Reg. No._____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, JULY 2017

CS205: DATA STRUCTURES (CS, IT)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions.

1. Derive the Big O notation for $f(n) = n^2+2n+5$. (3)
2. Write a recursive function(C / pseudocode) for linear search. (3)
3. What are the applications of a linked list? (3)
4. Compare a linked list and an array implementation of a general list. (3)

PART B

Answer any two questions.

5. a. Write a function(C / pseudocode) to delete a node in a singly linked list. (4.5)

   b. Derive the Big O notation using the step count for the function. (4.5)

6. Write a recursive algorithm to insert an element into a linked list in which elements are stored in ascending order. (9)
7. a. What do you mean by abstract and concrete data structures? (4.5)

   b. Compare vectors and arrays in detail. (4.5)

PART C

Answer all questions.

8. What is a double ended queue? (3)
9. Explain any two applications of a Stack. (3)
10. What is a Binary Tree? (3)
11. What is the purpose of studying graphs as a data structure? (3)

PART D

Answer any two questions.

12. a. Write a function(C / pseudocode) to delete a sub-string in a given string. (4.5)

    b. Give the DFS algorithm for graph traversal. (4.5)

13. a. Write a function(C / pseudocode) to insert an element into a BST. (4.5)

b. How are strings represented in a C program? (4.5)

14. a. Explain the array implementation of a binary tree? Why it is not a good representation for Binary Trees in general? (4.5)

b. Write a function(C / pseudocode) to delete a node from a Binary Search Tree. (4.5)

PART E

Answer any four questions.

15. a. Write a program to perform Quick Sort on a set of 'n' values given as input. (5)

b. Explain Best Fit strategy with an example. (5)

16. a. Write a function(C / pseudocode) to insert an element into a Heap. (5)

b. Derive the worst case and average case complexity of Quick Sort. (5)

17. a. Explain mid-square method in hashing with an example. (5)

b. Derive the complexity of Heap sort. (5)

18. a. What is hashing and what is its importance. (5)

b. Write a program to perform insertion sort on a set of 'n' values given as input. (5)

19. a. Write a function(C / pseudocode) to perform merge sort. (5)

b. Compare selection sort and bubble sort. (5)

20. a. Write a function(C / pseudocode) to perform binary search. (5)

b. What is garbage collection? (5)

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