INDIAN STATISTICAL INSTITUTE BANGALORE CENTRE
Documentation Research and Training Centre

M.S.(Library and Information Science)2015-16
First Year, Semester II
Paper 10: Data Structures and Computer Programming

Date: June 10, 2016

Duration: 3 hours Maximum Marks: 50, each question carries 10 marks

1. Given below is the adjacency matrix representation of a graph. Traverse the graph using DFS and BFS.

$$\begin{pmatrix} 0 & 1 & 1 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & 0 \end{pmatrix}$$

2. Create MIN Heap and MAX Heap corresponding to the following array.

$$\{35, 33, 42, 10, 14, 19, 27, 44, 26, 31, 43, 69, 66, 97, 8\}$$

3. Construct a B-Tree of branching factor(order) 5 with the following keys:

$$\{1, 12, 8, 2, 25, 5, 14, 28, 17, 7, 52, 16, 48, 68, 3, 26, 29, 53, 55, 45, 35, 42, 19, 27, 4\}$$

4. Construct an AVL tree for the following list, by successive insertion.

$$\{8, 9, 11, 6, 5, 7, 10, 12, 3, 14, 2, 15, 13, 4, 21\}$$

5. Demonstrate what happens when we insert the following keys into a hash table with collisions resolved by linear probing and chaining. Let the table have 9 slots, and let the hash function be h (k) = k mod 9.

$$\{5, 28, 19, 15, 20, 33, 12, 17, 10\}$$

6. Given a weighted digraph, find the shortest directed path from the vertex labeled as 3 to all other vertices.