

Programme Name & Branch: B.Tech. - Computer Science and Engineering

Course Name & Code: Data Structures and Algorithms, BCSE202L

Class Number (s): ALL

Exam Duration: 90 Min.

Maximum Marks: 50

General instruction(s): Any other specific instruction

Q. No.	Question	Marks
1.	<p>a) Function Sort(array, n)  // n is the number of elements in array  for (i from 0 to n-1)  {  for (j from 0 to n-2-i)  {  if array[j] &gt; array[j+1]  {  // Swapping array[j] and array[j+1]  temp = array[j]  array[j] = array[j+1]  array[j+1] = temp  }  }  }  }</p> <p>Find out the worst-case time complexity for this iterative algorithm using summation formulas. Assume that the input array is unsorted.</p> <p>b) Write the pseudo code for recursive linear search algorithm, and the find the recurrence relation of the algorithm.</p>	5+5
2.	<p>State Master's Theorem and apply the same to solve the following recurrence relation :</p> <p>i) <math>T(n) = T(n/2) + 2^n</math>  ii) <math>T(n) = 2T(n/2) + n \log n</math>  iii) <math>T(n) = 3T(n/2) + n^2</math>  iv) <math>T(n) = 64T(n/8) - n^2 \log n</math></p>	5+5
3.	<p>Provide the steps for a) infix to postfix and b) infix to prefix conversion using proper data structure and show to convert the given infix expression: <math>(a-b)/c*(d+e-f/g)</math> to postfix.</p>	5+5
4.	<p>Deque (Double Ended queue) efficiently manages insertion and deletion of elements at both ends, i.e., front and rear.  Implement and compare <i>enqueueFront()</i> <i>dequeRear()</i> operations for linear and circular DQueue.</p>	5+5
5.	<p>Output of a sorting algorithm after 2nd iteration looks like:  10 12 93 42 77 63 57.</p> <ul style="list-style-type: none"> <li>Identify the sorting algorithm applied on this array of integers; (1 mark)</li> <li>Show the steps to sort the entire array, (4 marks)</li> <li>Provide the pseudo code for the same algorithm. (5 marks)</li> </ul>	10