Question Paper

Exam Date & Time: 05-Jan-2018 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SCHOOL OF INFORMATION SCIENCES FIRST SEMESTER MASTER OF ENGINEERING - ME (Embedded Systems and Instrumenetation) DEGREE EXAMINATION (MAKE - UP) - JANUARY 2018 DATE : FRIDAY, JANUARY 05, 2018 TIME : 10:00AM - 1:00PM Data Structures and Algorithms [ESI 601]

Marks: 100

Duration: 180 mins.

Answer all the questions.

¹⁾ Write the data structure required to implement single ⁽¹⁰⁾ linked list. Write functions to add an element at the head position and search the given element in the list.

(4+3+3)

²⁾ What is stack? Giving the required data structures, write ⁽¹⁰⁾ the functions to push and peek into array based stack.

(1+3+3+3)

³⁾ Define Queue data structure. List any four applications of ⁽¹⁰⁾ queue. Write functions to add and delete alements from linked list based queue.

(2+2+3+3)

(i) Write a recursive function to search an element in a (10) binary search tree.
(ii) Write a recursive function to find the height of a binary

tree.

(6+4)

⁵⁾ Implement Heap sort and Bubble sort. Discuss its time ⁽¹⁰⁾ complexity.

(6+4)

⁶⁾ What is Hashing? What is collision in hashing? How do you ⁽¹⁰⁾ overcome collision in hashing? Expalin with an example.

Write a function for building adjacency list of a graph. Implement (10)
DFS and display elements.

(6+4)(10)Write the following algorithm A. Finding minimum and maximum elements (divide and conquer) B. Graph coloring using backtracking technique. (5+5)Solve the following with greedy algorithm (10)(i) Consider an instance of knapsack problem: n=3, m=20, (p1,p2,p3) = (25,24,15), and (w1,w2,w3) = (18,15,10).Generate at least 3 feasible solutuions which include an optimal solution. (ii) Let n=4, (p1,p2,p3,p4) = (100,10,15,27) and (d1,d2,d3,d4) = (2,1,2,1). Generate the list of feasible silotions, processing sequence and profit earned. Give the optimal solution.

(5+5)

8)

9)

¹⁰⁾ Explain how matrix chain multiplication problem can be ⁽¹⁰⁾ solved using Dynamic Programming, Illustrate with an example.

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