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TOTAL NO OF PAGE 1

MAY-2014

MCA-203 (Data Structures)

Time: 3 hours

MM:100

Note: Attempt five questions in all, selecting one question each from Section A, B, C and D. Section E is compulsory.

SECTION-A

Q1) a) What do you understand by complexity of an algorithm. Discuss time space complexity tradeoff with the help of an example. (10)

b) How to delete an element from a linked list. Write an algorithm to delete a node with the given item of information. (10)

Q2) a) Write a program to implement a stack with the basic operations associated with it. (10)

b) What is a two dimensional array? How is it represented in memory? How to find the location of an element in a two dimensional array? (10)

SECTION-B

Q3) a) Write an algorithm to traverse a tree using inorder traversal. (10)

b) What is a binary search tree? How to delete an element from a binary search tree? Explain with the help of an example. (10)

Q4) a) What is an AVL search tree? Construct an AVL search tree using the following elements in the order of their occurance:

64, 1, 44, 27, 12, 100, 99, 86. (10)

b) Sort the following elements using heap sort:

85, 96, 20, 25, 70, 99, 15 (10)

SECTION-C

Q5) a) Write an explain an algorithm to find shortest path from one node to another in a graph. (10)

b) How to traverse a graph using Depth First Search technique? Write an algorithm for the same. (10)

Q6) a) Explain the following terms:

i) Directed graph
ii) Weighted graph
iii) Path Matrix
iv) Connected graph. (10)

b) How to find the location of an edge in a graph? Explain with the help of an algorithm. (10)

SECTION-D

Q7) a) Consider the following numbers and find two digit hash address of each number using (a) division method, with m = 97; (b) the midsquare method; (c) the folding method without reversing; and (d) the folding method with reversing. (10)

b) Write and explain the method of merge sort with the help of an algorithm. (10)

Q8) a) How to sort a list of elements using selection sort? Explain the method and complexity of the method. (10)

b) Write and explain algorithm for searching an element using linear search. Discuss its complexity. (10)

SECTION-E

Q9 a) What is Big O notation? (2)

b) What is a two way linked list? Give an example. (2)

c) What do you understand by garbage collection? (2)

d) What is a B tree? (2)

e) What is the depth of a complete binary tree? (2)

f) What do you understand by degree of a graph? (2)

g) What is a multigraph? (2)

h) What is linear probing? (2)

i) What is the complexity of radix sort? (2)

j) What are the limitations of a binary search algorithm? (2)