

UNIVERSITY OF PUNE

[4362]-217

S. E. (Computer) Examination - 2013

Data Structures (2008 Course)

[Time: 3 Hours]

[Max. Marks: 100]

Instructions:

- 1 Answer three questions from section-I and three questions from sections-II.
- 2 Answers to the **two sections** should be written in **separate answer-books**.
- 3 Neat diagrams must be drawn wherever necessary.
- 4 Figures to the right indicate full marks.
- 5 Assume suitable data, if necessary.

SECTION - I

- Q.1 A The inorder and postorder traversals of a certain binary search tree are given as follows. 6
Inorder Traversal: 10,30,40,50,52,54,55,60,90
Postorder Traversal: 40,54,52,55,50,30,60,90,10
Construct the binary search tree from above traversals and write the preorder traversal.
- B Write a non-recursive pseudo C/C++ code to display the height of a binary tree 6
- C Define the following terms and their use with respect to the threaded binary tree with suitable example. 6
- i. Inorder threaded binary tree
 - ii. Inorder successor
 - iii. Inorder predecessor

OR

- Q.2 A List the different depth first search traversal techniques for binary trees. Write a pseudo C algorithm for any one of the above techniques. 6
- B Write a non-recursive pseudo C/C++ code to generate the 6

mirror image of a binary tree.

- C For the binary tree represented as an array of size 30, perform in-order threading on the tree: 6

A B C D E F G H — — F — — — J K —
 — — — — — — — — — — — — — — — L — — —

- Q. 3 A Explain with example inverse adjacency list representation of graph. 4
 B Write a pseudo C/C++ code to display breadth first traversal of a graph. Explain the working with suitable example. 8
 C What is the difference between the Prim's and Kruskal's algorithms for minimum spanning trees? 4

OR

- Q. 4 A For the following graph represented in the form of adjacency matrix representation, generate the minimum tree using Kruskal's algorithm 8

	A	B	C	D	E	F	G	H
A	0	1	1	0	0	0	0	0
B	1	0	0	0	1	0	0	0
C	1	0	0	1	0	1	0	0
D	0	0	1	0	0	0	0	1
E	0	1	0	0	0	0	1	0
F	0	0	1	0	0	0	1	1
G	0	0	0	1	0	1	0	0
H	0	0	0	1	0	1	0	0

- B Write a pseudo C/C++ code to find a shortest path of a given graph using Dijkstra's shortest path algorithm. 8
- Q. 5 A Construct AVL search tree by inserting the following elements in the order of their occurrence. Show the balance factor and type of rotation at each step. 8
 70,55,60,65,50,80,49,68,44,66,77,79
 B What is the use of hash tables? Explain the characteristics of a good hash function. 4
 C Enlist various static and dynamic tree tables. Explain when to select the static tree tables and dynamic tree tables. 4

OR

- Q. 6 A Write a pseudo C/C++ code for LL,RR,LR and RL 8

rotations for AVL tree

- B Assume a hash table of size 10 and hash function $H(X)=X \bmod 10$ performs linear probing with and without replacement for the given set of values.
0,1,2,4,7,2,6,5,8,5,8,7,9,0,5,8.

SECTION II

- Q. 7 A Define the term heap trees. Write a pseudo C/C++ code to insert the element in Max Heap. 8
B Create a B+ tree of order 3 for the data given below. 10
55,10,40,20,12,15,90,80,45,52,25,22,85,95,65
- OR**
- Q. 8 A Sort the following numbers in descend using heap sort 10
22,75,34,55,25,10,45,52,90,65
B Write a pseudo C/C++ code to delete the node in B tree 8
- Q. 9 A What is file organization? Explain any three types of file organization. 8
B Write a C/C++ program to create a sequential file and to implement primitive operations for the same. 8
- OR**
- Q. 10 A Compare sequential file organization, indexed file organization and direct file organization 8
B Explain different modes of opening file 4
C Compare text and binary files 4
- Q. 11 A Write a C++ program using STL stack to convert decimal number to binary number 6
B What is STL? Explain various components of STL 10
- OR**
- Q. 12 A Implement doubly ended queue as ADT using STL 8
B Explain the following terms 8
i. ADT
ii. Generic programming
iii. Iterators
iv. Containers