National University of Computer and Emerging Sciences



Lab Manual 02

Object Oriented Programming

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## Objectives

After performing this lab, students shall be able to:

* Dynamically allocate and deallocate memory
* Create and manipulate dynamic 1D arrays
* Use pointers to pass arrays to functions
* Pass pointers to functions by value and by reference.

**Short Tutorial:**

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**Static Declaration of Variable:** int a;

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**Dynamic Declaration of Variable:** int\* ptr=new int;

**Deletion of dynamic variable:** delete ptr;

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**Static Declaration of array:** int a[5];

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**Dynamic Declaration of array:** int\* ptr=new int[5];

**Deletion of dynamic variable:** delete [] ptr;

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**TASK 1:**

Fibonacci sequence is a sequence in which every number after the first two is the sum of the two preceding ones. Write a C++ program that takes a number **n** from user and populate a dynamic array with first n Fibonacci numbers.

**For example**:

For n=10

Fibonacci Numbers: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55

**TASK 2:**

Write a C++ program that declares and initializes a float array dynamically and finds the index of the first occurrence of the second largest element in the array.

**For Example:**

**Input:**

Please enter size: 5

Please enter elements: 1.5

7.8

3.2

9.0

7.1

**Output:**

Second Largest element is: 7.8

Index of second largest element is: 1

**TASK 3:**

Write a C++ program that keeps taking integer input from the user until user enters -1 and displays the data in reverse order.

Your program should save the input in a dynamically allocated array. Initially create a dynamic array of five integers. Each time the array gets filled your program should double the size of array and continue taking the input. After receiving **-1** (i.e. end of data input) your program should print the integers in the reverse order as entered by the user.

You have to make use of the following functions for this task:

* **void Input (int \* & iarr, int & size);** //why is size passed by reference for this?
* **void reverse (int \* iarr, int size);**
* **void Output (int \* iarr, int size);**

**TASK 4:**

Take size input from the user and create an array of that size. Now populate the array as well by taking input from the user.

* First Implement **void copyArray(int\* arr, int \*&arr1, int size)** that copies arr into arr1.
* Now implement another function **int reduceArray(int \*arr, int \*&arr1, int size)** that asks user to enter size to reduce the array. To reduce the array remove the elements of the arr from the start and copy remaining into arr1. Use **copyArray** function to copy.

**For Example:**

**Input:**

Please enter size: 8

Please enter elements: 91

5

3

40

7

8

12

642

Please enter the reduced size of array: 5

**Output:**

Array after reduction is: 40

7

8

12

642