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| <b>6E3113</b> | Roll No. _____  | [Total No. of Pages : 3] |
|               | <b>6E 3113</b>  |                          |
|               | <b>B.Tech. VI Semester(Main/Back) Examination, May 2015</b><br><b>Electrical Engg.</b><br><b>6EE5 Data Structures In C</b><br><b>(Common for EE &amp; EX)</b> |                          |

**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 traversal  
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 height 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)



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

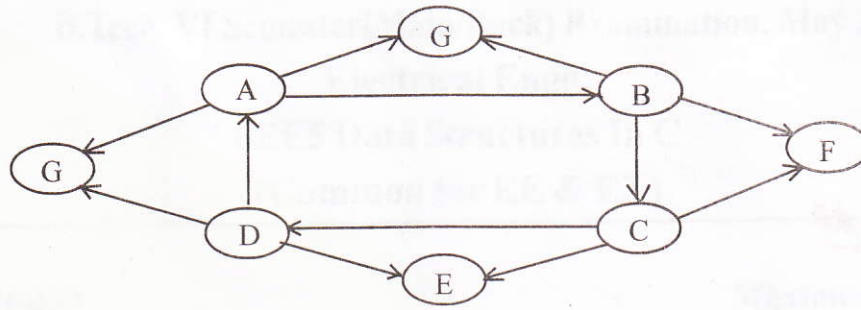


fig:G

- 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)