COMP 4 – 2 (RC)

S.E. (Comp.) (Semester – IV) (Revised 07-08) Examination, November 2010
DATA STRUCTURES

Duration: 3 Hours | Total Marks: 100

Instructions : *1) Answer **any five** questions, at least **one** from **each** Module.*
*2) Make suitable assumptions, **wherever** necessary.*

MODULE – I

1. a) How are 1-D arrays passed in functions ? Explain with an example. **5**

   b) Explain a program to initialize and display arrays of strings. **5**

   c) What are Macros ? Give an example. **4**

   d) Explain how memory allocation takes place incase of structures and unions. **4**

   e) Explain the following functions with respect to files. **2**

      i) fscanf

      ii) fputc.

2. a) Write a C function to perform binary search using recursion. Explain the code. **6**

   b) Write short notes on : **4**

      i) Circular linked lists

      ii) Doubly linked lists.

   c) Explain the algorithm for inserting and deleting nodes in a linked list in general with diagrams. **5**

   d) Explain how available list of nodes is used in getnode and freenode functions. **5**

MODULE – II

3. a) Explain the linked list implementation of stacks. **7**

   b) What are basic queue operations ? Explain them. **5**

P.T.O.

c) Identify whether the following are : **8**

i) Trees

ii) Binary trees

iii) Strictly binary

iv) Complete binary or almost complete binary.

Fig 1

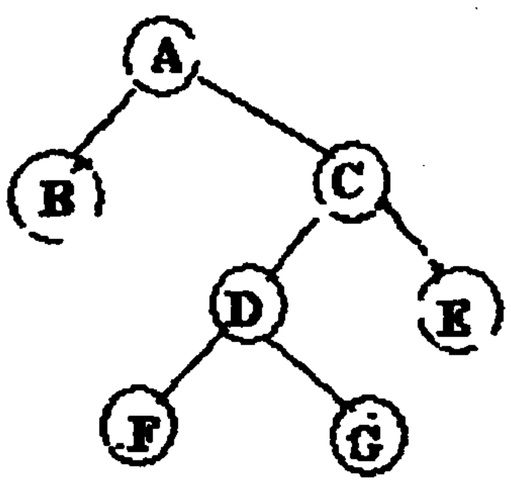

Fig 2

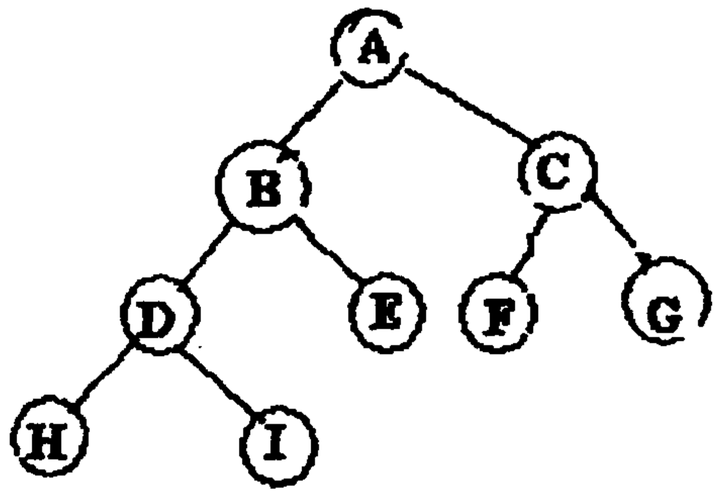

Fig 3

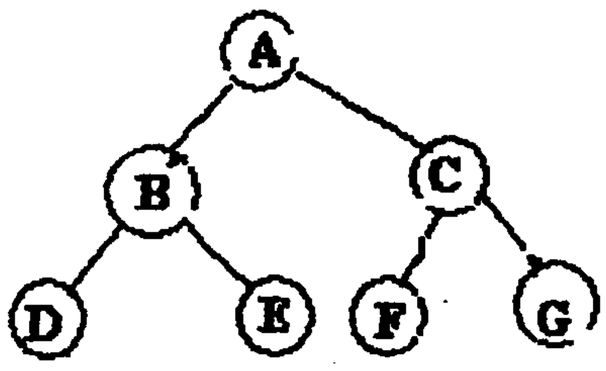

Fig 4

4. a) State and explain the maketree and setleft functions for dynamic node representation of binary trees. **8**

b) What is a threaded binary tree. Give an example. **5**

c) Explain the representation of balanced trees in C. **4**

d) Explain any one of the tree traversal methods. **3**

MODULE – III

5. a) Explain linked representation of graphs using adjacency list. **9**

   b) Explain the three reasons that make the traversing a graph complex. **6**

   c) Explain the following : **5**

      i) Connected components ii) Spanning tree.

6. a) Let G be a graph with vertices and edges as follows. **(3+4)**

   V(G)={A,B,C,D,E}

   E(G)={<A,B>, <A,D>, <A,C>, <B,C>, <C,E>, <D,C>, <D,E>}

      i) Draw the graph

      ii) Draw the adjacency matrix and adjacency list.

   b) Write short note on : **4**

      i) Reference count method ii) Garbage collection.

   c) Discuss the variations of Garbage collection method. **5**

   d) Explain First-Fit, Best-Fit and Worst-Fit methods. **4**

MODULE – IV

7. a) Explain how stacks can be used for infix to postfix conversion using the expression. **6**

   A-B/(C*D$E)

   b) Explain shortest path algorithm. Give an example. **8**

   c) State the complete set of iterations for sorting following list of numbers using bubble sort. **3**
   25, 57, 48, 37, 12, 92, 86, 33.

   d) Explain insertion operation for heapsort. **3**

8. a) Compare linear search and binary search with an example. **4**

   b) Explain the advantages of binary search tree. **4**

   c) Explain the following terms w.r.t. hashing. **8**

      i) Hash function ii) Buckets

      iii) Clustering iv) Rehashing

   d) Write short note on : **4**

      i) Chaining ii) Linear hashing.