COMP 4-2 (RC)

S.E. (Comp) Semester – IV (RC) Examination, May/June 2012
DATA STRUCTURES

Duration : 3 Hours | Total Marks : 100

Instructions : *1) Answer **any five** questions by selecting atleast **one** from **each** Module.*
*2) **Assume** data **if** required.*

MODULE – I

1. a) Write a C program to find cube of a number using macros. 4
   b) Explain the following file operations :
      i) ferror ii) fputs
      iii) fseek iv) fclose. 4
   c) Explain the relationship between pointers and arrays. 4
   d) Write a C program using recursion to find Fibonacci series. 4
   e) What is ADT ? How can you define a new data type of a structure. 4

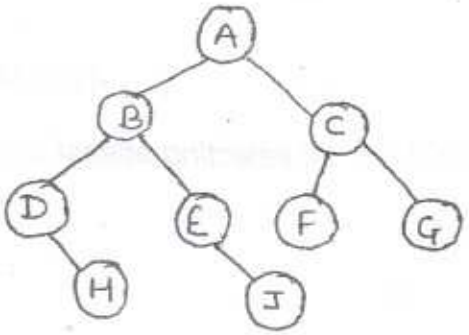
2. a) Write and explain the code for insertion (any one) into a dynamic linked list. 6
   b) Explain the doubly linked lists. Explain how nodes are represented in array implementation of linked list. 6
   c) Give the general algorithm to insert and delete an element from the front of a linked list. 4
   d) Compare array and dynamic representation of linked list. 4

MODULE – II

3. a) State and explain the basic stack operation. 4
   b) Assume that there are two stacks containing integer numbers, write a function that inserts the given integer number into the stack with less number of elements. If two stacks contain equal number of element the item goes into the first stack. The function also returns the total number of elements in both of the stacks. 5
   c) Explain linked implementation of circular queues. 5
   d) Write the code to insert and delete elements of a linear queue implemented using linked list. 6

P.T.O.

4. a) Perform the tree traversal methods for the following binary tree. Give C routine for any one method. 6



b) Write short note on balanced trees. 4

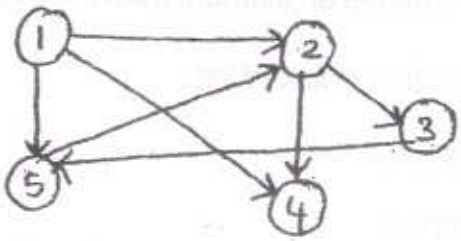
c) Explain the basic operations performed on queue. 4

d) Write a C code for linked list implementation of stack. 6

MODULE – III

5. a) Explain the following with respect to graphs :
   i) Graph
   ii) Degree
   iii) Weighted graph
   iv) Path of length K 4

b) Let G be a graph with vertices and edges as follows : 5



Draw the adjacency list and adjacency matrix for the above graph.

c) What are the various methods of graph traversal techniques ? Explain with an example. 6

d) Explain the following :
   i) Connected components
   ii) Spanning tree. 5

6. a) Explain briefly the two principle methods of automatic list management. 6

   b) What is internal and external fragmentation in memory ? Explain with an example. 4

   c) Compare first fit, best fit and worst fit methods with an example. 6

   d) Discuss the variations of Garbage collection method. 4

MODULE – IV

7. a) Explain any one method for resolving hash collision. 5

   b) Write a C program for a binary search. 5

   c) Explain the Josephus problem with an example. 4

   d) Sort the following array using bubble sort :

   92, 45, 8, 62, 9, 59. 6

8. a) Explain the binary search method to search 24 for the following input array: 15, 20, 24, 39, 66, 94, 100. 5

   b) Write short note on :

      i) Chaining

      ii) Radix sort. 5

   c) Explain general coalesced hashing and varied insertion coalesced hashing. 5

   d) Explain how stack can be used for evaluation of postfix expression with an example. 5