University of Computer and Emerging Sciences

Laboratory Manual

for

Data Structures Lab

Course Instructor	Mr. Faraz
Lab Instructors	Ms. Humna Shabir Mr. Muhammad Mazarib
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Department of Computer Science

FAST-NU, Lahore, Pakistan

Objective:

After performing this lab, below mentioned concepts would be revised

1. Array based list

Instructions:

• Make a separate project for each task.
• Indent your code properly.
• Use meaningful variable and function names. Follow the naming conventions.
• Use meaningful prompt lines and labels for all input/output.

Question 1:

Implement a class called myVector that stores integers in it. You have to implement the following members:

1. Private data member **arrayPtr** to integer array
2. Private data member **capacity** of array
3. Private data member that specifies the actual elements i.e.**current size**(elements added to the array by the user (initially it should be set to zero))
4. Default constructor (initially it should allocate an array of size 2. You will have to set the other private members too. Initialize the array to zero)
5. Constructor with int parameter (the int parameter specifies the capacity of the array). The constructor should initialize the entire array to zero.
6. Copy constructor (should make a deep copy)
7. Destructor (if the array is allocated then deallocate it)
8. Get function for total capacity…(think of other get functions)
9. + operator that takes an integer variable as parameter. This method should add one integer to the array and increase the number of current elements. If the allocated size is not sufficient then increase the capacity of the array by double. Copy the old array in the new one (including the new element) and delete the old array.
10. Make a function **sortelement** that sort all elements of array using insertion sort sorting techniques.
11. Make a function **SearchElement** that searches an element of an array using Binary search techniques.
12. Make a function **DeleteFirstElement** that deletes the first element of an array.
13. Make a function **ShuffleElement** that takes two indexes of an array as arguments and shuffle these index elements of an array.
14. – operator that takes no parameters. This method should delete the last added value from the array and change the current size. (note no memory allocation or deallocation will take place here)
15. >>operator which takes as input the elements of myVector.
16. <<operator which prints the elements of myVector.

Provide a sufficient main program that tests all of the above functions. (including destructors too).

Question 2:

Convert the class myVector, which is implemented in Question 1, in a generic template class that can store any data value in it.