Question Paper

Exam Date & Time: 08-Feb-2021 (02:00 PM - 05:15 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

MANIPAL SCHOOL OF INFORMATION SCIENCES, MANIPAL

FIRST SEMESTER MASTER OF ENGINEERING- ME (VLSI DESIGN) DEGREE EXAMINATION - FEBRUARY 2021

Data Structures [CSE 606]

Marks: 100

Duration: 180 mins.

MONDAY, FEBRUARY 8, 2021

Answer all the questions.

1)	Design data structure for single linked list. Write function to delete element at any position. (TLO2.2) (10 (2+8 Marks)))
2)	What is Stack data structure? List applications of Stack. Provide data structure for linked list based (10 Stack. Implement stack_push() and stack_pop() functions. (TLO: 2.2)(1+1+2+3+3 marks))
3)	Design data structure for circular Queue. Write functions to add to queue and delete from queue. (10 (TLO: 2.2) (2+4+4 marks)))
4)	List the properties of Binary Search Tree (BST). Design data structure for BST. Write functions to display the elements of BST in ascending and descending order. (TLO: 4.1)(2+2+3+3 marks).))
5)	What is hashing? What are the advantages of hash table? Write hash function to store the names of (10 students in alphabetical order. Each chain should store the names based on its first alphabet. (TLO:4.3) (2+2+6 marks)))
6)	Write a program to sort the elements of an array. Sorting technique will perform in $O(N)$ time in best (10 case scenario and $O(N^2)$ in worst case scenario. (TLO:3.2)(10 Marks)))
7)	What is Minimum Spanning Tree? Write pseudo code for Prims's algorithm to find Minimum (10 Spanning Tree. Illustrate with an example by considering a graph with 6 vertices. (TLO: 4.2)(2+4+4 marks)))
8)	Consider a graph with 5 Vertices and represent the graph using Adjacency matric and Adjacency (10 list. Traverse the graph using DFS Technique. (TLO:4.2) (5+5 marks)))
9)	Given two linked list A and B, Create linked list C = A minus B. Define the data structure for the following problem and write the function List * minus(List *, List *). Note: Assume List * Initialize_list(); List * insert_at end(List *, int) is implemented. (TLO:3.1; TLO: 2.1; TLO:2.2) (2+8 marks)))
10)	Given an integer array of size N, write a function with time complexity of O(N logN) to find two (10 elements 'X' and 'Y' such that it sums to 'M'. For Eg. Given int arr[2, 6, 1, 7, 4, 5, 8, 2]and M=9, then X=2 and Y=7 or X=1 and Y=8. (TLO:3.1; TLO: 2.1; TLO:2.2) (10 marks)))

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