6E3113

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6E 3113

B.Tech. VI Semester(Main/Back) Examination, May 2015

Electrical Engg.

6EE5 Data Structures In C

(Common for EE & EX)

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from **each unit**. All questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) What are the various operations performed on data structure ? Explain. **(6)**

   b) Write an algorithm to search an element while list is sorted. **(5)**

   c) Differentiate between Big oh, Omega & Theta notation **(5)**

OR

1. a) Write down the advantages of Linked list over arrays. **(4)**

   b) What do you mean by space and time complexity. **(4)**

   c) Define and compare static memory allocation and dynamic memory allocation **(4)**

   d) Write down the operations of data structures. **(4)**

Unit - II

2. a) Let A and B are two arrays and their size are 50 & 60 respectively. Suppose one want to keep 100 data in these arrays. But in accessing the data problems are that when one makes a search for particular data if he does not find the data in array A then goes into array B in this fashion accessing of data being very slow. Suggest remedies for this problem. **(12)**

b) Derive the formulae to calculate size of Linear array. **(4)**

OR

2. a) Write an algorithm to concatenate two arrays A and B. Implement the designed algorithm. **(8)**

b) Why binary search is more efficient than the linear search? Explain and justify **(4)**

c) Explain sparse matrices **(4)**

Unit - III

3. a) Is it possible to implement a Queue with the help of two stacks ? justify your answer. **(4)**

b) Explain how stacks are used in postponed decision. **(3)**

c) Explain output restricted queue with suitable example. **(5)**

d) Implement a deque with the help of linear linked list **(4)**

OR

3. a) Design an algorithm for a input restricted queue implement the designed algorithm. **(7)**

b) List the operations that can be performed on a stack **(4)**

c) Translate the following Infix expression into equivalent post fix expression

$(x-y)*((z+v)/f)$. **(5)**

Unit - IV

4. a) Construct the binary tree from the following traversel

Sequences Preorder: F A E K C D H G B
Inorder : E A C K F H D B G **(6)**

b) Write a function that finds heigh of binary tree. **(5)**

c) Write a recursive function to print the postfix representation of binary tree **(5)**

OR

4. a) Create an AVL search tree from the given

Set of values : H,I,J,B,A,E,C,F,D,G,K,L **(6)**

b) Prove that the root of a binary tree is an ancestor of every node in the tree except itself. **(5)**

c) Write a function that counts number of nodes in a binary tree. **(5)**

Unit - V

5. a) Consider the graph G illustrated in the figure below.

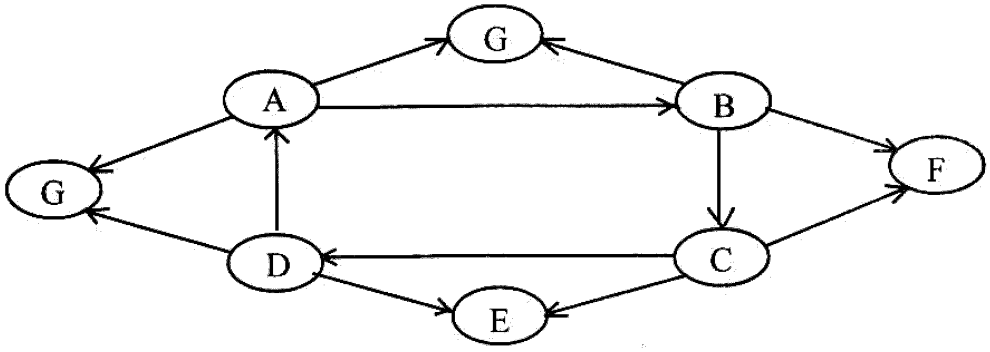

fig :G

i) Find adjacency matrix A of the graph G **(3)**

ii) Find the depth of the graph G **(3)**

iii) Find path matrix using Warshell's algorithm. **(4)**

b) Explain Kruskals algorithm using an example. **(6)**

OR

5. a) Draw the complete undirected graph for five vertices. Prove the number of edges in an n vertex graph is $n(n-1)/2$. **(8)**

b) Explain the difference between depth first and Breadth first traversing techniques of a graph. **(5)**

c) For what kind of graph is the topological sorting defined? justify your Answer **(3)**