National University of Computer and Emerging Sciences

Laboratory Manual

for

Object Oriented Programing Lab

Course Instructor	Mr. Uzair Naqvi
Lab Instructor(s)	Aqib Zeeshan, Seemab Ayub
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Department of Computer Science

FAST-NU, Lahore, Pakistan

Objectives:

In this lab, students will practice:

1. Pointers
2. Dynamic memory allocation

1   Exercise- Pointers

Write a program with below features:

1. The program declares a pointer dynamic Array to an array of integers.
2. It dynamically allocates memory for an array of 5 integers using new.
3. The array elements are initialized with values (in this case, twice the index).
4. The program prints the array elements using pointer arithmetic, demonstrating accessing elements with pointer notation.
5. Finally, it deallocates the dynamically allocated memory using delete [].

One example is below:

2   Exercise- Address and Dereference Operators

Write a program that dynamically allocates memory for an integer variable, takes user input for its value, and then prints both the value and the address of the variable using both the address-of and dereference operators.

1. The program dynamically allocates memory for an integer using new.
2. User input is taken for the integer value, and the value is printed using the dereference operator (*).
3. The address of the dynamically allocated integer is printed using the address-of operator (&).
4. Finally, the dynamically allocated memory is deallocated using delete.

One example is below:

```
Enter an integer value: 42
Value using dereference operator: 42
Address using address-of operator: 0x7fff9d7e8a90 (This address will be different on each run)
```

3   Exercise – Dynamic memory Allocation and Arithmetic Operations

Write a program that dynamically allocates memory for an array of integers, takes user input for the array size and elements, and then performs arithmetic operations using pointers to manipulate the array. Display the modified array after performing operations such as incrementing each element or multiplying by a constant.

1. The program dynamically allocates memory for an array of integers based on user input.
2. User input is taken for the array elements, and arithmetic operations (in this case, incrementing each element by 5) are performed using pointers.
3. The modified array is displayed, and dynamically allocated memory is deallocated.

Required Output:

```
Enter the size of the array: 3
Enter 3 integers for the array:
```

Element 1: 10
Element 2: 20
Element 3: 30
Modified array after incrementing each element:
15 25 35

4   Exercise – DMA and passing dynamic arrays to functions.

Write a program that reverses the elements of an array using pointer notation. The program should prompt the user to enter the size of the array and its elements.

Steps:

- Get the size of the array by user and create a dynamic array.
- Prompt the user to enter array elements.
- Create a function void reverseArray(int *arr, int size) that will reverse the array elements by using pointers.
- Print the reversed array.
- Deallocate memory.