2016

MCA

MCA 2.1

DATA STRUCTURE AND ALGORITHMS

Full Mark : 75
Time : 3 Hrs

Figures in the right hand margin indicate full marks for the question

1. Answer any five from the following: 2 x 5 = 10

   a) Why we need a data structure?

   b) What do you mean by abstract data type?

   c) Explain linear and non-linear data structures?

   d) Explain Stack ADT and give few applications of stack ADT.

   e) Define complete binary tree with example.

   f) Define the term node, address, null pointer and next pointer for linked list.

   g) Explain time complexity of bubble sort.

2. Answer any five from the following: 3 x 5 = 15

   a) Define binary tree and also explain when a binary tree will be a strictly binary tree.

   b) Explain the two way of representing graph with example.

c) Give any two comparison of linked and sequential storage representation.

d) What is worst-case, best-case and average case efficiency of an algorithm?

e) Define single linked list and doubly linked list.

f) Explain the following of a graph with example.

(any three)

i. Directed and undirected graph.

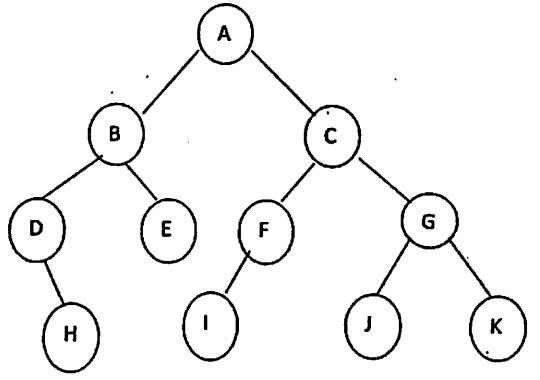
ii. Weighted graph

iii. Cyclic graph.

iv. Complete graph

3. Answer the following:

a) What is traversal in a binary tree ? Explain with an example. Find out the Pre-order, Post-order and In-order traversal for the following binary tree. 1+1+3=5



b) Explain the three Asymptotic Notation O(Big "Oh") , Ω (Omega) θ (Theta.). 5

c) What is hash table? Explain two hash functions with example. 1+2+2=5

d) Define Binary search tree . Construct a Binary search tree by inserting the following data sequentially.

45, 32,70,67,21,85,92,40 2+3=5

4. Answer the following (any five) 6 x 5=30

a) Write a program to implement stack by using array.

b) Write a Program to sort n number using bubble sort. (using function)

c) Write a program to sort n numbers using quick sort .

d) Write a program to merge two sorted array to a third sorted array.

e) Write a program to find the largest elements by using single liked list.

f) Write a recursive function to find the sum of all even elements in an array.

g) Write a program to implement breadth first search.

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