National University of Computer and Emerging Sciences

Lab Manual # 07

Programming Fundamentals

Course Instructor	Dr. Amir Wali
Lab Instructor(s)	Arfa Masood Hira Butt
Section	1B
Semester	Fall 2022

Department of Computer Science
FAST-NU, Lahore, Pakistan

Instructions:

- Do your tasks individually
- Anyone indulged in the act of plagiarism would be awarded zero
- Pay attention to details, do paper work before starting your code
- Understanding of the question is also part of the lab work

Objectives:

In this lab, students will study:

- Nested loop
- Arrays

Searching in arrays

Searching is the process of finding the required data in the array. Searching become more important when the length of the array is large.

Task 1: (Nested loop) Write a program that takes height as an input and shows the following triangle: i.e. size = 6

```
      1
     1 1
    1 2 1
   1 3 3 1
  1 4 6 4 1
 1 5 10 10 5 1
```

Task 2: (1D- Array) Write a program that initializes an array. It inputs a value from the user and searches the number in the array.

Output:

Enter a value to find: 50

Value found at index: 4

Task 3: (1D-Array) Write C++ program that initializes an array of ten integers (sorted array). It inputs an integer from the user and searches the value in the array doing the following tasks:

- First locate the middle element of array and compare with the search number

- If they are equal, search is successful and the index of middle element is returned

- If they are not equal, reduces the search to the half of the array

- If the search number is less than the middle element, the first half of the array search, otherwise the second half of the array is search

- The process continues until the required number is found or loop completes without successful search

Output:

Enter values: 10 20 30 40 50 60 70 80 90 100

Enter any number to find: 30

Output: 30 found at index 2