

Total No. of Questions—8]

[Total No. of Printed Pages—4

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[5252]-568

SE (Computer) (Second Semester) EXAMINATION, 2017
ADVANCED DATA STRUCTURES
(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Answer *four* questions

(ii) Figures to the right indicate full marks.

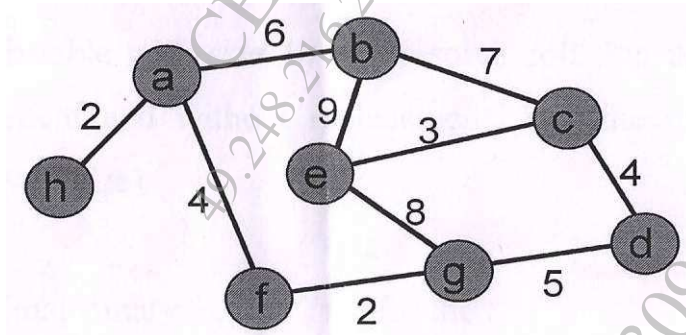
(iii) Assume suitable data, if necessary

1. (a) From the given traversals construct the binary tree. [4]

Pre-order : G, B, Q, A, C, K, F, P, D, E, R, H

In-order : Q, B, K, C, F, A, G, P, E, D, H, R

(b) Find the MST for the graph given using Kruskals Algorithm and show all the steps. [4]



(c) Construct Huffman's Tree and the prefix free code for all characters : [4]

| Symbol | A | C | E | H | I |
|-----------|---|---|---|---|---|
| Frequency | 3 | 5 | 8 | 2 | 7 |

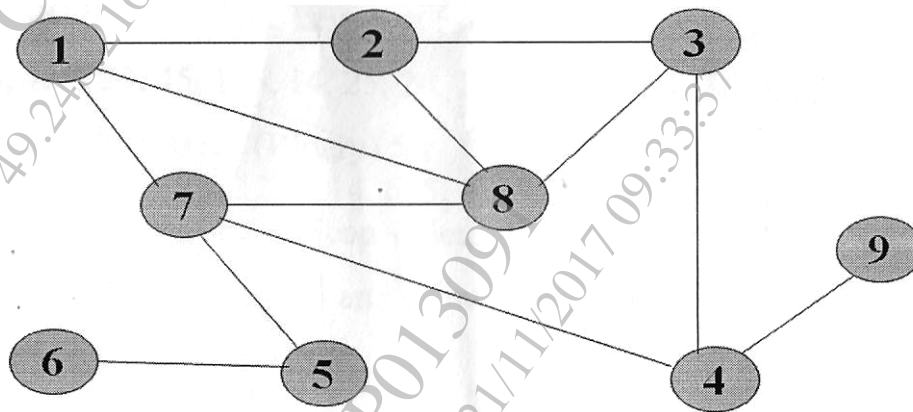
P.T.O.

Or

2. (a) For the binary tree represented as an array, perform in-order threading on the tree : [4]

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| A | B | C | D | E | F | G | | H | I | | | | J | K | | | | | | | | | | | | | L |

- (b) Define DFS and BFS for a graph. Show BFS and DFS for the following graph with starting vertex as 1. [4]



- (c) Write pseudo-code for performing level order traversal of a binary tree. [4]
3. (a) Obtain AVL trees from the following data : [6]
30, 50, 110, 80, 40, 10, 120, 60, 20, 70, 100, 90
- (b) For the given set of values. [6]
11, 33, 20, 88, 79, 98, 44, 68, 66, 22
- Create a hash table with size 10 and resolve collision using chaining with replacement and without replacement. Use the modulus Hash function. (key % size.)

Or

4. (a) Find the Optimal Binary Search Tree for the : [6]
Identifier set {a1, a2, a3} = {do, if, while}
Where $n = 3$ and
Probabilities of successful search as {p1, p2, p3} = {0.5, 0.1, 0.05} and Probability of unsuccessful search as {q0, q1, q2, q3} = {0.15, 0.1, 0.05, 0.05}.
- (b) What is hash function ? What are characteristics of good hash function ? Explain the different types of hash functions ? [6]
5. (a) Insert the following keys to a 5-ways B-tree : [6]
3, 7, 9, 23, 45, 1, 5, 14, 25, 24, 13, 11, 8, 19, 4, 31, 35, 56
- (b) Create Min Heap (Binary) for
10, 12, 1, 14, 6, 5, 8, 15, 3, 9, 7, 4, 11, 13
After creating Min Heap delete element 1 from Heap and repair it. [6]
Then insert element 20 and show final result.
- (c) Define Red-Black Trees [2]
- Or
6. (a) State the need of B+ tree. Construct a B+ tree of order 5 for the following data : [6]
30, 31, 23, 32, 22, 28, 24, 29, 15, 26, 27, 34, 39, 36
- (b) What is priority queue ? Explain the insert and delete operations for priority queues using heap data structure. [6]
- (c) Define Splay trees. [2]

7. (a) What is index sequential file organization ? State its advantages and disadvantages. [6]
- (b) What is a File ? List different file opening modes in C++. Explain the concept of inverted files. [6]

Or

8. (a) Write a C++ program to create a file. Insert records in the file by opening file in append mode. Search for a specific record entered by user. [6]
- (b) Compare index sequential and direct access files. [6]