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13MCA21

Second Semester MCA Degree Examination, June/July 2015
Data Structures using C

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions.

- 1
 - a. What is an abstract data type? Write the ADT for an array. (06 Marks)
 - b. What are the different data types in C? Explain with examples. (07 Marks)
 - c. What is a string? What are the different character string operations in C? Discuss. (07 Marks)

- 2
 - a. Define stack. Explain the implementation of push and pop operations (using structure). Give atleast one major application of stack. (07 Marks)
 - b. Convert the following infix expression to postfix expression through tracing and evaluate:
 $5 + (3 * 2) / (2 - 1)$. (07 Marks)
 - c. Write a 'C' program to evaluate the postfix expression. (06 Marks)

- 3
 - a. What is recursion? Demonstrate recursion by solving tower of Hanoi problem using C. (10 Marks)
 - b. What is a queue? Represent a queue as an ADT. (06 Marks)
 - c. Briefly explain queue as a circular list. (04 Marks)

- 4
 - a. What is a linked list? What is a doubly linked list? Bring out the advantages of doubly linked list over singly linked list. (04 Marks)
 - b. Simulate the working of a linked list providing insert at any given position, insertion before an element and display the updated list. (10 Marks)
 - c. Discuss array implementation of lists and its limitations. (06 Marks)

- 5
 - a. Write the function to perform bubble sort and trace the same for the input values:
 25 57 48 37 12 92 86 33. (10 Marks)
 - b. Which are the different sorting algorithms? Discuss. (10 Marks)

- 6
 - a. Write a 'C' program to traverse a tree in inorder, preorder and postorder. (10 Marks)
 - b. Explain binary search and write a program for searching an element in a given list of integers using binary search. (10 Marks)

- 7
 - a. Define: Binary tree, strictly binary tree, level of a node, depth of a tree, complete binary tree. (05 Marks)
 - b. Give the binary tree representation of the expression:
 $A + (B - C) * D \$(E * F)$ and $((A + B * C) \$ (A + B) * C)$. (05 Marks)
 - c. What are balanced trees? Explain insertion into AVL trees. (10 Marks)

- 8
 - Write short notes on:
 - a. Information and meaning
 - b. Implementing recursive functions
 - c. Getnode and freenode operations in lists
 - d. Threaded binary tree. (20 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and/or equations written e.g. 42-8 = 50, will be treated as malpractice.