



School of Computer Science and Engineering

Winter Semester 2023-24

Continuous Assessment Test I

SLOT: AI+TA1

Programme Name & Branch: MIC & MID

Course Name & code: CSI2002 -Data Structures and Algorithm Analysis

Class Number (s): VL2023240504535, 1874, 1870, 1872, 1867

Faculty Name (s): Prof. Parveen Sultana H, Prof. Murali, Prof. Goutam Majumder, Prof. Boominathan & Prof. Parthasarathy G

Exam Duration: 90 Min.

Maximum Marks: 50

Q. No.	Answer all the Questions	Max Marks
1.	Devise a code to delete all occurrences of an element from an array and display the count of the element occurred.	10
2.	Find the time Complexity for the following recurrence relation using Master's theorem. i) $T(n) = 2T(n/2) + n \log n$ ii) $T(n) = 6T(n/3) + n^2 \log n$	10
3a.	Find the time complexity for the following code snippet <pre>void function() { int i, j, k; for(i=n/2; i<=n; i++) { for(j=1; j<=n/2; j++) { for(k=1; k<=n; k=k*2) { printf("DSAA"); } } } }</pre>	4+6
3b.	Derive the time complexity for the following recurrence relation using recursion tree. $T(n) = 2T(n/2) + c$, if $n > 1$ and $T(n) = c$ if $n = 1$.	
4.	Inscribe an algorithm to convert infix expression to postfix expression. Apply the same algorithm to convert given infix expression to postfix. Show the stack trace for each symbol scanned. $(A+B)*(C*D - E)*F / G$	10

5.	In an office, there are n chairs numbered 1 through n for a reservation counter. The service desk has a counter that goes from 1 to n servicing each customer and repeats. New customers arrive (all the time) and take the seat with the lowest possible number which is still unoccupied. If all seats are occupied, then the arriving customer leaves and does not return. Identify an appropriate data structure for this use case and devise an algorithm to perform the operations to be carried out in a above case.	10