Code No: R31053 **R10** **Set No: 1**

III B.Tech. I Semester Supplementary Examinations, May 2013

ADVANCED DATA STRUCTURES

(Common to Computer Science and Engineering & Information Technology)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. (a) What is a dictionary? What are its types? What are the methods supported by dictionary?
   (b) With an example, describe how to calculate hash function using decisive model.

2. (a) What are the differences between an AVL tree and a binary tree? When would you use an AVL tree?
   (b) What is a 2-3 tree? Explain its insert operation with illustrative example.

3. (a) Discuss about the insert and delete operation of heap with illustrative example.
   (b) Explain Kruskal's algorithm and illustrate with suitable example.

4. (a) What is graph? Explain the vertex insertion and deletion with suitable example.
   (b) What are the graph traversal methods? Explain with example.

5. (a) Write and explain an algorithm to find all-pair shortest path.
   (b) What is Binomial queue? Discuss about lazy binomial queues.

6. (a) Illustrate the performance of the heap-sort algorithm on the input sequence:
   2, 5, 16, 4, 10, 23, 39, 18, 26, 15
   (b) Explain quick sort algorithm with example.

7. (a) What is binary tree? What for it is used? Explain with suitable example.
   (b) Discuss the KMP pattern matching algorithm with example.

8. (a) Discuss the different methods of record organization in files.
   (b) Explain the file opening operation with example.

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Code No: R31053 **R10** **Set No: 2**

III B.Tech. I Semester Supplementary Examinations, May 2013

ADVANCED DATA STRUCTURES

(Common to Computer Science and Engineering & Information Technology)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. (a) List and explain the different methods for creating Hash functions.
   (b) What is skip list? Illustrate insertion and deletion operation with suitable example.

2. (a) Create 2-3 tree from the following lists of data items.
   30, 20, 35, 95, 15, 60, 55, 25, 5, 65, 70, 10, 40
   (b) Define AVL tree. Discuss in what way is an AVL tree better than a binary tree.

3. (a) What is priority queue? How can it be represented by a Heap?
   (b) What is Binomial queue? Discuss about binomial amortized analysis.

4. (a) For a sample graph, give the adjacency list representation and adjacency matrix representation.
   (b) Discuss the Depth first search with its non recursive algorithm.

5. (a) Give pseudo code for Dijkstra's algorithm and explain.
   (b) What is All-pairs shortest path problem? Explain Floyd-Warshall algorithm.

6. (a) Sort the following list of elements using merge sort.
   70, 80, 40, 50, 60, 12, 35, 95, 10.
   (b) Analyse the quick sort algorithm. Argue on its best case, average case and worst case time complexity.

7. (a) What is multi-way trie? What for it is used? Construct a muti-way trie.
   (b) Discuss the Boyer-Moore algorithm with example.

8. (a) What are the special characters in files? How to handle them?
   (b) Discuss the fundamental file structure concepts.

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Code No: R31053 **R10** **Set No: 3**

III B.Tech. I Semester Supplementary Examinations, May 2013

ADVANCED DATA STRUCTURES

(Common to Computer Science and Engineering & Information Technology)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. (a) Discuss briefly about linear probing, quadratic probing, and double hashing.
   (b) What is hash table restructuring? Why is it needed? Explain with example.

2. (a) Describe the AVL tree's insert method with proper illustration.
   (b) What is an AVL tree? In what way is an AVL tree better than a Binary tree.

3. (a) What is Binomial queue? How it differs from normal queue? What is its use?
   (b) Discuss the operations of Binomial queue.

4. (a) What do you mean by pattern matching? Discuss its need. Illustrate with example the Boyer-Moore algorithm.
   (b) What is tree? Why tries are used? Explain Patricia trie with example.

5. (a) Discuss the operations on graph with suitable examples.
   (b) Create a min-heap for the following list
   20, 10, 1, 5, 4, 80, 60, 30

6. (a) Give the analysis of merge sort. Argue on its best case, average case and worst case time complexity.
   (b) Explain heap sort algorithm with example.

7. (a) Draw a simple, connected, weighted graph with 8 vertices and 16 edges, each with unique edge weight. Identify one vertex as a "start" vertex and illustrate a running of Dijkstra's algorithm on this graph.
   (b) With examples, briefly describe graph storage representations.

8. (a) List and explain briefly the fundamental file processing operations.
   (b) Discuss the different file structures.

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Code No: R31053 **R10** **Set No: 4**

III B.Tech. I Semester Supplementary Examinations, May 2013

ADVANCED DATA STRUCTURES

(Common to Computer Science and Engineering & Information Technology)

Time: 3 Hours **Max Marks: 75**

Answer any FIVE Questions

All Questions carry equal marks

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1. (a) What is hashing? What is hash function? What are the characteristics of a good hash function?
   (b) Consider inserting the keys 10, 22, 31, 4, 15, 28, 17, 88 and 59 into a hash table of length m = 11 using open addressing with the primary hash function h'(k) = k mod m. Illustrate the result of inserting these keys using linear probing, using quadratic probing with c1 = 1 and c2 = 3 and using double hashing with h2(k) = 1 + (k mod(m-1)).

2. (a) Insert the following keys into an AVL tree:
   342, 206, 444, 523, 607, 301, 142, 183, 102, 157, and 149
   Illustrating the problematic insertions.
   (b) Describe the AVL tree's delete method with proper illustration.

3. (a) What is Binomial queue? Discuss its operations.
   (b) Define heap. Discuss a procedure for maintaining the heap property.

4. (a) Explain the breadth first search algorithm.
   (b) What is graph? Explain the edge addition and deletion with suitable example.

5. (a) What are the algorithms to find minimum-cost spanning trees? Compare them with illustrative example.
   (b) What is minimum cost spanning tree? Explain Kruskal's algorithm to get MST?

6. (a) Sort the following array using heap-sort techniques.
   5, 8, 3, 9, 2, 10, 1, 45, 32
   (b) Explain the radix sort with suitable example. Give its complexity.

7. (a) What for the prefix function is used in KMP algorithm? Compute the prefix function for the pattern ababbabbabbababbabb when the alphabet is (a, b).
   (b) Explain Prim's algorithm and illustrate with suitable example.

8. (a) Explain the file closing operation with example.
   (b) Explain the file reading and writing operation with example.

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