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MCS-021

MCA (Revised)

Term-End Examination

December, 2010

01997

MCS-021 : DATA AND FILE STRUCTURES

Time : 3 hours *Maximum Marks : 100*

(Weightage 75%)

Note : *Question number **1** is **Compulsory**. Attempt **any three** questions from the rest. All algorithms should be written nearer to C language.*

1. (a) Write a program which combines the Quick sort and Merge Sort algorithms in the following way : **20**

   (i) Use quick sort to obtain two sorted lists of length "m" and "n".

   (ii) Then use Merge Sort to complete the sorting of " N" numbers, where $(1 \leq m \leq N)$ $(1 \leq n \leq N)$

   (b) Write a function to sort a matrix row-wise. Also, calculate the complexity at this code using Big "O" notation. **10**

   (c) Mention and explain the situations which require " Double Rotation " in an AVL tree while inserting elements in an AVL tree. Also, write a function to implement it. **10**

2. (a) A bidirectional list is a list of elements that are linked in both ways. Both links are originating from a header. Write a program with functions for searching, inserting and deleting elements from a bidirectional list. **15**

(b) How is a circular queue better than a linear queue ? Explain with an example. **5**

3. (a) Write an algorithm for Heap sort. Write step by step working of the algorithm for the following set by data

23, 16, 19, 3, 53, 9, 17, 1, 89 **10**

(b) Write a program to implement a function named " Replace". It is used in the form Replace (String 1, String 2, String 3) to replace the first occurrence of string 2 in string 1 by string 3. **10**

4. (a) Sort the following numbers using Bubble sort. 14, 8, 23, 6, 55, 70, 13. Write all the steps involved in sorting. **10**

(b) What is a splay tree? Write the steps involved in a top-down splaying procedure. **10**

5. (a) Define and give an example of minimum cost spanning tree. Write at least two differences between Kruskal's and Prim's algorithms. **10**

(b) Write Floyd-Warshall's algorithm for computing "All pairs shortest path" problem. Show how does this algorithm work for the following graph. **10**