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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Second Semester - Master of Computer Applications (MCA)

Make-up Examination; Jan/Feb - 2016

Data Structures using C

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** full question from each **unit**.*

UNIT - I

1. a. What is an abstract data type? Write the ADT for an array. 5

   b. How two dimensional array is allocated in a row major order? Explain through an example. 10

   c. Define a pointer. Explain the operators used in pointers, with example. 5

2 a. Define a String in C language. Write 'C' functions for joining two strings and to find the length of string without using library functions. 10

   b. Give the difference between: (i) call by value and call by reference
   (ii) malloc ( ) and calloc ( ) (iii) Structure and union (iv)* pi + 1 and * (pi + 1) 10

UNIT - II

3 a. Define a stack. Write 'C' program to implement PUSH and POP operations on a stack. 10

   b. Write an algorithm to convent infix expression to postfix and trace it showing the contents of stack for the given expression $\left(A-\left(B+C\right)\right)*D)\wedge\left(E+F\right)$ 10

4 a. Discuss stack as an ADT and list the application of stack. 4

   b. What is recursion? What are the conditions necessary for development of recursive algorithm? 6

   c. Write a recursive C program to search a given number using Binary search method. 10

UNIT - III

5 a. Define priority Queue? Explain the various types of priority queue. 4

   b. Write a C program to perform insert, delete and display operation on an ordinary Queue. 10

   c. Write a C routines to perform the following on a circular queue
   (i) insertion (ii) deletion 6

6 a. What is doubly linked list? Write C function to implement stack's PUSH and pop operation using singly linked list. 10

   b. List the advantages to perform the following operation on circular queue:
   (i) Insertion (ii) Deletion 4

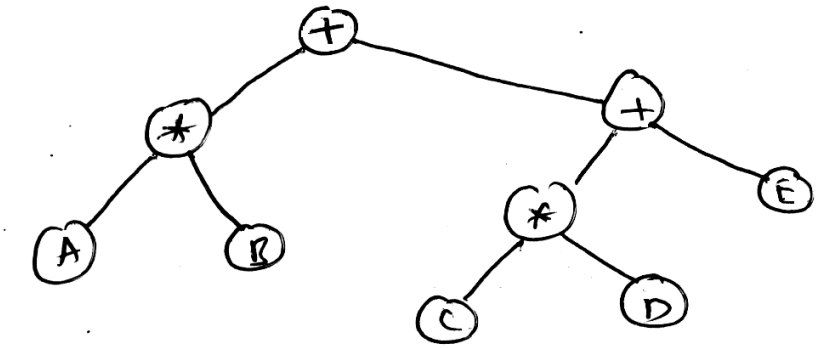
   c. Write a C function to count number of nodes in a linked list. 6

Contd…2

UNIT - IV

7 a. Write a C program for binary search technique. Explain with example. 10

b. Define binary tree. Write the inorder, preorder and postorder traversal for the given binary tree. 10



8 a. Define binary search tree. Write and explain the C module to insert an element into BST, if it does not exist on it already. 10

b. Write about the following : 10

i) AVL Trees ii) Threaded Binary Tree. (iii) Hashing

UNIT - V

9 a. Explain shell sort. Trace the shell sort for the following data: 25 27 57 48 37 12 92 86 10

b. Write a C program for Quick sort. 10

10 a. Sort the following number using heap sort procedure. 10

21 42 49 52 5 7 81 86

b. Write a C program for Bubble sort. 10

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