Total Number of Pages: 02

MCA
MCC201

2ndSemester Regular / Back Examination – 2015-16
DATA STRUCTURE USING 'C'
BRANCH : MCA
Time : 3 Hours
Max Marks : 70
Q.CODE : MCC201
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1   Answer the following questions: (2 x 10)
  a) What is an abstract data type? Can you consider an array as abstract
      data type?
  b) If the base address of a two dimensional array is 1000H, find the
      address of the following elements:
      i.   (3,4)th element of the array assuming the array is storing
            integer type data in row major order.
      ii.   (2,5)th element of the array assuming the array is storing
            floating point type data in column major order.
  c) Write down the merits of a circular queue over a queue.
  d) When can you use array to store polynomials? Mention the condition
      when it becomes necessary to store polynomials using linked list.
  e) Construct the binary tree from the following expression
            E=a*b-c/d+f
  f) What is garbage collection? List any two disadvantages of garbage
      collection.
  g) Mention any two important properties of a B tree.
  h) Illustrate topological sorting with a suitable example.
  i) Define a single-pair shortest path problem.
  j) Compare the running times of linear search and binary search
      algorithms for the following two cases:
      a. When item to be searched is placed at first position.
      b. When item to be searched is placed at last position.

Q2 a) Write a program in C to implement the basic operations of a queue.   (5)
    b) Outline the important steps to convert the following infix expression to   (5)
        its equivalent postfix expression using stack
            A * B + C ^(D-E/F)

Q3   Write program in C for that implements insertion and deletion   (10)
        operations in a doubly circular link list.

                                                                                  (5)
Q4 a) Describe the different collision resolution techniques.
    b) Write an algorithm that deletes a given node from a binary search tree.   (5)

Q5 a) Construct a height balance tree using the following set of keys: (5)
         <1, 4, 5, 10, 16, 17>
    b) Describe the steps of heap sort algorithm for sorting the following input   (5)
         data items in descending order
         7, 5, 10, 4, 20, 3, 9.

Q6 a) Define a threaded binary tree. Mention the different types of threaded   (5)
         binary tree with suitable examples. Write the important operations
         associated with threaded binary tree.
    b) Illustrate each step of merge sort for sorting the following data elements   (5)
         in ascending order
         10, 6, 19, 15, 7, 1, 5
         What is the worst case running time of merge sort?

Q7   Use breadth first search and depth first search to traverse the following   (10)
         graph by using D as the starting node.
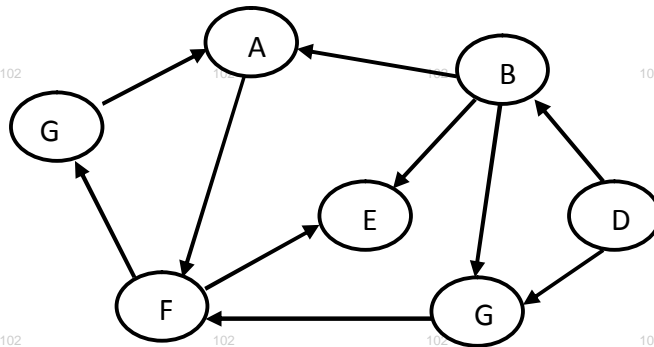
Q8   Answer any two   (5 x 2)
    a) Pattern matching algorithm.
    b) Hashing function.
    c) Operations on binary trees
    d) Radix sort