LAB NO: 5 **Date:**

1D ARRAYS

Objectives:

In this lab, student will be able to:

- Write and execute programs on 1Dimensional arrays

Introduction to 1D Arrays

1 Dimensional Array

Definition:

- An array is a group of related data items that share a common name.
- The array elements are placed in a contiguous memory location.
- A particular value in an array is indicated by writing an integer number called index number or subscript in square brackets after the array name. The least value that an index can take in array is 0.

Array Declaration:

data-type name [size];

- ✓ where data-type is a valid data type (like int, float, char...)
- ✓ name is a valid identifier
- ✓ size specifies how many elements the array has to contain
- ✓ size field is always enclosed in square brackets [ ] and takes static values.

Total size of 1D array:

The Total memory that can be allocated to 1D array is computed as:

Total size =size *(*sizeof*(data_type));

where, size→ number of elements in 1-D array

data_type→ basic data type.

sizeof()→ is an unary operator which returns the size of expression or data type in bytes.

For example, to represent a set of 5 numbers by an array variable ***Arr***, the declaration the variable ***Arr*** is

***int Arr*[5];**

Solved exercise

Sample Program code snippet to read *n* elements into a 1D array and print it:

```
int a[10], i, n;
cout<<"enter no of elements";
cin>>n;
cout<<"\nenter n values\n";
for(i=0;i<n;i++) // input 1D array
        cin>>a[i];
cout<<"\nNumbers entered are:\n";
for(i=0;i<n;i++) // output 1D array
        cout<<a[i]<<endl;
```

Output:

```
Enter no of elements
3
Enter n values
9
11
13
Numbers entered are:
9
11
13
```

Lab exercises

With the knowledge of 1D and 2D array structures,

Write C++ programs to do the following:

1. Arrange the elements in ascending/descending order using Bubble sort method.
2. Insert an element into a 1D array and delete an element from a 1D array.
3. Search an element in a 1D array using linear search.
4. Implement Euler's method for finding an approximate value of y corresponding to x ranging from [1.0 to 1.5], with y1=5, h=0.1 and n=6.
5. Obtain f (x) using Lagrange's Interpolation method for the following records with x=2.5

X	0	1	2	3
f(x)	0	2	8	27

Additional exercises on 1D array

1. Find the largest and smallest element in a 1D array.
2. Print all the prime numbers in a given 1D array.
3. Search for an element in a given matrix and count the number of its occurrences.
4. Implement modified Euler's method for finding an approximate value of y corresponding to x0=0, y0=1 and h=0.05 with value of last point as 0.1.
5. Implement Runge-Kutta method for finding an approximate value of y corresponding to x0=0, y0=2 and h=0.05 with value of last point as 0.1.