(Please write your Exam. Roll No.) Exam. Roll No. 0211 420210

END TERM EXAMINATION

SECOND SEMESTER [BCA], MAY – 2011

Paper Code : BCA 108	*Subject : Data Structure Using C*
Paper Id : 20108	*(Batch : 2009)*

Time : 3 Hours *Maximum Marks : 75*

Note : Attempt all questions as per interinal choice given in each questions.

Q. 1. Attempt all parts of the folloiwng :

(a) Find an expression to generate the address of i, j th element in a upper triangular sparse matrix of order nxn when this matrix is stored in a linear array of single dimension. (4)

(b) Find the prefix expression of the following infix expression. (3)

$$X = A + \frac{B + C/E}{D - \frac{G*(P+H)}{H-E}}$$

(c) Why do we require D-queues when there are circular queues and priority queues? (2)

(d) What is multilevel indexing? List their applications. (3)

(e) Which algorithm is better between the selection sort and heap sort when number of data is (i) small (ii) very large. Give justification. (3)

Q. 2. Attempt any One part of the following :

(a) (i) A three dimensional array A of order mxnxp is stored in memory in the row major order. Find an expression to find the address of the any general element A(i,j,k). α Generalize your expression for the n-dimensional array.Given that the address of the first element is α. (8)

(ii) Give an algorithm to convert infix expression into the prefix expression with suitable example. Can we use infix to postfix algorithm for doing it? If so what are the required changes? (7)

(b) (i) Write an algorithm to implement the push and pop operations in an array when the array is used to implement two stacks simultaneously. One stack will grow from left end and other one will grow from he right end without overlapping the contents of other stack. Give all the assumptions made by you.

(ii) Write an algorithm to evaluate any postfix expression. Iterate it to evaluate the following infix expression : (7)

$$S = 12 - \frac{3 + \frac{5*(2+3)}{3-5}}{3 - \frac{5*(1+2)}{4}} * 2 + \frac{3}{4}$$

Q. 3. Attempt any **One** part of the following :

(a) (i) Write an algorithm to find the addition of two polynomials using the circular linked lists. (8)

(ii) Given two singly linked lists. Write an algorithm attach (X, Y) to concatenate Y at the end of X. Write all possible cases. (7)

(b) (i) Discuss the memory representatio of a circular doubly lned list? Write steps to reverse the links of this list (7)

(ii) Write an iterative algorithm to traverse a binary tree in the post order traversal. (8)

Q. 4. **Attempt any** One part of the following :

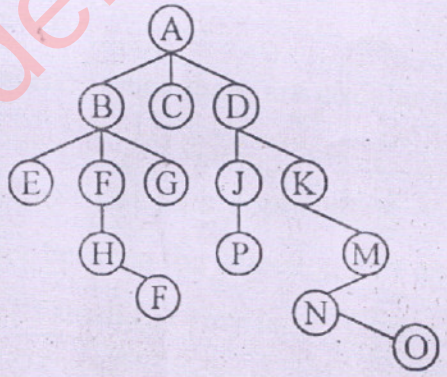
(a) Write the algorithm to merge two arrays. Using it write the algorithm to sort n numbers into descending order. Show the various steps over the sequence –10, 100, 300, 40, –9, –12, –12, 45, –12, 45, –12, 78 (15)

(b) (i) What is Hashing? Discuss at least thre Hash functions. How collisions are resolved? (7)

(ii) Write an algorithm for insertion sorting over n numbers using a liked list. (8)

Q. 5. Attempt any **One** part of the following :

(a) (i) Traverse the following tree in inorder and post-order traversals. (7)



(ii) Write an algorithm to find the kth largest number in a binary search tree. The tree is createdusing pointers and nodes output has to be generated through traversal of given tree only. (8)

(b) Create a B tree of order 4 on inserting the keys a b m j e s l n t u p d h k g i c f y, inserted in left to right sequence. Show the trees on deleting g and n. (15)

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