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[4957]-1044

S.E. (E&TC/Electronics) (First Semester) EXAMINATION, 2016

DATA STRUCTURES AND ALGORITHMS

(2012 PATTERN)

Time : Two Hours

Maximum Marks : 50

N.B. :— (i) Answer Q. No. 1 or Q. No. 2 and Q. No. 3 or Q. No. 4 and Q. No. 5 or Q. No. 6 and Q. No. 7 or Q. No. 8.

(ii) Assume suitable data, if necessary.

(iii) Write output of programs if necessary.

(iv) Draw neat diagrams wherever necessary.

(v) Figures to the right side indicate full marks.

1. (a) What is the difference between internal sorting and external sorting. Sort the following numbers using selection sort : [6]

25, 17, 31, 13, 2

(b) Explain the examples different types of data structures. [6]

Or

2. (a) Compare linear search and binary search. Write algorithm to search the element in list using linear search. [6]

(b) What is a pseudocode ? Write a pseudo code to find the factorial of n number. [6]

P.T.O.

3. (a) Write the limitations of arrays over linked list ? Represent the following polynomial using linked list : [6]

$$5x^4 + 2x^3 + 7x^2 + 10x - 8$$

- (b) Define dequeue. Explain the variations of dequeue. [6]

Or

4. (a) Convert the following expression into postfix form. Show all the steps and stack content : [6]

$$4 * 2 * 3 - 3 + 8 / (1 + 1)$$

- (b) Draw and explain circular linked list. State the limitations of single linked list. [6]

5. (a) Explain with suitable example how will you represent a binary tree using linked list. [4]

- (b) Define BST ? Create a BST for the following data : [5]

$$20, 17, 6, 8, 10, 7, 18, 13, 12, 5$$

- (c) Write a pseudo code to search an element in binary search tree using arrays. [4]

Or

6. (a) What is threaded binary tree. Draw the node structure of threaded binary tree. [4]

- (b) Define traversal of binary tree ? Explain *three* popular methods of binary tree traversal. [5]

- (c) What is AVL tree ? Write structure of AVL tree. [4]

7. (a) Define graph ? What are the types of graphs ? Explain with example. [4]
- (b) Draw adjacency list and adjacency matrix for the following graph : [5]

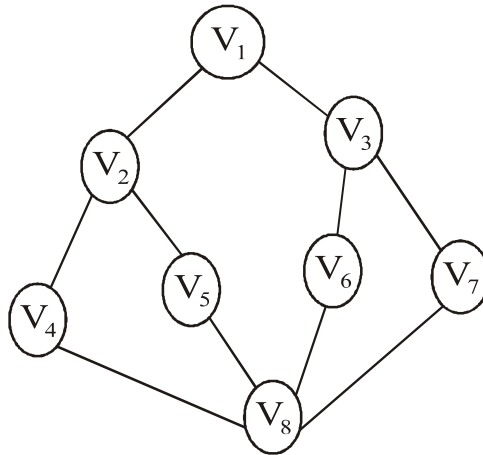


Fig. 1

- (c) Write an algorithm for DFS traversal of graph. [4]

Or

8. (a) Define spanning tree ? Find all the spanning tree for graph given below : [4]

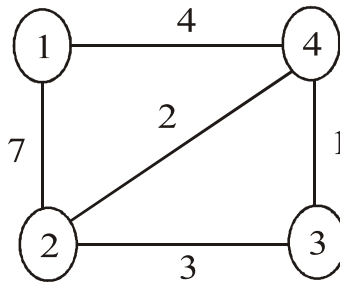


Fig. 2

- (b) Explain Kruskal algorithm ? Find the minimum spanning tree for fig. Q. 2. [5]
- (c) What is the difference between DFS and BFS methods. [4]