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10CS35

Third Semester B.E. Degree Examination, Dec.2018/Jan.2019
Data Structures with C

Time: 3 hrs.

Max. Marks:100

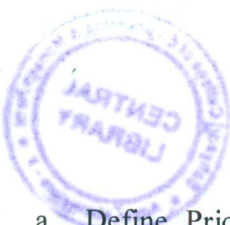
**Note: Answer FIVE full questions, selecting
at least TWO questions from each part.**

PART - A

- 1 a. Explain with suitable examples dynamic memory management in C. (08 Marks)
- b. What are the components of space requirements of an algorithm? Illustrate computations for space requirements for the function to add list of 'n' numbers. (08 Marks)
- c. Give the meaning of $O(1)$, $O(n)$, $O(n^2)$ and $O(n^3)$. (04 Marks)
- 2 a. Write Abstract Data Type for array. Write a function to sort an array of 'N' integers in ascending order. (08 Marks)
- b. Differentiate between structure and union. Give structure representation for polynomial diagrammatically, illustrate how multiple polynomials can be stored in one-dimensional array. (08 Marks)
- c. Write function to add two matrices. Display proper error messages when addition is not possible. (04 Marks)
- 3 a. Give ADT for stack. Write push () and pop () functions for stack for array representation. (08 Marks)
- b. What are the limitations of sequential queue? How it is overcome using circular queue? Write addq () and deleteq () functions for circular queue. (08 Marks)
- c. Give Prefix and Postfix forms of following expressions :
 - (i) $a/b - c + d * e - a * c$
 - (ii) $a * (b + c) / d - g$ (04 Marks)
- 4 a. Discuss how chain is represented in C. Write program in C to implement stack, using linked list. (08 Marks)
- b. Explain with suitable example representation of circular list in C. Write a C function to count number of nodes (length) of circular list. (08 Marks)
- c. Compare arrays with linklists. (04 Marks)

PART - B

- 5 a. What is Binary search tree? Write a function for level order traversal of binary search Tree. Trace your function for one sample input. (08 Marks)
- b. Write program to construct Binary Search Tree : Trace the program and construct a Tree for following sequence of numbers, 14, 15, 4, 9, 7, 18, 3, 5, 16, 20, 17, 10, 8. Clearly show the step wise construction of tree. (08 Marks)
- c. With the help of diagram show representation of a node in threaded binary tree. Construct a max heap for following sequence of numbers. 10, 20, 40, 2, 19, 6, 78, 23, 100. Clearly show the step wise construction of Tree. (04 Marks)
- 6 a. Define Graph. Give Abstract Data Type for Graph. (08 Marks)
- b. Explain two types of selection trees with suitable examples. (08 Marks)
- c. Demonstrate with suitable example the process of transforming multi tree forest into Binary Tree. (04 Marks)



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- 7 a. Define Priority Queue. What are the varieties of Priority Queue? List the operations supported by them. (08 Marks)
- b. Explain with example minimum binomial heaps. (08 Marks)
- c. Give four steps for deleting an element from a B-heap. (04 Marks)
- 8 a. What are AVL Trees? Explain with example. (08 Marks)
- b. Write short notes on splay trees. (08 Marks)
- c. Write code snippet for splitting a red-black tree. (04 Marks)

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