MCSE/MSE - 102

M.E./M.Tech., I Semester

Examination, December 2014

Advanced Data Structure and Algorithm

Time : Three Hours   Maximum Marks : 70

Note: Attempt five questions out of eight questions (including all parts). Assume missing data, if any suitably.

1. a) How are multidimensional arrays represented in a computer? Illustrate with example. Also give formula to calculate the address of an element of the array.

   b) Show how a polynomial can be represented using linked list. Write an algorithm to add two polynomials containing minimum of four terms.

2. a) Given the list {928,0,4,6,3,1,60,11,32,15,16,241 under take the search of the key list {6,60,2,16,24,8} and tabulate the comparisons made when the search strategy is
   i)   Binary search
   ii)   Linear search
   iii)   Hash table search. When the hash function used is h(X)=Xmod9 and each bucket contain 2 slots.
   b) Write an algorithm which trims off all trailing blanks of a character string.

3. a) Compare Kruskal's and Prim's algorithms to construct the minimum cost panning tree.

   b) Explain with example of the following:
      i) 2-3 tree   ii) D- queue   iii) ADT

4. a) Discuss the various memory allocation strategies. b) Write algorithms to allocate and free nodes in a buddy system of memory allocation.

5. a) Explain B-tree with insertion and deletion operations performed on it by using suitable example of data list.
   b) What are decision tree? Explain the concept of decision trees for sorting algorithm.

6. a) Discuss the boundary tag method to allocate and free the variable size nodes.

   b) A file of 60000 records is to be sorted using a balanced 3-way merge sort with 6-tapes (T1,T2,T3.T4,T5,T6) available for use. The internal memory has a capacity of 10,000 records. Trace the steps of the sorting scheme.

7. a) Differentiate between DFS and BFS graph traversals. Explain how DFS algorithm can be used to obtain the topological sorting. http://www.rgpvonline.com
   b) Explain Divide and Conquer strategy giving its control abstraction. What will be the recurrence relation if the problem is equally subdivided?

8. Write the short notes on any three the following :
a)   Garbage compaction.
b)   Multilists
c)   Hashing techniques for direct files.
d)   Local search algorithms.
e)   Dynamic programming.