B.E./B.TECH. DEGREE EXAMINATIONS: NOVEMBER 2009

Second Semester

U07CS201: DATA STRUCTURES

(Common to B.E. Computer Science and Engineering & B.Tech. Information Technology Branches)

Time: Three hours   **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. _____ method is used to build up a solution to a problem via a sequence of intermediate steps.

   a) Static programming   b) Dynamic programming

   c) Divide-and-conquer   d) Binary doubling

2. Top down design is also known as _____ strategy.

   a) Step backward   b) Stepwise refinement

   c) Backtracking   d) Doubling

3. Which one is working with FIFO concept?

   a) Queue   b) Stack   c) Cursor   d) Linked list

4. What is the post fix notation for this expression: a + b * c

   a) abc+*   b) abc*+   c) abc*   d) ab+*

5. In binary search trees, Minimum value in the tree can be found at _____

   a) T->left   b) T->right   c) In root   d) Any where

6. Which type of tree will be in balanced condition?

   a) Binary tree   b) Binary search tree   c) Splay trees   d) AVL trees

7. Divide-and-conquer strategy is used in

   a) Merge sort   b) Shell short   c) Selecting a list   d) searching a list

8. In quick sort, the splitting of arrays is based on

   a) First element b) Last element   c) Pivot element   d) any element

9. The simple way to represent a graph is to use a 2 dimensional array is known as

   a) Traffic flow   b) Adjacency matrix   c) List   d) Route

10. Depth-first is a generalization of _____ traversal.

   a) In order   b) Pre order   c) Post order   d) Any order

PART B (10 x 2 = 20 Marks)

11. What is meant by top down design?
12. When will you say an algorithm is efficient?
13. Define Doubly Linked List.
14. Explain the representation of Priority queue.
15. Describe the hashing function.
16. Define AVL Tree with an example.
17. Describe Binary Heap.
18. Compare Insertion sort and Shell sort.
19. What is Topological sorting on graph?
20. Draw a directed acyclic graph with four vertices.

PART C (5 x 14 = 70 Marks)

21. (a) i) How will you measure the efficiency of an algorithm with an example.
    ii) Analyze the linear search algorithm with an example.

(OR)

(b) Explain the various aspects of problem solving in detail. Also discuss pros and cons of each.

22. (a) Write an algorithm to insert, delete and display the top element of the Queue using array implementation. Give examples.

(OR)

(b) Write suitable ADT operations to perform insertion and deletion in a doubly list.

23. (a) i) Define Binary search tree. Write a routine to insert a node into a Binary Search tree.
    ii) Show that maximum number of nodes in a binary tree of height "N" is 2(n+1) -1.

24

25. (

(b

(OR)

(b) Write a suitable ADT's to perform the operations in an AVL tree with examples.

24. (a) Write ADT operations for Heap sort. Simulate the following numbers using Heap sort. What is time complexity?

$$12, 53, 34, 89, 125, 67, 72, 9$$

(OR)

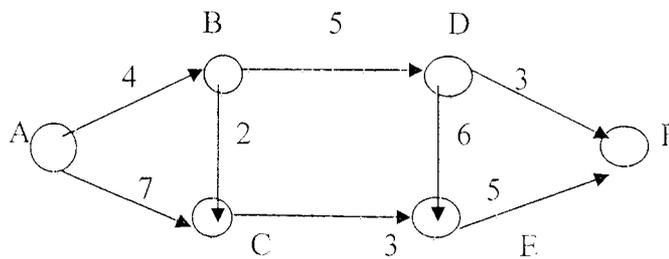(b) Write the Quick-sort algorithm and illustrate its working to sort the list.

$$45, 23, 11, 35, 62, 87, 24, 66$$

25. (a) i) What is single source shortest path algorithm. Discuss Disikstra's single source shortest path algorithm with an example. (10)

   ii) Explain Depth first search on a graph. (4)

(OR)

(b) Write suitable ADT operation for minimum spanning tree of a weighted directed graph. Use it to find the MST of the following graph.

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