

II B.Tech I Semester(R05) Supplementary Examinations, May/June 2010

ADVANCED DATA STRUCTURES AND ALGORITHMS

(Common to Information Technology and Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What is a friend? Do friends violate encapsulation? What are some advantages/disadvantages of using friend functions?
(b) What does it mean that "friendship isn't inherited, transitive, or reciprocal"?
(c) Should my class declare a member function or a friend function? [5+5+6]
2. (a) What is inheritance?
(b) What is multiple inheritance(virtual inheritance)? What are its advantages and disadvantages?
(c) What is Polymorphism? [5+5+6]
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. (a) Solve the recurrence relation , where N is an integer power of 3
$$T(N) = 6T(N/3) + 2N - 1 \quad \text{Where } N > 1$$
$$= 2 \quad \text{Where } N = 1$$

(b) Write an algorithm of deletion of an element from a heap also analyze its time complexity. [8+8]
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) What is a Binary search tree? Define a C++ abstract class that corresponds to this ADT.
(b) Write a method to search for an element of a Binary Search Tree? What is its time complexity? [8+8]
7. (a) Derive the time complexity of Quick sort in average case.
(b) Write a non recursive algorithm for pre order traversal of a tree. [8+8]
8. (a) Show how Prim's algorithm can be implemented using heap. What would be the time complexity of the algorithm.
(b) What is the time complexity of traveling sales person problem using dynamic programming.[10+6]
