Code No: R5210503 **R5**

II B.Tech I Semester(R05) Supplementary Examinations, May/June 2010
ADVANCED DATA STRUCTURE
(Common to Computer Science & Engineering and Electronics & Computer Engineering)
Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Each class has some special member-functions, which calls can be inserted by the compiler into a code without explicit instruction of the programmer. Enumerate such functions, members and cases, when implicit calls can arise.
   (b) If when creating a variable the programmer explicitly did not initialize it, in some cases, the compiler itself would give it a certain, predefined initial value, and in some cases the initial value would be unpredictable. What does it depend on? [8+8]
2. (a) When should my destructor be virtual?
   (b) What is a "virtual constructor"?
   (c) What's the difference between how virtual and non-virtual member functions are called? [5+5+6]
3. Create a program that opens a file (the first argument on the command line) and searches it for any one of a set of words (the remaining arguments on the command line). Read the input a line at a time, and print out the lines (with line numbers) that match. [16]
4. (a) What is a Sparse Matrix? Explain about the linear list representation of a sparse matrix?
   (b) Write a C++ program to implement addition of two sparse matrices? [8+8]
5. (a) What is the structure to represent node in a skip list. Write the constructor for skipList.
   (b) Write a method in C++ to erase a pair in the dictionary with key theKey in a skip list representation. What is the complexity of this method? [8+8]
6. (a) What is an AVL search tree? How do we define the height of it? Explain about the *balancefactor* associated with a node of an AVL tree.
   (b) Explain how an AVL tree can be used to sort a sequence of n elements in O (n log n) time. [8+8]
7. (a) Prove that net T be a B-tree of order m and height h. Let d = $[m/2]$ and let n be the number of elements in T.
      i. $2d^{h-1} - 1 \leq n \leq m^n - 1$
      ii. $\log_m (n+1) \leq h \leq \log_d \left(\frac{n+1}{2}\right) + 1$
   (b) Explain the advantages of splay tree in representation of dictionaries. [10+6]
8. (a) Explain the KMP flow chart for the pattern 'ABAABA' where $\{A, B, C\}$
   (b) Explain the complexity of Brute Force pattern matching algorithm. [10+6]

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