National University of Computer and Emerging Sciences



**Laboratory Manual #2**

*for*

# Data Structures Lab

**(CL 2001)**

Department of Computer Science

FAST-NU, Lahore, Pakistan

## Introduction

### Objectives

After performing this lab, students shall be able to:

* Overview of vectors and arrays
* Different techniques of how to sort the input data.
* Different techniques of how to search from the input data.
* Learn to find the time complexity of the different codes and techniques.

### Problems

**Vectors:**

In computer programming, a vector is a data structure used to store a collection of elements, typically of the same data type, in a sequential and ordered manner. Vectors are also known as dynamic arrays because they provide dynamic sizing, allowing elements to be easily added or removed.

**Question#1:**

Write a function to sort vector elements using bubble sort. Also write the time complexity of complete code.

[64, 34, 25, 12, 22, 11, 90]

**Question#2:**

Write a function to sort vector elements using insertion sort. Also write the time complexity of complete code.

[64, 34, 25, 12, 22, 11, 90]

**Question#3:**

Write a function to sort vector elements using selection sort. Also write the time complexity of complete code.

[64, 34, 25, 12, 22, 11, 90]

**Question#4:**

Write a function that takes an input from user then search that element from the given vector using binary search. Also write the time complexity of complete code.

[64, 34, 25, 12, 22, 11, 90]