D   **B3D041**   **Total Pages:3**

Reg. No._____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, JANUARY 2017

Course Code**: CS 205**

Course Name**: DATA STRUCTURES (CS, IT)**

Max. Marks:100   Duration: 3 Hours

PART A

(Answer ALL Questions)

1. Compare and contrast singly linked list and doubly linked list.   (3)

2. What do you understand by complexity of an algorithm? Write worst case and best case complexity of linear search.   (3)

3. Let *LIST* be a singly linked list in memory. Write an algorithm to find number of times a given data item called *ITEM* occurs in *LIST*.   (3)

4. Define the terms

     a) Frequency count.

     b) Stepwise refinement technique.   (3)

PART B
(Answer Any Two Questions)

5. Describe the different notations used to describe the asymptotic running time of an algorithm.   (9)

6. How a linked list can be used to represent a polynomial $5x^3+4x^2+3x+2$? Give an algorithm to perform addition of two polynomials using linked list.   (9)

7. Give an algorithm to perform following operations in a singly linked list.

     (a)   Insert a new node after a given node.   (3)

     (b)   Delete last node.   (3)

     (c)   Count the number of elements in the list.   (3)

PART C
(Answer ALL Questions)

8. What is a circular queue? How it is different from normal queue?   (3)

9. Free memory blocks of size 60K, 25K, 12K, 20K, 35K, 45K and 40K are available in this order. Show the memory allocation for a sequence of job requests of size 22K, 10K, 42K, and 31K (in this order) in First Fit, Best Fit and Worst Fit allocation strategies.   (3)

10. How a stack can be implemented using linked list?   (3)

11. Write an algorithm to perform concatenation of two strings.   (3)

PART D
(Answer Any Two Questions)

12. Write an algorithm for evaluating a postfix expression and evaluate the following postfix expression using the algorithm **AB+CD/AD-EA^ + *** where A=2, B=7, C=9, D=3, E=5

                                                                          (9)

13. List the properties of binary search tree. Write an algorithm to search an element from a binary search tree.   (9)

14. a) Write the non recursive preorder traversal algorithm.   (4.5)

     b) What is the output obtained after preorder, inorder and postorder traversal of the following tree.   (4.5)
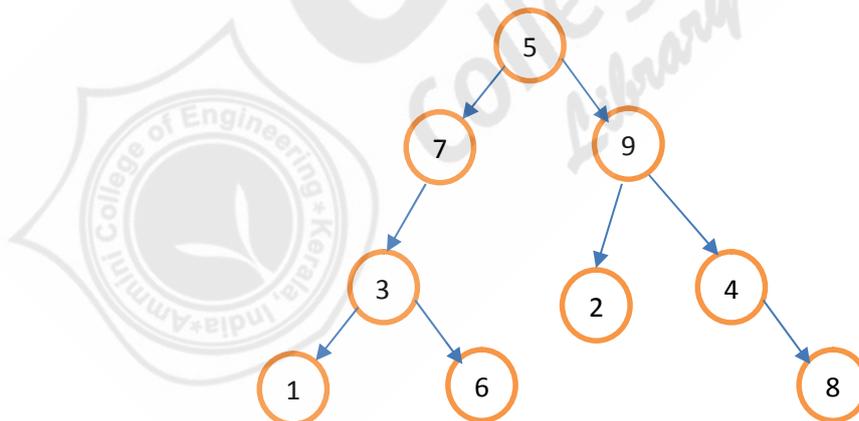
PART E
(Answer Any Four Questions)

15. Write an algorithm for merge sort technique. Illustrate with an example. Give its complexity.   (10)

16. Give any two representations of graph. Give algorithm for DFS. Demonstrate DFS using suitable example. (10)

17. Give an algorithm to perform binary search. Using the algorithm, search for elements 23 and 47 in the given set of elements[12 23 27 35 39 42 50]. (10)

18. a) Write algorithm for (i) Insertion sort (ii) Bubble sort (6)

    b) Illustrate the insertion sort algorithm and bubble sort algorithm on input [30,20,10,60,70,40] (4)

19. Define hashing. What are the properties of a good hash function? With necessary examples explain four different hashing techniques. (10)

20. Define collision. What is linear probing? The following keys 10, 16, 11, 1, 3, 4,23 and 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function h(k) = k mod 10 and linear probing. What is the resultant hash table? (10)

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