KUMARAGURU
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Register Number:……………………..

MCA DEGREE EXAMINATIONS: NOV/DEC 2014

(Regulation 2009)

First Semester

MASTER OF COMPUTER APPLICATIONS

MCA504: Data Structures

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

1. What is the difference between an array and a linked list?

2. Convert the expression A-B* C/D into prefix form.

3. What do you mean by a complete binary tree? Give an example.

4. What is difference between internal and external nodes?

5. What is the time complexity of the quick sort?

6. What is meant by hashing?

7. How does a graph differ from a tree?

8. What are the drawbacks of adjacency matrix representation of a graph?

9. What is meant by compaction?

10. What is the output of head (tail (7, 6, (5, 3), 8, 9, 2, 1))?

PART B (5 x 16 = 80 Marks)

11. a) (i) Write an algorithm to convert an infix expression to a postfix expression. Use It   (10)
            to convert the following expression into postfix form.

            ((A - (B +C)) * D)\$ (E + F)

       (ii) Write the abstract data type for an array.   (6)

(OR)

    b) (i) What is a queue? Write a C program to implement the queue operations using   (10)
            linked list.

       (ii) Explain the row major representation of two dimensional array with examples.   (6)

12. a) (i) Write the Huffman algorithm. Use it to encode the string ABBBAAACCAA. (10)

      (ii) Explain with an example how a binary tree can be represented in the form of (6) arrays.

(OR)

   b) (i) Write the algorithm for preorder, in-order and post order traversal on binary (8) trees and explain with an example

      (ii) What are threaded binary trees? Explain with example. (8)

13. a) (i) Write an algorithm for bubble sort and use it to sort the following numbers in (10) ascending order :
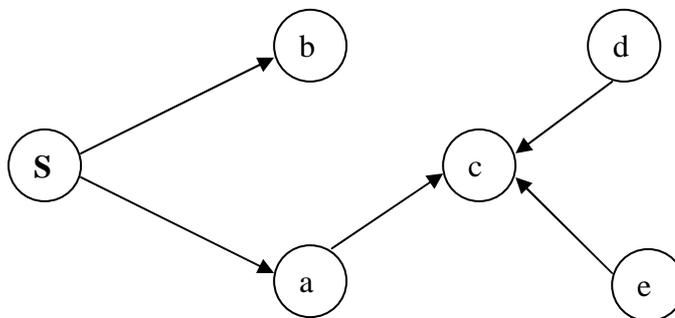
                    24, 43,5,33,65,47,86,16, 25, 88, 75, 32

      (ii) Explain binary search with an example (6)

(OR)

   b) (i) Write an algorithm to implement merge sort and explain it with an example (10)

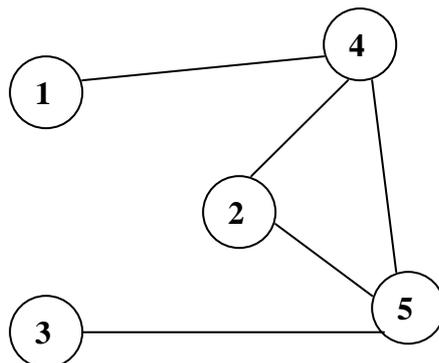   (ii) Explain sequential search with an example. (6)

14 a (i) Find the shortest path from {S} to all other nodes in the following graph using (8) Dijkstra's algorithm.

      (ii) Explain the flow problem. (8)

(OR)

   b) (i) Write the algorithm for breadth first search and implement it on the following (8) graph.

(ii) What is transitive closure? Write Warshall's algorithm. (8)

15. a) Write the algorithm and explain the phases of garbage collection with an example

(OR)

b) (i) Explain the operations that are used to modify a list. Give examples. (8)

(ii) How will you free list nodes? Explain with an example. (8)

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