(Please write your Exam Roll No.) *Exam Roll No.* 01214902009

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY-2010

Paper Code: BCA 108	***Subject: Data Structure Using C***
Paper ID: 20108	
Time : 3 Hours	***Maximum Marks : 75***

Note: Question 1 is compulsory. Internal choice is indicated.

Q1. (a) What is sparse matrix? Implement sparse matrix as an array.

(b) What are the applications for the tree data structure?

(c) Which data structure is used to perform recursion? Explain.

(d) Convert the expression given below into its equivalent prefix and postfix notation.

$((A+B)\hat{}C-(D-E)\hat{}(F+G))$

(e) How many branches are there in a binary tree with 20 nodes?

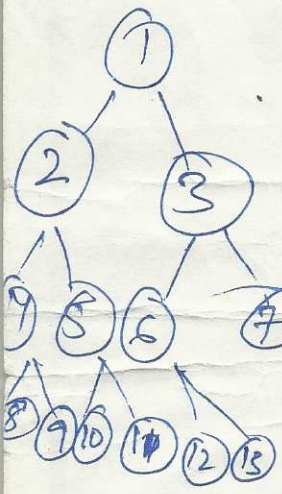
(f) What pointer type is used to implement the heterogenous linked list in C?

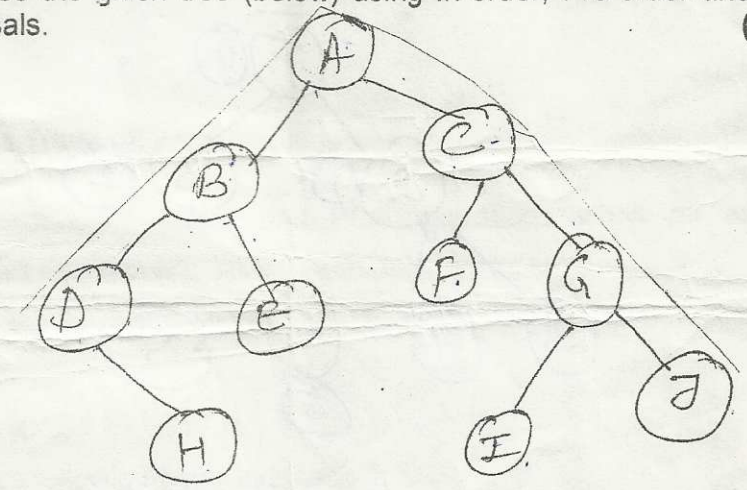
(g) Differentiate between linear search and binary search.

(h) Write a function in C that counts the total number of nodes in a binary tree.

(i) What do you understand by multi level indexing? State its application.

(j) Traverse the given tree (below) using In-order, Pre-order and Post-order traversals. **(10x2.5=25)**





Q2. What are the advantages of circular queue over queue? Write a menu driven program to implement simple arithmetic operations in circular queue. **(12.5)**

OR

(a) Why an operation to check 'stack overflow' is not implemented on linked stack? Explain. **(4)**

(b) What is stack? Is stack a linear or non linear data structure? **(4)**

(c) What are D-queues? Explain with the help of an example. **(4.5)**

Q3. (a) Differentiate between linked list and an array. **(3.5)**

(b) Write a function in C to add a node 'before' a node and count the number of nodes in doubly linked list. **(5+4=9)**

OR

(a) What do you mean by complete binary tree? Draw one such tree. **(3)**

(b) How an AVL tree differ from binary search tree? Also explain how AVL trees are represented in memory. **(4)**

(c) Write an algorithm for insertion of a node in binary search tree using linked list representation. **(5.5)**

P.T.O.

Q4. (a) Define B-tree. Draw a B tree of order 5 when the following keys arrive in following order C N G A H E K Q M F W L T Z D P R X Y S. **(10)**

(b) What is the advantage of using B tree for indexing? **(2.5)**

OR

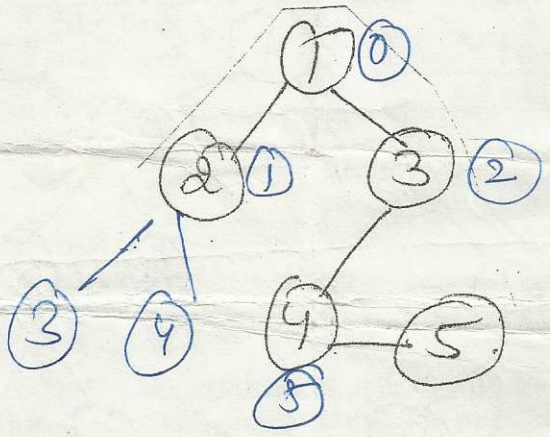
(a) A binary tree T has 9 nodes. The Pre-order and In-order traversal of T yields the following sequence of nodes. **(6.5)**

Pre-order: F A E K C D H G B
In-order : E A C K F H D B G

Draw the binary tree T.

(b) How many null branches are there in binary tree with 20 nodes? **(2)**

(c) In the given binary tree, using array you can store the node 4 at which location ? **(4)**



Q5. What do you understand by hashing? State the different types of hashing techniques? What are the limitations in each technique and how to overcome them? **(12.5)**

OR

(a) Write a C program that implement selection sort. **(6.5)**

(b) Sort the following numbers (showing each iteration) using insertion sort. **(6)**
57, 73, 43, 77, 83, 63, 87.

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