

**BACHELOR IN COMPUTER
APPLICATIONS****Term-End Examination****June, 2007****CS-62 : 'C' PROGRAMMING AND DATA
STRUCTURE**

Time : 2 hours

Maximum Marks : 60

Note : Question no. 1 is **compulsory**. Answer any **three** questions from the rest. All algorithms should be written nearer to 'C' language.

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1. (a) Write a 'C' function to compute the total number of nodes in a binary tree. 6
- (b) Write an algorithm to sort 'N' numbers using Bubble sort. Also, show that bubble sort algorithm, on average, makes $O(N^2)$ comparisons while sorting a list of N elements. 7
- (c) What is indexed sequential file organisation ? Name the data structure which is most appropriate for this file organisation. Justify the answer. 6
- (d) Write a program in 'C' language that counts total number of characters, words, white-spaces and lines in a given text file. 8

- (e) Construct a binary tree from the following preorder and inorder traversal sequence :

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Preorder : A B C D E F

Inorder : C B A E D F

2. Write a 'C' language that sorts a given linked list of integers. Also, write a function that splits this linked list into a linked list of even integers and a linked list of odd integers.

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3. (a) What is a height-balanced tree ? Construct an AVL tree for the following elements :

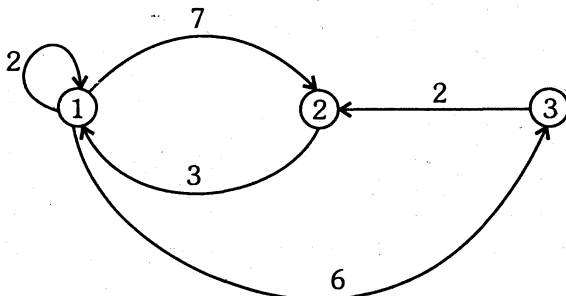
6

5, 9, 12, 10, 6, 1, 20, 8, 4, 15

- (b) Write a recursive function to calculate the 'gcd' of a number.

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4. (a) Consider the following graph :



Make the adjacency matrix for the given graph. Also, write an algorithm to compute the transpose of the matrix.

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- (b) What is the difference between Sequential and Direct file organisations ? Under what conditions, if any, is it advantageous to have the file organized as a direct file rather than sequential file ?

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5. Explain the following with example :

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- (a) Column-major order
- (b) Structures vs Unions
- (c) Complete binary tree
- (d) m-way merging
- (e) Spanning tree

