

CBCS SCHEME

USN

CHIKODI

ICS/1533

Third Semester B.F. Degree Examination, Dec.2010, 11.10.20

Data Structures & Applications

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-I

- 1 a. Differentiate between Structures and Unions with example. (05 Marks)
- b. Explain the functions supported by 'C' to carry out dynamic memory allocation. (05 Marks)
- c. Express the given sparse matrix as triplets and find its transpose and also write a fast transpose algorithm to transpose a sparse matrix

$$\begin{array}{|c|cccccc} 15 & 0 & 0 & 22 & 0 & -15 \\ 0 & 11 & 3 & 0 & 0 & 0 \\ 0 & 0 & 0 & -6 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 91 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 28 & 0 & 0 & 0 \end{array}$$

(10 Marks)

OR

- 2 a. How would you represent polynomial using array of structures and also write a function to as 2 polynomials. (to Marks)
- b. Find the table and corresponding graph tier the second pattern matching algorithm where the pattern is $P = ababab$. (10 Marks)

Module-2

- 3 a. Convert the following Infix expression to Postfix expression :
 (i) $((((a/b) - c) + ((d * e)) - a * c))$ (ii) $A - B \text{ I } (C * D \$ E)$ (06 Marks)
 b. Write a function to evaluate Postfix expression. (08 Marks)
 c. Define Recursion and Evaluate $A(1, 3)$ using Ackermann's function. (06 Marks)

OR

- 4 a. Explain with suitable example disadvantages of ordinary queue and how it is solved using circular queue, write functions for circular queue insertion and deletion. (10 Marks)
- b. Define stack. Give 'C' implementation of PUSH and POP functions. Include check for empty and full conditions of stacks. (06 Marks)
- c. Evaluate the following Postfix expression (04 Marks)
- 623 + — 382 I + * 2 \$ 3 +

Module-3

- 5 a. Write 'C' function to perform the following :
- Assume a four node single linked list with data value 15, 25, 40, 50
 - Insert a node with data value 30 in between the nodes 25 and 40.
 - Delete a mode with data value '40'.
 - Search a mode with data value '25'

(15 Marks)

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- b. Write a note on linked representation of sparse matrix. Give linked representation of the given sparse matrix
- | | | |
|---|---|---|
| 0 | 5 | 3 |
| 1 | 0 | 0 |
| 0 | 0 | 0 |
- (05 Marks)

OR

- 6 a. Write a note on Doubly linked lists and also write functions to insert at front and delete at front using D.L.L. (08 Marks)
- b. Write a function to add 2 polynomials using Single Linked lists. (08 Marks)
- c. Write a function to Concatenate 2 Single Linked lists. (04 Marks)

Module 4

- 7 a. With suitable example define the following :
 (i) Binary tree (ii) Full binary tree (iii) Almost complete B.T
 (iv) Strict Binary tree (v) Level of B.T (05 Marks)
- b. Create expression tree for the Postfix expression given below.
 AB/C*D*E+ and traverse the resulting expression tree using inorder and preorder traversals. (05 Marks)
- c. Write a note on Threaded Binary tree for a given Binary tree in Fig.Q7(c), Insert 'r' as right child of 'S' in a Threaded Binary tree and write the function to insert (10 Marks)



Fig.Q7(c)

OR

- 8 a. Define BST. Write a function to insert an item into BST. (10 Marks)
- b. Show that for any non-empty b-tree T, if n_0 is the number of leaf nodes and n_2 is the number of nodes of degree 2 then $n_0 = n_2 + 1$. (05 Marks)
- c. Write 'C' functions to illustrate copying of binary tree. (05 Marks)

Module 5

- 9 a. Define graph. Give adjacency matrix and adjacency lists for the graph given below Fig.Q9(a) :

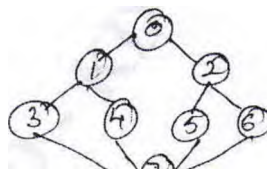


Fig.Q9(a)

- b. Write an algorithm for DFS, show BFS and DFS traversals for the graph given in Q.No.9(a). (10 Marks)
- c. Write a note on Hashing functions. (04 Marks)

OR

- 10 a. What is collision? What are the methods to resolve collision? Explain linear probing with an example. (10 Marks)
- b. Suppose 9 cards are punched as follows 348, 143, 361, 423, 538, 1321, 543, 366. Apply Radix sort to sort them in 3 phases and give its complexity. (10 Marks)