National University of Computer and Emerging Sciences

Lab Manual 1

for

Data Structures Lab

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Section	BCS-3H
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Objectives:
In this lab, students will practice:

- Searching Algorithms
- Sorting Algorithms

Question 1: Write a C++ program to search an element from an array. You are required to ask the user the enter size and elements of the array. Apply **Bubble Sort** on the entered array. Further ask the user to search an element. If the element is present print "Present" else "Not Present". Also print the index of the element on which it is present. (USE BINARY SEARCH)

Sample Output:
Enter the size of the array: 7
Enter the elements of the array: 5, 4, 8, 5, 1, 6, 3

Sorted Array: 1, 3, 4, 5, 5, 6, 8

Search an Element: 5
The searched element is Present on index 3 and 4.

Question 2: Write a C++ program to sort given array using **Insertion Sort.**

8	**2**	**10**	**1**	**3**	**15**

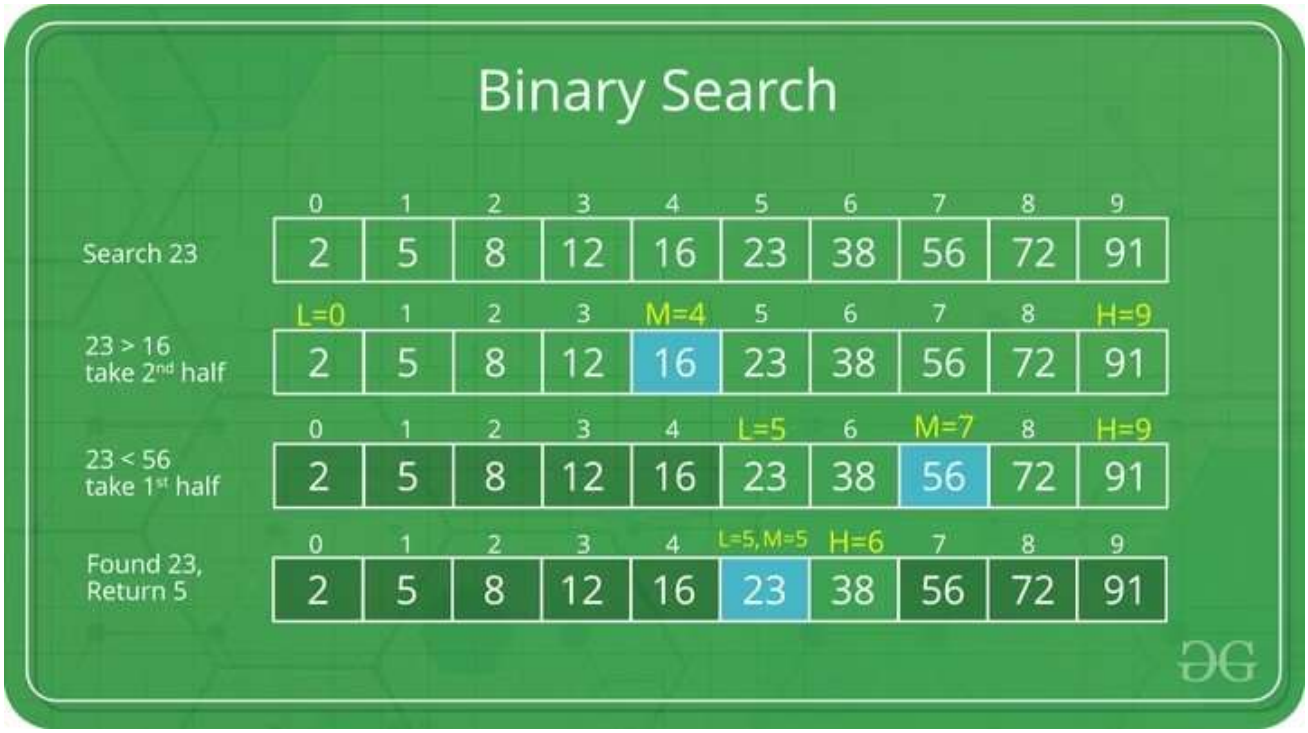
Sample Output:
Unsorted array: 8, 2, 10, 1, 3, 15
Sorted Array: 1, 2, 3, 8, 10, 15

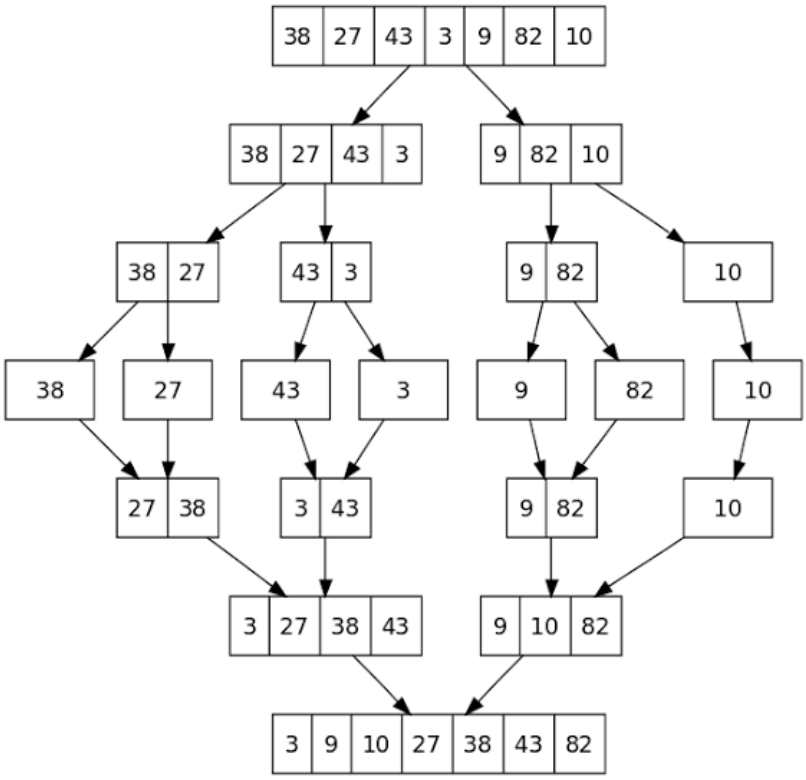
Question 3: Write a C++ program to sort given array using **Merge Sort**.

2	**1**	**10**	**7**	**3**	**6**	**5**

Sample Output:
Unsorted array: 2, 1, 10, 7, 3, 6, 5
Sorted Array: 1, 2, 3, 5, 6, 7, 10

For Reference


Binary Search
Search 23
23 > 16
take 2nd half
23 < 56
take 1st half
Found 23,
Return 5
0 1 2 3 4 5 6 7 8 9
2 5 8 12 16 23 38 56 72 91
L=0 M=4 H=9
L=5 M=7 H=9
L=5,M=5 H=6


38 27 43 3 9 82 10
38 27 43 3
9 82 10
38 27
43 3
9 82
10
38
27
43
3
9
82
10
27 38
3 43
9 82
10
3 27 38 43
9 10 82
3 9 10 27 38 43 82

Insertion Sort Execution Example