**National University of Computer and Emerging Sciences**

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**Lab Manual # 02**

Object Oriented Programming

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# **Objective:**

* Dynamic memory allocation using pointers.
* Dynamic Variables new and delete operators.
* Dynamic 1- dimensional arrays, Create, Delete, Grow and Shrink.

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| **Task 1:** | **Dynamic Memory Allocation** |

### **Exercise 1 [Input Array]:**

Write a function **int\* InputArray(int& size)** that asks user to enter size of required array, allocates the memory on heap, takes input in array and returns its pointer.

### **Exercise 2 [Output Array]:**

Write a program **void OutputArray(int\* myArray, const int& size)** that takes a pointer to an integer array and prints its data.

Write main function to test above functionality.

### **Exercise 3 [Union]:**

Implement a function **int\* Union(int\* setA, int& size1, int\* setB, int& size2, int& size3)** that finds the intersection of two sets (stored using arrays).

**Sample Run:**

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| **//Input:**  **Enter Size of Array:** 6  **Enter 6 elements:** 1 2 3 4 5 6  **Enter Size of Array:** 4  **Enter 4 elements:** 1 3 5 7  **//Output**  **A =** {1,2,3,4,5,6}  **B =** {1,3,5,7}  **A Union B =** {1,2,3,4,5,6,7} |

**Help:** Note array3 **should not have any duplicate** elements. You have to:

* Allocate the three arrays dynamically after inputting the size of array1 and array2 from the user. Statically allocated arrays are NOT allowed
* Initially you can allocate elements = (size of array1 + size of array2) to array3. For example, you would allocate 6+4 to array3 for the above example. After finding the union, the allocated size of array3 may be more than what you need. (In the above example you require size 7 whereas you have allocated 10).

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| **Task 2:** | **Expand Array** |

Write a 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 (i.e. create a new array of double size, copy previous data in new array, delete previous array) and continue taking the input. After receiving -1 (i.e. end of data input) your program should print the numbers in the reverse order as entered by the user.

**Important Note:** **Do not consume extra space. There shouldn’t be any memory leakage or dangling pointers in your code.**