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BMS College of Engineering, Bangalore-560019

(Autonomous Institute, Affiliated to VTU, Belgaum)

July / August 2017 Supplementary Semester Examinations

Course: **Data Structures With C** Duration: **3 hrs**
Course Code: **15IS3DCDSC / 15IS3DCDSE** Max Marks: **100**
Date: 27.07.2017

Instructions: **1.Answer any five full questions choosing one from each unit.**
2. Assume missing data (if any) suitably

UNIT 1

1. a) Outline the different features of a structure & Union. **04**

   b) Transpose the given sparse matrix & write C routine for the same task when implemented efficiently using arrays. **06**

$$\begin{bmatrix} 0 & 0 & 0 & 4 & 0 & 0 \\ 9 & 0 & 5 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & -3 & 0 \\ 0 & 2 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 11 \end{bmatrix}$$

   c) Develop C program to maintain student records which takes USN, name & semester as input for each student and display the student record for the given USN. Use pointers to structures in the code. **06**

   d) How is dynamic memory allocation enabled in C? **04**

UNIT 2

2. a) Construct the sequence of popped elements considering the sequence of operations on a stack as: Push A, Push B, Push C, Pop, Push D, Pop, Pop, Push E, Pop, Pop **04**

   b) Demonstrate the evaluation of the postfix expression 8 7 4 * + 3 – 2 * along with the stack trace. **06**

   c) Develop recursive C functions for (i) Fibonacci series (ii) GCD of 2 numbers **10**

UNIT 3

3. a) Develop a C program to evaluate a polynomial with two variables using singly linked list. **08**

   b) Outline the advantages of circular queues over linear queues. **05**

   c) Implement the queue full and queue empty functions for circular queues **07**

OR

4. a) Outline the advantages of linked list over arrays **03**

   b) Implement a C routine to reverse the singly linked list so that the last element becomes the first & vice versa **07**

   c) Illustrate linked stack & linked queue with suitable figure. Also explain the declarations, initial conditions & boundary conditions of stack and queue **10**

UNIT 4

5. a) Implement a C routine to display alternate elements in a circular linked list. **06**

   b) Write an algorithm for traversing a list & to search an element in a linked list **06**

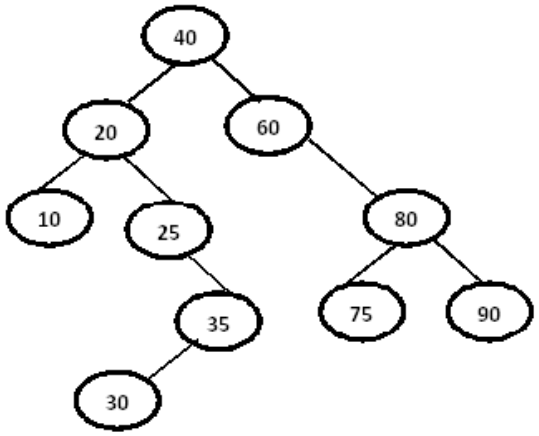
   c) Develop a program to demonstrate insert operation in an ordered doubly linked list **08**

UNIT 5

6. a) Illustrate the following operations on binary tree **04**

   (i) Make tree (x) (ii) isempty (root)

   b) Illustrate the preorder, postorder and inorder traversal of the below shown tree **06**



   c) Develop a C function for creation of BST & searching an element in a BST **10**

OR

7. a) Construct an expression tree for the arithmetic expression (A-B*C)+((D+E)/F) **04**

   b) Briefly explain left-in threaded trees with an example. **06**

   c) Illustrate and develop a C function for deleting a node in BST. **10**

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