SEM IV Repeat 4/12/13 (M)

Comp Dept

COMP 4-2 (RC)

S.E. (Comp.) (Semester – IV) (RC) Examination, Nov./Dec. 2013

DATA STRUCTURES

Duration : 3 Hours | Total Marks : 100

Instructions : 1) *Answer **any five** questions selecting at least **one** from **each** Module.*

2) *Make **necessary** assumptions **if required**. **Clearly** state **any such** assumptions made.*

MODULE – I

1. a) Write a program to find the length of a string : 8

   i) Using the pointers

   ii) Without using pointers.

   b) What are void pointers ? Explain with an example. 4

   c) Write a C program to compute factorial of a given number using : 8

   i) Iteration

   ii) Recursion

   Differentiate.

2. a) Write a C program to concatenate the two strings and check if string entered is a palindrome. 8

   b) Explain the following with the help of a diagram : 9

   i) Insert a node at the beginning, at the end and at the specified position of the singly linked list.

   ii) Deleting the first node, last node and a node from a specified position in case of a doubly linked list.

   iii) Deleting the first node, last node and a node from a specified position in case of circular linked list.

   c) Distinguish between structure and union. 3

P.T.O.

MODULE – II

3. a) Write a C program to implement queue as linked list. 8

   b) What are Btree ? Construct a Btree of order 4 by inserting the following elements : 6

      92, 8, 10, 12, 22, 30, 27, 83

   c) Explain the following terms with an example : 6

      i) Infix expression

      ii) Polish notation

      iii) Reverse polish notation.

4. a) What is a priority queue ? 2

   b) What is a stack ? How do you represent a stack in C ? Write a C program to accomplish the following stack operations : 10

      i) PUSH

      ii) POP

      iii) Stack empty

      iv) Stack full

      v) Display.

   c) Provide C code to implement the following functions of a binary tree : 8

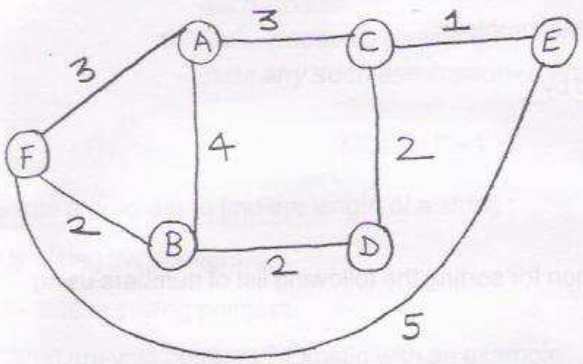
      i) Count number of nodes in a binary tree

      ii) Find sum of all elements.

MODULE – III

5. a) Explain briefly the two principle methods of automatic list management. 7

b) Draw minimum spanning tree for the graph given below and also find its cost : 7



c) Discuss variation of garbage collection methods. 6

6. a) Let G be a graph with vertices and edges as follows : 9

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

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

i) Draw a graph.

ii) Give DFS and BFS.

iii) Draw its adjacency matrix and adjacency list.

b) State and explain best fit algorithm. 7

c) What is collection and compaction ? 4

MODULE – IV

7. a) Explain binary search method. Write a C function to implement binary search and hence trace it for the following data : 8

   1, 3, 4, 5, 17, 18, 31, 33 Key = 18

   b) State and explain Josephus problem. 8

   c) What do you understand by : 4

      i) Chaining

      ii) Linear probing ?

8. a) Show step by step iteration for sorting the following list of numbers using heap sort : 8

   25, 57, 48, 37, 12, 92, 86, 33

   b) Write a C program to add 2 polynomials using linear linked list. 8

   c) Sort the following elements using insertion sort : 4

   89, 6, 5, 7.