

07/10/22 (3)

Time: 2½ hrs.

Marks:75

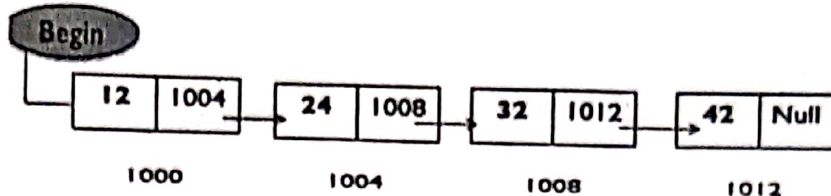
Note:

1. All questions are compulsory with internal choice.
2. Draw neat diagrams wherever necessary.
3. Figures to the right indicate full marks.

Q.1 Answer the following (any four)

(20)

- (a) What are the various operations performed on Data Structure?
- (b) Find the location of a desired element '42' in a sorted (In ascending order) linked list. Show the dry run along with steps.



- (c) Write an algorithm to 'Traverse a One-way linked list' and print the elements of a Linked List.
- (d) Convert the following Infix notation to 'Prefix Notation'
 - i) $(x-y) * ((z+v)/f)$
 - ii) $((a+b)/d)^{((e-f)+g)}$
- (e) Write an algorithm for 'Pop operation' in Stack represented in memory using Array. Take an example and do dry run.
- (f) Write an algorithm to 'Delete' an element from a 'Circular Queue'

Q.2 Answer the following (any four)

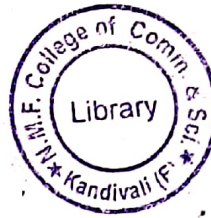
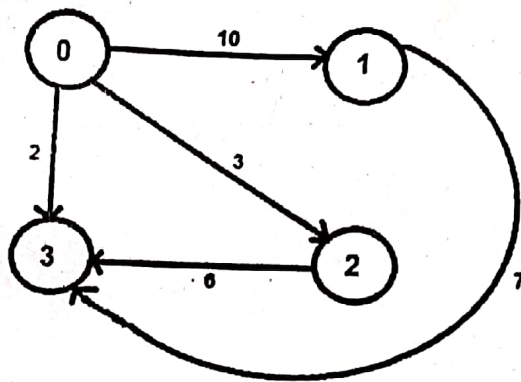
(20)

- (a) Write a short note on 'Doubly Linked List' along with an example.
- (b) Explain the following terms with the help of an example:
 - i) Degree of a node
 - ii) Height of a node
 - iii) Level of a Tree
- (c) Write an Algorithm to traverse a binary tree 'T' in the 'pre-order' manner recursively. Explain with an example.
- (d) What is a Priority Queue? Explain the concept of 'Priority Queue using Multiple Queues' with the help of your own example.
- (e) Create a Heap with the following elements : 15 7 10 2 20 15.
- (f) What is an AVL Tree? Create an AVL Tree with 5 elements as given below:
50, 100, 200, 35, 15

Q.3 Answer the following (any four)

(20)

- (a) What is a Hashing? Explain 'Division Remainder Method' with the help of an example.
- (b) Consider a hash table of size 10. Insert the records with key values 33,101,99,83 using 'Linear Probing' Method.
- (c) What is a Folding Method? Consider the following 8 digit keys 20542270 , 32450001 and find the 3 digit relative address using 'Folding Method'.
- (d) Perform following operations on the given graph:
 - i) Find out outdegree and indegree of all vertices
 - ii) List source and sink vertices
 - iii) Write adjacent vertices of all vertices
 - iv) Write any three paths
 - v) Check whether graph contain Hamiltonian path or not, if yes write it down



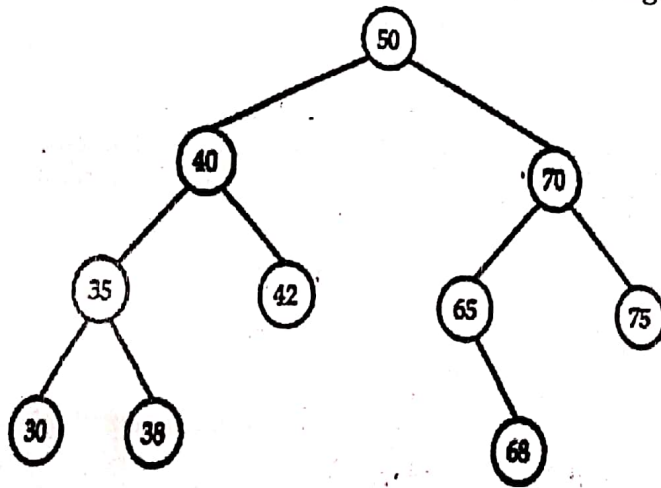
- (e) Explain the concept of Depth First Search (DFS) with the help of an example.
 (f) Explain the memory representation of a graph with suitable examples

Q.4

Answer the following (any three)

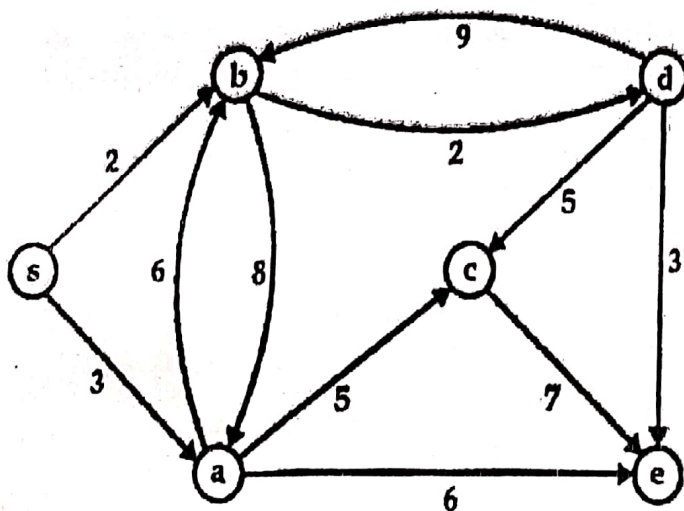
- (a) What is a Data Structure? Explain any two classifications of Data Structure?
 (b) State the advantages and disadvantages of a 'One-way Linked List'.
 (c) Explain the concept of Recursion along with the help of an example.
 (d) Find the 'largest' element in the 'Binary Search Tree' as given in the below diagram.
 Show the dry run along with the steps of an algorithm.

(15)



A Binary Search Tree

- (e) Write an algorithm to insert an element 'New' into a Heap 'H' of size 'n'.
 (f) Consider the following connected graph G. Use the 'Dijkstra's Algorithm' to find the shortest path.



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