Total No. of Questions—**12**] [Total No. of Printed Pages—**4+2**

[3762]-607

S.E. (Comp.) (II Sem.) EXAMINATION, 2010

DATA STRUCTURES

(2003 COURSE)

Time : Three Hours **Maximum Marks : 100**

N.B. :— (*i*) Answer *three* questions from Section I and *three* questions from Section II.

(*ii*) Answers to the two Sections should be written in separate answer-books.

(*iii*) Neat diagrams must be drawn wherever necessary.

(*iv*) Figures to the right indicate full marks.

(*v*) Assume suitable data, if necessary.

SECTION I

1. (*a*) Write pseudo 'C' code to implement stack as an ADT using Singly Linked List. [6]

(*b*) Define a node structure to represent the list using GLL. Represent the following list using GLL

List A = ((*a*, *b*), ((*c*, *d*), *e*)). [6]

(*c*) Write pseudo 'C' code to invert a given Singly Linked List. [6]

P.T.O.

Or

2. (*a*) Write pseudo 'C' code to implement queue as an ADT using circular linked list. [6]

(*b*) Write pseudo 'C' code to perform the following operations on Doubly Linked List :

(*i*) insertion of a node

(*ii*) deletion of a node

(*iii*) to find the length of the list

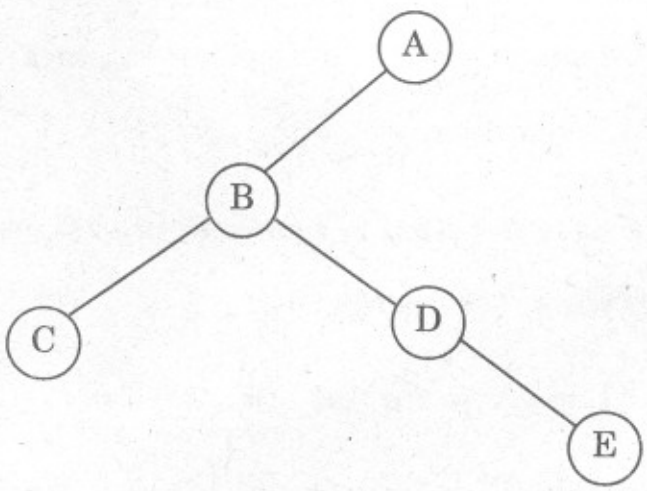
(*iv*) to concatenate two given lists. [12]

3. (*a*) Draw the internal memory representation of the following binary tree using :

(*i*) Sequential representation

(*ii*) Linked representation and

(*iii*) Inorder threaded linked representation.



[10]

(*b*) Compare the representation of binary tree using sequential and linked organization. [6]

Or

4. (*a*) Write non-recursive pseudo code in 'C' for inorder traversal of binary tree. What is time and space complexity of your algorithm. [8]

(*b*) Write pseudo 'C' code to determine equivalence of two binary trees. What is time and space complexity of your algorithm ? [8]

5. (*a*) Write an algorithm for topological sorting. Obtain time complexity of your algorithm. [6]

(*b*) Write an algorithm for Breadth First Search of an undirected graph. Obtain the time complexity of your algorithm. [6]

(*c*) Define spanning tree. Explain in brief any *two* applications of spanning tree. [4]

Or

6. (*a*) Write an algorithm for Depth First Search of an undirected graph and obtain time complexity of your algorithm. [6]

(*b*) Write an algorithm to find Minimum Spanning Tree for a given graph 'C' and obtain its time complexity. [6]

(*c*) Define Minimum Spanning Tree. Explain in brief any *two* applications of MST. [4]

SECTION II

7. (*a*) Write pseudo 'C' code to construct a binary tree with minimum weighted external path length. Construct a binary tree with minimum weighted external path length for the following weights :

14, 3, 10, 4, 8, 6.

Find the total weighted external path length of the tree constructed by you. [10]

(*b*) Explain the following terms with an example :

(*i*) Hash function

(*ii*) Identifier density

(*iii*) Loading density. [6]

Or

8. (*a*) What is collision ? Explain any *two* methods of collision resolution. [8]

(*b*) Write short notes on the following :

(*i*) Static Tree Tables

(*ii*) Dynamic Tree Tables. [8]

9. (*a*) Write pseudo 'C' code for Heapsort and obtain time complexity of your algorithm. [10]

(*b*) Write short notes on the following :

(*i*) B-tree

(*ii*) Trie Indexing. [8]

Or

10. (*a*) Write pseudo 'C' code to construct a heap for the given set of keys. Obtain time complexity of your algorithm. [10]

(*b*) Write short notes on the following :

(*i*) Red-black trees

(*ii*) K-d trees. [8]

11. (*a*) Compare sequential file organization with direct access file organization. Write 'C' implementation of primitives for direct access file. [8]

(*b*) Write short notes on the following :

(*i*) Index sequential file

(*ii*) Hashed indexes. [8]

Or

12. (*a*) Compare linked organization with inverted file organization by means of an example of your choice. [8]

(*b*) Write short notes on the following :

(*i*) External storage devices

(*ii*) File organization techniques. [8]