B.Tech / Integrated (MBA/M.Tech) 3rd Sem Examination
June 2014
Data Structures and Applications

Subject Code: CSL-205

Time Allowed: 03 hours. Maximum Marks: 100

Before answering the question paper the candidate should ensure that they have been supplied the correct question paper. Complaints in this regard, if any, shall not be entertained after the examination.

Note: Question No. 1 is Compulsory and attempt two questions from each section. All questions carry equal marks.

1(a) Write a short note on linked representation of a graph.
(b) Define an m-way search tree. Construct an 3-way search tree with elements given below:
   D, K, P, V, A, G
(c) What is circular linked list? How it is different from singly linked list?
(d) What do you understand by Deque? Discuss the different variations of Deque.

SECTION-A

2(a) What do you think about data? How it is different from information? Explain with suitable example.
(b) What do you mean by algorithm? Define the time and space complexity of an algorithm with example.
(c) Define data structure with suitable example. Explain the basic operations that can be performed on the data structure with examples.

3(a) Write a program using c for searching an element in an array using binary search. Calculate the complexity of binary search.

4(a) Explain PUSH() and POP() operations on the stack.
(b) Convert the following infix expression to their equivalent postfix expressions?
   i) A-B/C
   ii) (A*B)+(C-D)
   iii)((A/B)/C)+D
   iv) A^B^C*D

5(a) Write functions in C for inserting an element in linked list at different positions i.e. at start, at end, inserting after a given node.
(b) Differentiate between Linear Linked List and Circular Doubly Linked List with proper explanation.
(c) Write functions in C for deleting an element in linked list at different positions i.e. at start, at end, deleting after a given node.

6(a) What are multi-way search tree? Explain insertion in 4-way search tree with the elements given below:
   50, 60, 80, 30, 35, 70, 63, 73, 58, 59, 100, 25, 40, 45, 65, 90
   How tree will be modified after deleting 25, 35, 100, 60.
(b) Suppose the following eight numbers are inserted inorder into an empty Binary Search Tree “T”
   50, 33, 42, 22, 77, 55, 60, 70
   Draw the Binary Search Tree.

Q.7(a) Explain the depth first algorithm for graph traversal with example.
(b) Write Warshall’s algorithm for finding shortest path in a graph.
(c) Discuss the adjacency matrices representation of graph.