

MANIPAL UNIVERSITY

THIRD SEMESTER B.S. (ENGG.) DEGREE EXAMINATION – DECEMBER 2014

SUBJECT: DATA STRUCTURES (CS 231)

(BRANCH: COMP./C.SCIENCE)

Friday, December 12, 2014

Time: 10:00 – 13:00 Hrs.

Max. Marks: 100

✍ Answer ANY FIVE Questions.

✍ All programs/functions should be well documented.

✍ Missing data if any, may be suitably assumed.

- 1A. Write a function to construct a binary search tree. Construct a binary search tree from the given set of values: F, B, A, D, C, E, G, I, H considering the first value as the root. After the tree is created display the elements of the tree using post order traversal.
- 1B. What is a template? Give the function template for finding the largest element in a given list of N values and instantiate this template for integers and floating-point values.

(12+8 = 20 marks)

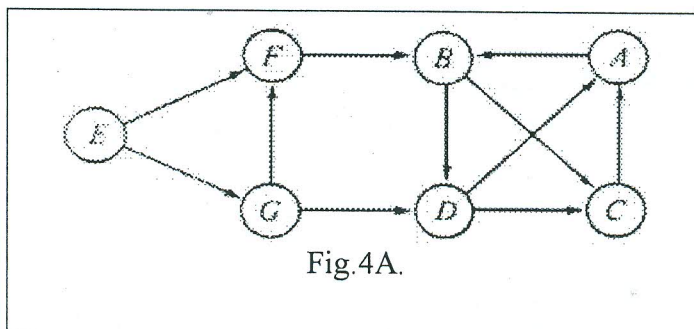
- 2A. Give a comparison between iterative and recursive algorithms. Write a recursive function for tower of Hanoi problem and explain with an example.
- 2B. Write a function to add two polynomials represented by two singly linked lists, A and B and return the new polynomial, C.
- 2C. What is a doubly linked list? How it is advantageous over singly linked list?

(8+8+4 = 20 marks)

- 3A. Write an algorithm to convert an infix expression into its equivalent postfix form.
- 3B. With example explain the principle of ordinary queue. Write functions to insert an element, and to delete an element from a circular queue.

(12+8 = 20 marks)

- 4A. Write DFS algorithm for directed graph. Represent the graph given in Fig.4A using Adjacency list and write the order of nodes visited starting with node A using DFS.



4B. What is an expression tree? Write a function to create a binary tree for given postfix expression.

(12+8 = 20 marks)

5A. Write a function to sort the elements in ascending order using insertion sort. Using the same function show step by step procedure to sort the numbers: 12, 3, 1, 5, 8.

5B. Write the following functions for doubly linked list.

- i) Insert_rear(list, ele) which inserts elements to the rear end.
- ii) Insert_front(list, ele) which inserts elements to the rear end.
- iii) Deleteval(list, ele) which deletes the given element node.
- iv) Display(list) which displays the elements in the list.

(8+12 = 20 marks)

6A. Write an iterative function to search an element using linear search. Write main() to test the function. Find the Average case time complexity for the same.

6B. With example for each case explain how to convert non AVL tree to AVL tree.

(8+12 = 20 marks)

7A. Write a function to display the elements of a binary tree using level order. Explain the function with an example.

7B. Write and explain overflow handling methods in hashing.

(12+8 = 20 marks)

8A. Write all pairs shortest paths algorithm. And trace the same for the graph given in Fig8A.

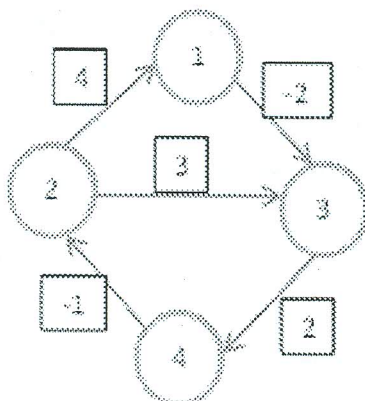


Fig.8A.

8B. Given two singly linked lists A and B, representing 2 sorted lists, give the algorithm to create a new linked list C, by merging these two lists such that list C is also sorted.

(12+8 = 20 marks)

