Sardar Vallabhbhai National Institute of Technology, Surat Department of Artificial Intelligence Data Structure (AI102) B.Tech I - II Semester

Assignment-1

Q1: An array is a bitonic array if all integers from index 0 to index i are sorted in ascending order, and all subsequent integers from index i+1 to n-1 are sorted in descending order. Given a bitonic array of n distinct integers, write a C/C++ program to find the maximum integer in the array in O(log(n)) time.

Example:

Input: n = 6, $A[] = \{1 2 4 8 7 6\}$

Output: 8

Q2: Let A[n] be an array of n distinct integers. If i < j and A[i] > A[j], then the pair (i, j) is called an inversion of A. Write a C/C++ program that determines the number of inversions in any permutation on n elements.

Example: $A = \{4, 1, 3, 2\}$ output is 4

Q3: Write a C program to manage the details of students using an array of structures.

The program should:

- 1. Accept the number of students (n) from the user.
- 2. For each student, input the following details:
 - Roll number (integer)
 - Name (string)
 - Marks (floating-point value)
- 3. Store the details of all students in an array of structures.
- 4. Display the details of all students in a formatted way.