / Process Array Elements:

- cout << num [4];

- for (int i=0; i<10; i++)

  cout << num[i];

- if (num [5] > 5)

  cout << "greater";

- for (int i=9; i>=0; i++)

  cout << num[i];

- for (int i=0; i<10; i++)

cin >> num[i];

- sum=0;

  for (int i=0; i<10; i++)

  sum = sum + num[i];

Example 1

Write C++ program to display 2nd and 5th elements of array distance:

```cpp
#include<iostream.h>

void main( )

{

double distance[ ] = { 23.14, 70.52, 104.08, 468.78, 6.28};

cout << "2nd element is: " << distance[1] << endl;

cout << "5th element is: " << distance[4];

}
```

Example 2

Write C++ program to read 5 numbers and print it in reverse order:

```cpp
#include<iostream.h>

void main( )

{

int a [5];

cout << "Enter 5 numbers \n";

for ( int i =0; i <5; i++ )

{

cout << i << ": ";

cin >> a [ i ];

cout << "\n";

}

cout << "The reverse order is: \n";

for ( i =4; i >=0; i-- )

cout << i << ": " << a [ i ] << endl;}
```

Example 3

Write C++ program, to find the summation of array elements:

```cpp
#include<iostream.h>

void main ( )

{

int const L = 10;

int a [L];

int sum = 0;

cout << "enter 10 numbers \n";

for ( int i =0; i <L; i++ )

{

cout << "enter value " << i << ": ";

cin >> a [ i ];

sum += a [ i ];

}

cout << "sum is: " << sum << endl;

}
```

Example 4

Write C++ program, to find the minimum value in array of 8 numbers:

```cpp
#include<iostream.h>

void main ( )

{ int n = 8; int a [ ] = { 18, 25, 36, 44, 12, 60, 75, 89 };

int min = a [ 0 ];

for ( int i = 0; i < n; i++ )

if ( a [ i ] < min ) min = a [ i ];
```

cout << "The minimum number in array is: " << min; }

Example 5

Write C++ program, to give the number of days in each month:

#include<iostream.h>

void main ( )

{

Int month, day, total_days;

Int days_per_month[12]={31,28,31,30,31,30,31,31,30,31,30,31}

Cout<<"\n Enter month(1 to 12):";

Cin>>month;

Cout<<"enter day(1 to 31):";

Cin>>day;

Total_days=day;

For (int j=0;j<month-1;j++)

Total_day+=day_per_month[j];

Cout<<"Total days from start of year is:"<<total_days;

}

Example 6

Write C++ program, using function, to find (search) X value in array, and return the index of it's location:

#include<iostream.h>

int search(int a[ ], int y)

{

int i= 0;

while (a [i] != y)

```cpp
i++;

return ( i );

}

void main ( )

{

int X, f;

int a [ 10 ] = { 18, 25, 36, 44, 12, 60, 75, 89, 10, 50 };

cout << "enter value to find it: ";

cin >> X;

f= search (a, X);

cout << "the value " << X << " is found in location "<< f;

}
```

Example 7:-

Write C++ program, to split the odd numbers and even numbers of one array into two arrays:

a = [1, 2, 3, 4, 5, 6, 7, 8, … , 20]

aodd = [1, 3, 5, 7, … , 19]

aeven = [2, 4, 6, 8, … , 20]

```cpp
#include<iostream.h>

void main ( )

{

int a [ 20 ]= { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 };

int aodd[20], aeven [20];

int i ,o=0, e=0;

for ( i=0 ; i<20; i++ )
```

```cpp
if (a[i] % 2 !=0)

{

aodd[o]=a[i];

o=o+1;

}

else

{

aeven[e]=a[i];

e=e+1;

}

for ( i=0 ; i<o; i++ )

cout<<aodd[i]<<" ";

cout<<endl;

for ( i=0 ; i<e; i++ )

cout<<aeven[i]<<" ";

}
```