U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July / August 2019 Supplementary Examinations

Programme: B.E.
Branch : Computer Science and Engineering
Course Code: 15CS3DCDST
Course: Data structure

Semester : III
Duration: 3 hrs.
Max Marks: 100
Date: 27.07.2019

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any may suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1 a) i. Show the tracing for tower of Hanoi problem for n=3 with an algorithm **08**
ii. Explain with an example about dynamic memory allocation methods.

b) Write an algorithm/program for postfix expression and Demonstrate the evaluation of following given postfix expression. **08**
2 3 8 * + 4 48 4 2 + / 6 * + - -

c) Analysis the code and print the output? **04**

```
#include<stdio.h>
int x;
 void Q(int z)
{
     z += x;
     printf("%d",z);
}
 void P(int *y)
{
     int x = *y+2;
    Q(x);
     *y = x-1;
     printf("%d",x);
 }
void main(void)
{
      x=5;
      P(&x);
      printf("%d",x);

 }
```

UNIT - II

2 a) Write a 'C' program to implement Stack primitive operations using singly link list **10**

b) Write a 'C' program to implement doubly link list and perform the following operations: **10**

i. Insert a new node to the end of the double linked list.
ii. Delete the node of a given data.

OR

3 a) Write a 'C' program to implement Single Link List and perform the following operations **10**

a) Create a new node at the end of linked list.
b) Insertion of a node at any position
c) Deletion of last node in the list.

b) Write a 'C' program to implement Single Link List and perform the following operations **10**

a) Sort the linked list.
b) Reverse the linked list.
c) Concatenation of two linked lists

UNIT - III

4 a) Construct a Binary Tree with the given data: **10**

i. Preorder: 8,5,9,7,1,12,2,4,11,3,
Inorder: 9, 5, 1, 7, 2, 12, 8, 4, 3, 11
Note: Traversal for Binary Tree

ii. Postorder: 10,9,23,22,27,25,15,50,,95,60,40,29
Inorder: 9, 10, 15, 22, 23, 25, 27, 29, 40, 50, 60, 95
Note: Traversal for Binary Search Tree

b) Write a 'C' program to implement the following operation in Binary Search Tree **10**

a) Insert a node
b) inorder
c) preorder
d) postorder

UNIT - IV

5 a) Illustrate splitting, merging and redistribution of keys in B-Tree (Consider any B-tree order) with an example. **08**

b) Consider an AVL tree given below fig.1 and insert the following data: 18, 81, 29, 15, 19, 25, 26, 1. **12**
Also delete nodes 39, 63 from the AVL tree formed after inserting the above data.

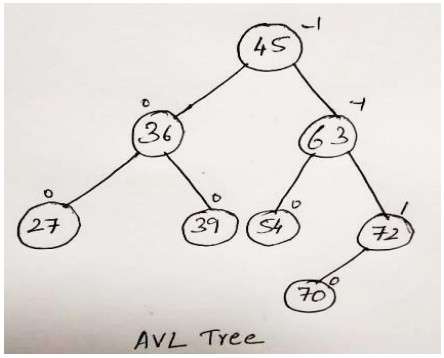

Fig1: AVL Tree

OR

6 a) Discuss the use of Threaded Binary Tree (TBT). Explain the different types of TBT with an example. **08**

b) Consider a sequence of numbers from 1 to 7 as the values of nodes in a splay tree, show the steps involved in splaying the tree at node 1. **05**

c) Explain Red-Black tree insertion with an example data 47, 32, 71, 93, 65, 82, 87 **07**

UNIT - V

7 a) Write the insertion sort algorithm. **05**

b) Given a hash table of size 13, show the contents of your hash table after inserting the values {8, 2, 7, 18, 15, 19, 23, 15, 20, 16}, show any collision happens during insertion and explain how it resolved using linear and quadratic probing. **10**
Note : [Hash function is K % M], K is Key and M is Table size.

c) Demonstrate sorting by counting for the values 4, 6,1,4,1,7,8,2 assuming the values are in the rays 0 to 9. **05**

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