Code No: R059210503 **Set No. 1**

II B.Tech I Semester Regular Examinations, November 2007
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) What do you mean by Encapsulation and explain in detail.
   (b) Explain about friend and inline functions? [8+8]
2. (a) What's the deal with operator overloading?
   (b) What are the benefits of operator overloading?
   (c) What are some examples of operator overloading?
   (d) What operators can/cannot be overloaded? [4+4+4+4]
3. (a) Why should we use iostream instead of the traditional cstdio?
   (b) Why does a program go into an infinite loop when someone enters an invalid input character?
   (c) How can we get std::cin to skip invalid input characters? [5+6+5]
4. What is a Circular List? Write a C++ program to search in a circular linked list that has a header node? [16]
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) State the conditions under which insertion of a vertex in a Red-Black tree will result in a sequence of recolouring steps that terminate with the root changing colour.
   (b) Will the root of a Red-Black tree always be black after performing a deletion operation? Justify with an example? [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) Describe about search engine and inverted files.
   (b) Explain the main features of Boyer-Moore algorithm. [10+6]

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Code No: R059210503 **Set No. 2**

II B.Tech I Semester Regular Examinations, November 2007
ADVANCED DATA STRUCTURE
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What do you mean by Stack unwinding?
   (b) What is the difference between const char ∗myPointer and char ∗const my pointer
   (c) Define precondition and post-condition to a member function.
   (d) What are the conditions that have to be met for a condition to be an invariant of the class? [4+4+4+4]
2. (a) What are the different types of polymorphism?
   (b) What are Virtual Functions? How to implement virtual functions in"C++" [8+8]
3. (a) Write a program to merge the contents of two given files ?
   (b) Write a program to count the no of lines in the given file ? [8+8]
4. Define the Abstract data type for Queue. Write a C ++ program to implement Queue ADT using arrays. [16]
5. (a) What is a dictionary? Define the abstract data type for it? Write the abstract class for the dictionary?
   (b) Give the applications of dictionary or dictionary with duplicates in which sequential access is desired. [8+8]
6. (a) State the conditions under which insertion of a vertex in a Red-Black tree will result in a sequence of recolouring steps that terminate with the root changing colour.
   (b) Will the root of a Red-Black tree always be black after performing a deletion operation? Justify with an example? [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) Describe about search engine and inverted files.

(b) Explain the main features of Boyer-Moore algorithm. [10+6]

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Code No: R059210503 **Set No. 3**

II B.Tech I Semester Regular Examinations, November 2007
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) What are the differences between a C++ struct and C++ class?
   (b) What is the difference between compiling and linking?
   (c) In a large program what problems might occur from putting c++ code in headers?
   (d) What is an "inline" function and when would you use it? [4+4+4+4]
2. (a) Explain the need for "Virtual Destructor".
   (b) Can we have "Virtual Constructors"? [8+8]
3. What is the difference between the C++ standard library, and the C++ standard template library? [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 multiplication of two sparse matrices represented using an array linear list? [8+8]
5. (a) Explain the linear probing method in Hashing? Explain its performance analysis?
   (b) What is hashing with Chains? Explain? Compare this with Linear Probing? [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) Describe about search engine and inverted files.
   (b) Explain the main features of Boyer-Moore algorithm. [10+6]

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Code No: R059210503 **Set No. 4**

II B.Tech I Semester Regular Examinations, November 2007
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) Compare various forms of type cast operations (in C and C++ styles). Tell about overloading of these operations.
   (b) How to set default values of function arguments? What are pros and contras of use of this C++ opportunity? What's its alternative?
   (c) When writing catch operator we can write directly type of exception as a type of its argument, pointer to a type of exception or reference to a type of exception. Compare these approaches. [6+5+5]
2. (a) What is Hybrid inheritance? Write a program to illustrate the concept of Hybrid Inheritance.
   (b) What is single inheritance? Write a program to illustrate the concept of single Inheritance. [8+8]
3. (a) Why should we use iostream instead of the traditional cstdio?
   (b) Why does a program go into an infinite loop when someone enters an invalid input character?
   (c) How can we get std::cin to skip invalid input characters? [5+6+5]
4. Write a C ++ program using stack ADT that reads an infix expression, converts the expression to postfix form and evaluates the postfix expression. [16]
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 find a pair with key theKey in a dictionary using skip list representation? What is its complexity? [8+8]
6. (a) Explain about the LLr, LRr, LLb, LRb imbalances in a Red-Black tree with example?
   (b) Draw the sequence of rotations required to perform a single right rotation and a double LR rotation in an AVL tree? [8+8]
7. (a) What is the maximum number of disk accesses needed to delete an element that is in a non leaf node of a B-tree of order m?
   (b) Does deleting a leaf node from a red-black tree then reinserting the same key always result in the original tree? Prove it does or given a counter example where it does not. [6+10]

8. (a) Describe about search engine and inverted files.
   (b) Explain the main features of Boyer-Moore algorithm. [10+6]

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