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B022312(022)

B.Tech. (Third Semester) Examination

Nov.-Dec. 2020

(CSE Branch)

DATA STRUCTURE & ALGORITHMS

Time Allowed : Three hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : *Attempt all questions. Part (a) is compulsory & Attempt any two parts from (b), (c) and (d) of each questions.*

Unit-I

1. (a) Explain asymptotic notations & also explain Big o notation & check whether this relation is valid or not with explanation $f\left(n_1 = 3x^2 + 4n = o\left(n^2\right)\right)$. 4

(b) Consider the linear array A [5 : 50], b [–5 : 10] & c [18].

(i) Find the number of elements in each array.

(ii) Suppose base (A) = 300 & w = 4 byte for A. Find the address of A [15], A [40] & A [55]. 8

(c) What is the ways to insert a node in link list? Write an algorithm for inserting a node at first position. 8

(d) Write an algorithm to delete the last node from a circular link list. 8

Unit-II

2. (a) Evaluate the given postfix expression : 4

9, 3, 4, *, 8, +, 4, /, –

(b) Write an algorithm to convert the infix to postfix expression & write all the steps involved in evaluating the postfix expression. 8

a+b*(c-d)/e+f % g

(c) Write an algorithm to traverse the circular queue. 8

(d) Write an algorithm for Tower of Hanoi & give example for n=3 disk. 8

Unit-III

3. (a) Write short notes on : 4

(i) Full Binary Tree

(ii) Complete Binary Tree

(b) Convert the following list into AVL Tree : 8

64, 1, 44, 26, 13, 110, 98, 85

(c) Convert the following list into B Tree of order = 5 : 8

10,25,15,4,3,5,9,2,7,11,12,50,26,23,22,13,24,6,8

(d) Short the following list by using Heap short algorithm : 8

10, 20, 50, 30, 15, 55, 25, 65, 45

Unit-IV

4. (a) Write short notes on the following : 4

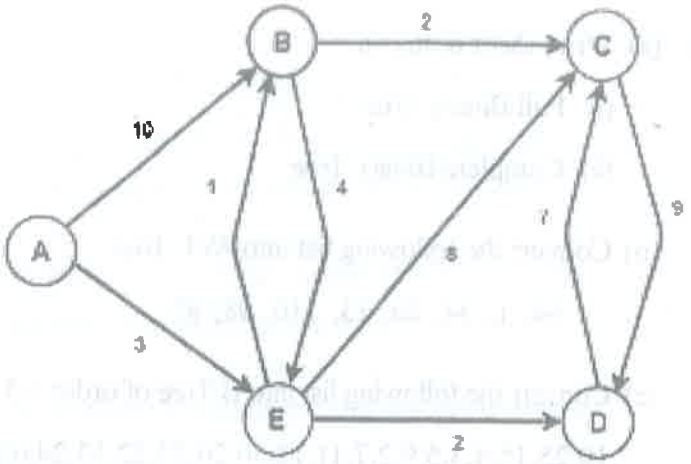
(i) Directed graph

(ii) Adjacency matrix

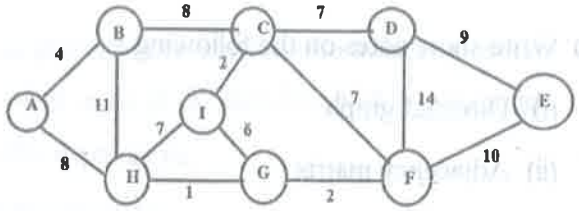
(iii) Degree or graph

(iv) Complete graph

(b) Find the shortest path from vertex A to all the vertex in the given graph by using Djkstra algorithm. 8



(c) By using Prims algorithm find spanning tree from the following graph : 8



(d) Distinguish between Breadth First Search and Depth First Search. 8

Unit-V

5. (a) Explain various types of time complexity and write down time complexity for Linear and Binary search. 4

(b) Consider inserting the key - 29, 46, 18, 36, 43, 21, 24, 54 into hash table of size ('M'=11) using linear probing consider the primary hash ( ) is H(k)=k (Mod m). 8

(c) Search the item 80 from the following list using binary search 8

11,22,30,35,42,45,53,63,65,78,80,90,95

(d) Sort the following series by using selection sort and write time complexity for selection sort. 8

32,51,27,85,66,23,13,57