10CS35

Third Semester B.E. Degree Examination, June/July 2019

Data Structures with C

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting*
at least TWO questions from each part.

PART – A

1   a. Define pointer with example. Explain pointer constants, pointer values, pointer variables.
                                                                                                   (06 Marks)
    b. What are the various memory allocation techniques? What are the various memory management functions in C? Explain malloc( ) function.   **(10 Marks)**
    c. Explain asymptotic notations.   **(04 Marks)**

2   a. What is a structure? Explain three different ways of declaring a structure. How do define the structure along with structure variables? How are structure initialized?   **(16 Marks)**
    b. For the given Sparse matrix A and its transpose, give the triple representations. A is the given sparse matrix and B will be its transpose.

$$\text{Sparse matrix A} = \begin{bmatrix} 10 & 0 & 0 & 40 \\ 11 & 0 & 22 & 0 \\ 0 & 0 & 0 & 0 \\ 20 & 0 & 0 & 50 \\ 0 & 15 & 0 & 25 \end{bmatrix}$$
                                                                                                   (04 Marks)

3   a. Define stack. List the operations on stack.   **(08 Marks)**
    b. Obtain the postfix and prefix expression for:
       (i) $(a + b) * d + e /(f + a * d) + c$ (ii) $a / b - c + d * e - a * c$ **(08 Marks)**
    c. What is system stack? How the control is transferred to or from the function with the help of activation record?   **(04 Marks)**

4   a. What is linked list? What are the different types of liked list with diagram?   **(10 Marks)**
    b. How polynomials are represented using linked lists?   **(06 Marks)**
    c. What is the difference between singly linked list and doubly liked list?   **(04 Marks)**

PART – B

5   a. What is a tree? With example for this given tree use list representation, left-child, right-sibling representation, binary tree representation. [Refer Fig.Q5(a)]
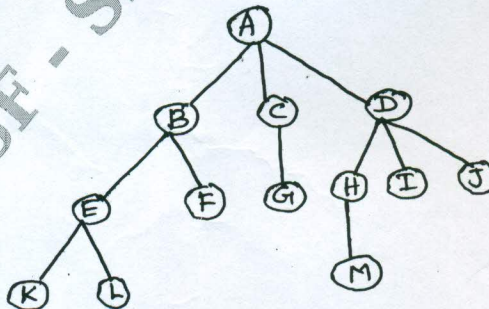

Fig.Q5(a)
                                                                                                   (10 Marks)

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b. What are the different traversal techniques of a binary tree? **(06 Marks)**

c. Define a max heap. Write a C function to insert an item into max heap. **(04 Marks)**

6 a. What is a selection tree? Explain two types of selection tree. **(10 Marks)**

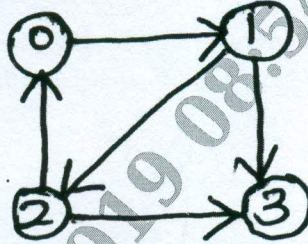b. Define adjacency matrix and adjacency list for the following graph in Fig.Q6(b).

Fig.Q6(b) **(06 Marks)**

c. Define forest with examples. **(04 Marks)**

7 a. What are the various types of leftist trees? **(08 Marks)**

b. What is binomial heap? What are the types of binomial heaps? **(06 Marks)**

c. What is priority queue? Explain single ended, double ended priority queue. **(06 Marks)**

8 a. What is an AVL tree? Explain different types of rotations in AVL tree. **(10 Marks)**

b. Explain Red-Black tree. How a red-black tree represented? **(04 Marks)**

c. What is a splay tree? What are the advantages of splay tree? What are the types of splay tree? **(06 Marks)**

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