

ALCCS – NEW SCHEME

Time: 3 Hours

FEBRUARY 2012

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

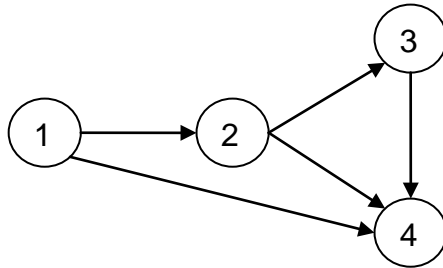
NOTE:

- Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.
- Parts of a question should be answered at the same place.

Q.1 a. Define complexity. Explain Big(O) notation with an example.

b. Write the prefix and postfix of following infix
 $A+(B*C-(D/E\uparrow F)*G)*H$

c. When is a directed graph a strongly connected graph? Is the directed graph shown below is a strongly connected? Give reasons. Show how this graph would look if represented by adjacency matrix



d. Why B^+ Tree is considered a better structure than B Tree for implementation of an indexed sequential file?

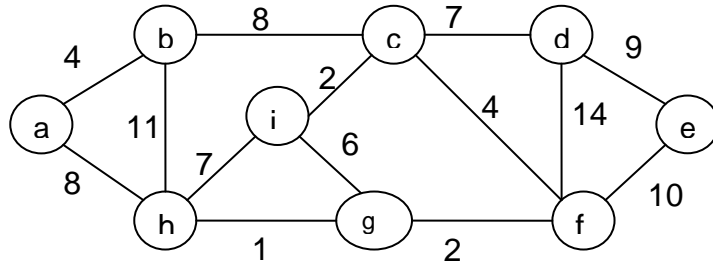
e. How to declare an array of N pointers to functions returning pointers to functions returning pointers to characters?

f. What do you mean by threaded binary tree? How null pointers are replaced in it?

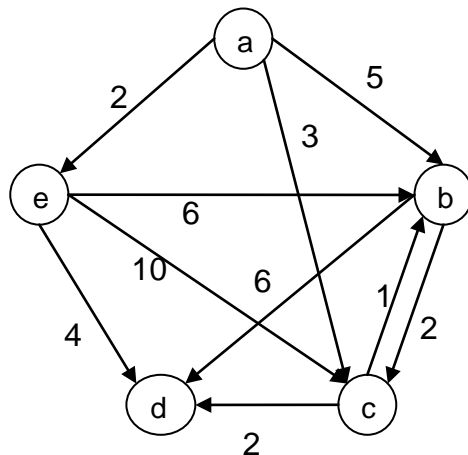
g. Explain how address calculation is done in row major ordering for a two dimensional array. Also generalize it for n dimensions. (7 × 4)

Q.2 a. How would you detect a loop in a linked list? Write a C program to detect a loop in a linked list. (9)

b. What is minimum spanning tree? Work out the Prims algorithm to find the minimum spanning tree of the following graph. (9)



- Q.3** a. What do you mean by Huffman trees? Write the algorithm for the same. Draw Huffman tree for the set of weights {1, 2, 3, 3, 4} (9)
- b. Write an algorithm to find the successor of an element(x) in a binary search tree. (9)
- Q.4** a. For the following sequence determine the binary heap obtained when the keys are inserted one by one in the order given into an initially empty heap 16,14,10,8,7,9,3,2,4,1 (10)
- b. What is the difference between Merge Sort and Quick sort? (4)
- c. What is the difference between the binary-search tree property and the heap property? Can the heap property be used to print out the keys of an n -node tree in sorted order in $O(n)$ time? Explain how or why not. (4)
- Q.5** a. Give recursive function for Inorder,Preorder and postorder traversal of a binary tree. (9)
- b. Work out the Dijkstra's shortest path algorithm on the following graph. (9)



- Q.6** a. What do you mean by buddy system memory allocator? What are its drawbacks? (5)

Code: CT11**Subject: DATA STRUCTURE THROUGH C**

- b. Explain first fit and best fit approaches of memory management. Write an algorithm for best fit approach. (5)
- c. What is scheduling problem? (4)
- d. Explain boundary tag method. (4)

Q.7 Write short note on any **THREE** of the following:

- (i) Circular queue and priority queue
- (ii) K-way merge sort
- (iii) Linear and quadratic probing
- (iv) Game tree (3×6)