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15CS33

Third Semester B.E. Degree Examination, July/August 2021 Data Structure and Application

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

- 1
 - a. Classify Data Structure, briefly. (05 Marks)
 - b. Explain how to use structure. Write a program to display record of at least 5 student (R No., Name, US No, Marks, Grade) using structure. (08 Marks)
 - c. Define pointer. Explain how to declare and use pointer. (03 Marks)

- 2
 - a. List and explain the function supported by C for Dynamic Memory allocation. (04 Marks)
 - b. What is polynomial? Explain how to represent polynomial. (04 Marks)
 - c. Write a program to add two polynomials. (08 Marks)

- 3
 - a. Define stack. Explain the operations performed by stack. (04 Marks)
 - b. Implement Push and POP function for stack using arrays with StackFull and StackEmpty conditions. (08 Marks)
 - c. Explain and implement Tower of Hanoi. (04 Marks)

- 4
 - a. Discuss application of stack. (04 Marks)
 - b. Define queue, circular queue. Implement enqueue and dequeue function for queues using array. (08 Marks)
 - c. Define recursion. Write a program for :
 - (i) Factorial of a number
 - (ii) Fibonacci sequence (04 Marks)

- 5
 - a. Define singly linked list and doubly linked list with example. (04 Marks)
 - b. Create a singly linked list of integers. Write a function to:
 - (i) Create and list with data
 - (ii) Insert a node in the list
 - (iii) Delete a node from the list
 - (iv) Display singly linked list (08 Marks)
 - c. What are the advantages of doubly linked list over singly linked list? (04 Marks)

- 6
 - a. Define Sparse matrix. Express the given sparse matrix in triplets and find its transpose

$$\begin{bmatrix} 0 & 0 & 4 & 0 & 0 \\ 8 & 5 & 0 & 0 & 0 \\ 0 & 10 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 2 \end{bmatrix}$$

(08 Marks)
 - b. Explain circular linked list. (08 Marks)

- 7
 - a. Define: (i) Tree (ii) Binary tree (iii) Complete Binary Tree (iv) Strictly Binary Tree (v) Skewed Tree (vi) Level of tree (08 Marks)
 - b. Write the routine to traversal given tree using :
 - (i) pre-order traversal
 - (ii) post-order traversal. (08 Marks)

- 8 a. What is Binary Search Tree? Write a program to implement recursive search or iterative search for a Binary Search Tree. (08 Marks)
- b. Explain threaded binary tree in detail. (08 Marks)
- 9 a. Define graph. Give adjacency matrix and adjacency linked list for the given weighted graph in Fig.Q9(a).

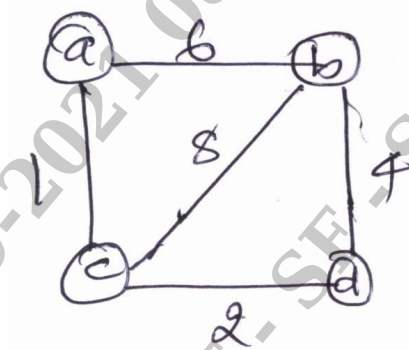


Fig.Q9(a)

- b. Write algorithm for breadth first search and depth first search. (08 Marks)
- 10 a. Explain about Hashing in detail. (06 Marks)
- b. Write an algorithm (i) Radix sort (ii) Insertion sort. (10 Marks)

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