

Introduction to Computing

Lab 01	
Topic	Basics of array
Objective	Learning objectives of this lab are to get hands on experience on the concepts of array

Array:

An array is a collection of a fixed number of components (also called elements) all of the same data type and in contiguous (that is, adjacent) memory space.

Declaration statement of an array: dataType

identifierName[numberOfElementsRequired];

Above statement is used for creating an array. But as we discussed above when a memory location is reserved for this array it holds some values which are not assigned by user. So those values are considered as garbage value. In order to avoid garbage value, it is a good practice to assign values at the time of creation of array.

Initialization statement of an array:

Assigning value at the time of declaring of array or variable is called initialization statement. There are multiple ways of initialize an array.

Initialize an array with 0:

```
dataType identifierName[numberOfElementsRequired]={};
```

OR

```
dataType identifierName[numberOfElementsRequired]{};
```

Example:

```
int arr[5]={}; OR int arr[5]{};
```

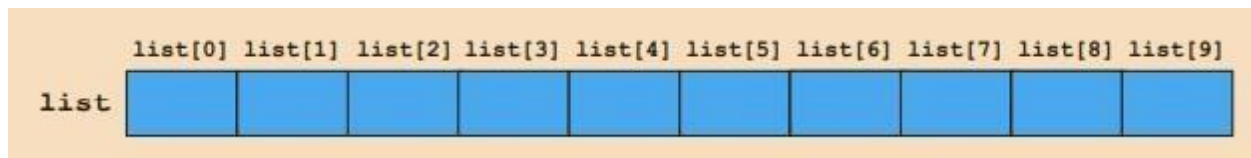
Full array initialization with different elements:

dataType identifierName[numberOfElementsRequired]={required # of elements but comma separated values}; Example: int arr[5]={1,2,3,4,5};

Partial array initialization with different elements:

dataType identifierName[numberOfElementsRequired]={less than required # of elements but comma separated values}; int arr[5]={1,2,3}; on remaining indexes 0 will be assigned as initial value in case of partial array initialization.

Accessing array components:



Generic way of accessing an array is: IdentifierName[index#]; int list[10];

//list[0] is use for accessing first element of an array.

Array input:

We can take input from user into an array. We can take input index wise one by one and we can also take input at specific index number.

Input at specific index:

cin>> list[0]; //taking input on index 0 which is the first element of an array.

Input in whole array:

We use repetition statement(loops) for taking input in whole array. We can take input one by one as mention above but it is not considered as a good practice.

```
for(int i=0;i<size;i++)// i is used as index number and size is the number element you want to enter.
{
    cin>>list[i]; // taking input at specific index i. After every iteration value of i will be updated.
}
```

Array output:

We can display the values of array on console as output to user. We can display index wise one by one and we can also take input at specific index number.

Output of specific index:

cout<< list[0]; //display the value of index 0 which is the first element of an array.

Output of whole array:

We use repetition statement(loops) for display whole array. We can display elements one by one as mention above but it is not considered as a good practice.

```
for(int i=0;i<size;i++)// i is used as index number and size is the number element you want to display.
{
    cout<<list[i]; // display specific index i. After every iteration value of i will be updated.
}
```

Array index out of bound:

Index of an array is in bounds if index is between 0 and ARRAY_SIZE - 1, that is, $0 \leq \text{index} \leq \text{ARRAY_SIZE} - 1$. If index is negative or index is greater than ARRAY_SIZE - 1, then we say that the index is out of bounds.

Task 1

Write a C++ program to take 10 inputs from user and store them in arrays and print the result on the screen.

Example:

Output:

Enter Numbers 1 2 3 4 5 6 7 8 9 10

Numbers are:

1 2 3 4 5 6 7 8 9 10

Task 2

Write a C++ program that initialize an array of size 10. Find the Sum and average of all numbers and print the result on screen.

Example:

Array [10] = 23 45 67 78 3 567 0 -1 4 67

Output:

Sum of numbers is: 853

Average of numbers is: 85.3

Task 3

Write a C++ program to find the Maximum element of an array.

Example:

Array [] = 1 2 3 4 5 6 7 8 9 10

Output:

Maximum Number is: 10

Task 4

Write a C++ program to find the Minimum and sum of elements of an array.

Example:

Array [] = 1 2 3 4 5 6 7 8 9 10

Output:

Minimum Number is: 1

Sum of elements is: 55

Task 5

Write a C++ program that initialize an array of size 10. Print the whole array in reverse order.

Example:

Enter the elements of Array: 1 2 3 4 5 6 7 8 9 10 The

Original Array is:

1 2 3 4 5 6 7 8 9 10

The Array in Reverse Order is: 10

9 8 7 6 5 4 3 2 1

Task 6

Write a C++ program that initialize an array and elements of an array taken by user. Print only odd values on screen.

Example:

Output:

Enter the size of the array

10

Enter the elements of the array

23 45 67 78 3 567 0 -1 4 67

Odd values are

23 45 67 3 567 -1 67

Task 7

Write a C++ program that initialize an array and elements of an array taken by user. Print all even numbers in array.

Example:

Output:

Enter the size of the array

10

Enter the elements of the array

23 45 67 78 3 567 0 -1 4 67

Even values are

78 0 4

Task 8

Write a C++ program to take 10 elements from user and find any number from the array elements.

Example:

Output:

Enter 10 elements: 1 2 3 4 5 6 7 8 9 10

Enter a number to search: 5

Number is found at index no. 4