B.E. Computer Technology Sem-V

CT501 - Advanced Data Structure

P. Pages : 2 **GUG/S/19/1662**

Time : Three Hours * 1 2 9 1 * Max. Marks : 80

Notes : 1. All questions carry equal marks.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Write ADT of queue. Implement queue using linked list in C++. **8**

b) Write ADT of stack. Implement ADT of stack using linked list in C++. **8**

OR

2. a) Construct heap structure for given list of elements using bottom up and top down manner 8, 7, 4, 5, 6, 2, 3, 11, 9. **8**

b) What do you mean by graph ? Discuss its various representations. **8**

3. a) Insert the following record by using the given hash function **8**
{3417, 3132, 7122, 5199, 5344, 6796, 1893}
and hash function h1(key) = x mod 10.
i) Open addressing hash table using quadratic probing
ii) Open addressing hash table second hash function h2 (key) = 7 - (x mod 7)

b) Explain Extensible Hashing in detail. **8**

OR

4. a) What is Rehashing ? Explain how rehashing resolves the problems caused by hashing ? **8**

b) Write a C++ program to implement Word Dictionary using Dictionary Data structure. **8**

5. a) Obtain an AVL tree by accepting the following keys one at a time. Show balance factor of each node, the type of rotation and the transformation required for each insertion in AVL tree 30, 31, 32, 23, 22, 28, 24, 29, 26, 27, 34, 36. **10**

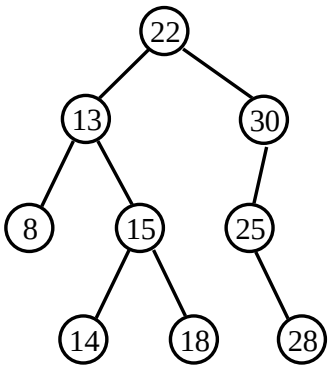
b) Explain how deletion occurs in AVL tree. **6**

OR

6. a) What is an AVL tree ? Explain about different rotation patterns in AVL tree for balancing with appropriate example. **8**

b) Give various cases involved in deletion of a node from Binary Search Tree. **8**

7. a) Write algorithm for OS-SELECT (x, i) find the 5^{th} smallest element from following order statistic tree. **8**



b) Write an algorithm to insert a node in 2-3 tree, for the following keys {60, 20, 10, 30, 25, 50, 80}. **8**

OR

8. a) What is Splay tree ? Explain how splaying operation is performed on splay tree ? **8**

b) Explain augmenting Red-black tree. **8**

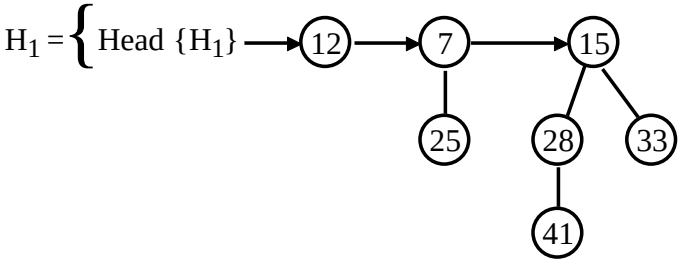
9. a) Construct a 2-3-4 tree for the following letters ALGORITHMS. **8**

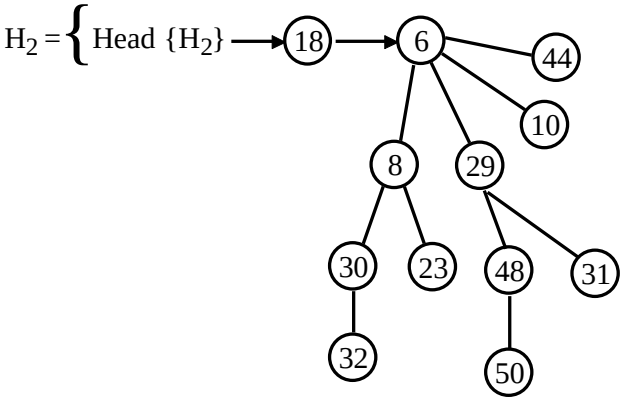
b) Write algorithm to extract node with minimum key from Binomial Heap. Explain it with example. **8**

OR

10. a) Write short note on Mergeable Heap. **8**

b) Perform union operation on the following binomial heaps. **8**





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