

JK Lakshmipat University Jaipur

INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination-, December 2023

B. Tech. in CSE+ECE, Semester III

Roll No.....

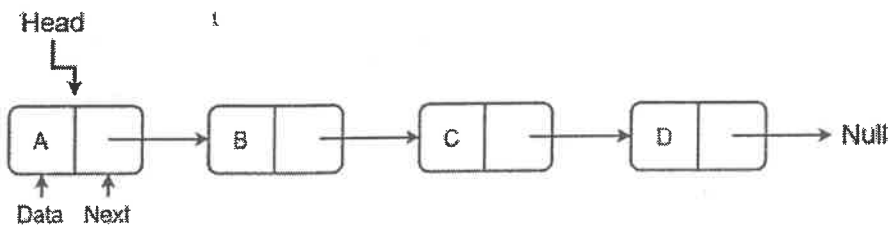
CSE1132: C Programming and Data Structures

Time: 2:30 hours

Max. Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A	For each of the following function $f(N)$ given below, write the closest bound in Big-O notation. Choose your answers from the following: $O(N^2)$, $O(\log_2 N)$, $O(1)$, $O(2^N)$, $O(N)$, $O(N^4)$ a. $f(N)=50000$ b. $f(N)=\log_2 N + N^{1/8}$ c. $f(N)=N \cdot \log_2(2^{4N}) + N$ d. $f(N)=(N^2)^2 + 2^{N-1}$	02 Marks CO2
Q.2	(a) For the given definition of stack structure, write the push function <pre>struct shirt_stack {int top; Int shirt_codes[20]; }</pre> (b) Write a C function to insert a node after the node having value C in the Data part Singly Linked list? <pre>struct Node{ char x; struct Node* next; }</pre>  What is the running time complexity of your code?	02 Marks CO2, CO3 02 Marks
Q.3A	Convert the following given infix expressions to postfix and prefix notation. $A + ((B + C) * (D + E) + F / G)$	02 Marks CO3
Q.3B	Suppose we want to delete a node (value 20) of a binary search tree. The node is a leaf node, and the address of its parent is P, then write a piece of code to delete this node?	02 Marks CO2
Q.4A	$ABC + * CBA - + *$ is a postfix expression with the assumption $A = 5$, $B = 3$, and $C = 6$, if the above postfix expression is evaluated, what will be the final stack value?	02 Marks CO5

Q.4B	Answer True or False with one line of explanation, if False, give the right answer. (a) Building a heap from an array of N items requires $O(N \log_2 N)$ operations. (b) Merging two sorted file of size N, requires $O(N^2)$ operations. (c) The balancing factor of any node of an AVL tree is not more than 1. (d) The worst case complexity of searching an element in an AVL tree is nearer to $O(\log_2 N)$. (e) The best-case complexity of bubble sort is $O(N)$. (f) In Hashing, collision can be reduced by making the table size bigger than the range of key values and the number of key values..	03 Marks CO4
Q.4C	Sort the following numbers using Heap Sort (Min Heap & Descending order) 73, 145, 47, 20, 50, 90, 60, 87 Also write worst case and best-case time complexity for this sorting?	03 Marks CO5

Q.5	For each binary tree provide the information listed below it- A) B) I) Type of binary tree II) Height of the tree III) Ancestor of node C IV) Balance of nodes G, C, B, D	03 Marks CO2, CO5
Q.6A	Draw a picture of the directed graph specified below: $G = (V, E)$ $V(G) = \{1, 2, 3, 4, 5, 6\}$ $E(G) = \{(1,2), (2, 3), (3, 4), (5,1), (5, 6), (2, 6), (1, 6), (4, 6), (2, 4), (3,6),(4,5)\}$ Obtain the following for the above graph: (i) Adjacency matrix (ii) Adjacency list	03 Marks CO2, C)7
Q.6B	Given the following Inorder and preorder traversal reconstruct a binary tree. Preorder: G, B, Q, A, C, K, F, P, D, E, R, H In-order: Q, B, K, C, F, A, G, P, E, D, H, R	02 Marks CO3
Q.7A	Draw the 11-item hash table resulting from hashing the keys: 12, 44, 13, 88, 23, 94, 11, 39, 20, 16 Using the hash function $h(k) = (2k+5) \bmod 11$. Use linear probing for collision.	02 Marks CO2

Q.7B	Draw an BST by inserting given keys into an empty binary search tree- 30, 40, 24, 58, 48, 32, 8, 76, 88, 99, 54, 29, 75 (in this order).	02 Marks CO3
------	--	--------------------

*****All THE BEST*****