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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: CS205

Course Name: DATA STRUCTURES (CS, IT)

Max. Marks: 100

Duration: 3 Hours

PART A

	Answer all questions, each carries 3 marks.	Marks
1	Differentiate between abstract and concrete data structure.	(3)
2	$N^2 + N = O(N^3)$ Justify your answer.	(3)
3	What is frequency count? Explain with an example.	(3)
4	How can we represent a linked list in memory using arrays?	(3)

PART B

Answer any two full questions, each carries 9 marks.

- 5 Describe Big O notation used to represent asymptotic running time of algorithms. (9) Give the asymptotic analysis of any one iterative algorithm.
- 6 a) Consider a singly linked list having n nodes. The data items d1, d2,, dn are (5) stored in the n nodes. Let X be a pointer to the jth node (1 ≤ j ≤ n) in which dj is stored. A new data item d stored in a node with address Y is to be inserted in the list. Give an algorithm to insert d into the list after dj to obtain a list having items d1, d2,, dj, d, dj+1,dn in that order without using the header.
 - b) Explain about the use and representation of header node in linked list (4)
- 7 a) What are the application of vectors.
 - b) Write an algorithm for deleting a node from a specified position in a circular (6) queue

PART C

Answer all questions, each carries 3 marks.

8	How will you check the validity of an arithmetic expression using stack	(3)
9	Let take initial memory as -	(3)

0		150	200	30	300		0	500K	
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Do the following things with first fit approach and show the memory status:

- 1. Allocate process C of size 90K
- 2. Allocate process D of size 70K
- 10 Write a program in C to concatenate two strings using string function. (3)
- 11 If a full binary tree is of height 5, give the positions of left child and right child (3) of the second node in level 2.

PART D

Answer any two full questions, each carries 9 marks.

12 Convert the following expression into its corresponding post fix form using the (9) prescribed algorithm:

(300+23)*(43-21)/(84+7). Do the evaluation of resultant postfix expression.

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(3)

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13 a) Here is a small binary tree:

What is the output obtained after preorder, inorder and postorder traversal of the following tree.

- b) Write the non-recursive algorithm for post order traversal of tree. (4.5)
- 14 a) Write a function(C/ pseudo code) to insert an element into BST. (4)
 - b) Write a program in C to check a particular sub string is present in a given string (5) or not? If found print its location.

PART E

Answer any four full questions, each carries 10 marks.

15 a) Draw the directed graph that corresponds to this adjacency matrix:

				0	1		2		3			
		0		true	false		tru	rue		se		
		1		true	false		falsefal		se			
		2		false	fal	lsefa	lse	tru	ıe			
	3		true	e fa	alse	tru	le	fals	se			
b)	Give the algorithm for BFS graph traversal.											

- b) Give the algorithm for BFS graph traversal. (5) 16 a) Show all the passes using insertion sort for the following list (5) 54,26,93,17,77,31,44,55,20
 - b) Write a function (C/ pseudo code) of heap sort using min heap. (5)
- 17 Write a program to do the partition of a list using quick sort and then use (10) insertion sort for sorting sub lists. Explain it with example.
- 18 a) Write a program of binary search which tells how many comparisons it did to (7) search an element given as user input.
 - b) Do the performance comparisons of Linear search and Binary search. (3)
- 19 Consider a hash table of size 7 and hash function $h(k) = k \mod 7$. Draw the table that results after inserting in the given order, the following values. 19,26,13,48.17 for each of the three scenarios.
 - a) When collisions are handled by separate chaining.
 - b) When collisions are handled by linear probing.
 - c) When collisions are handled by double hashing using second hash function h'=5- (4) (5 mod k).
- 20 a) Get the hash index in table of size 7 for the following list. 56,43,27,32,3.
 (3) b) Do the rehashing when the inserted elements are more than 4.
 (3)
 - b) Do the rehashing when the inserted elements are more than 4. (3)c) Briefly explain any 2 hasting functions. (4)

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(4.5)

(5)

(3)

(3)