B 2271

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2007.

Third Semester

Information Technology

IF 246 — DATA STRUCTURES AND ALGORITHMS

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is the BNF grammar for describing a digit?

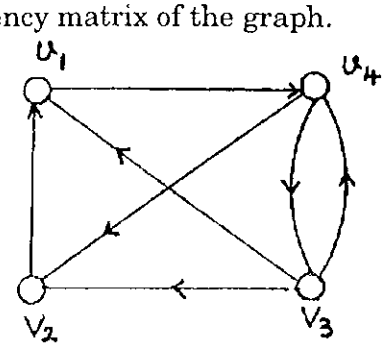
2. What is the use of space and time complexity?

3. Write down the array representing polynomial $2x^2 + 5xy + y^2$.

4. Give a directed tree representation of the formula $(a+b)*(c+d)$.

5. Define a priority queue.

6. Write down the adjacency matrix of the graph.



7. Why is the insertion sort most efficient when the original data are in almost sorted order?

8. What is the worst case search time of a balanced binary tree?

9. Define VSAM.

10. What are the two dynamic hashing technique?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Write an algorithm to convert character to numeric values. (8)

(ii) Write a string assignment procedure for the workspace/index table method. (8)

Or

(b) (i) Write an algorithm that checks for the largest and smallest entries in an integer array. (8)

(ii) Why study of data structures is also necessarily a study of the algorithm that control them? (8)

12. (a) (i) How to use stack in solving tower of Hanoi problem and write an algorithm to solve it? (8)

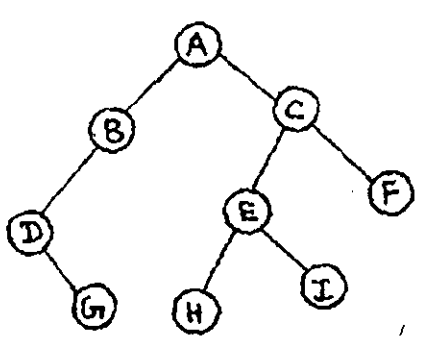
(ii) Write down the insertion and deletion algorithm for a circular queue. (8)

Or

(b) What is a doubly linked list? Write down the detailed algorithm for inserting a node to the left and deleting a node from a doubly linked list. (16)

13. (a) (i) Write down an algorithm to perform matrix multiplication with multilinked structures. (8)

(ii) Explain various kinds of traversals in a binary tree and illustrate the same with the following examples. (8)



Or

(b) (i) Write down an algorithm for allocating storage using the buddy system. (8)

(ii) Explain the DFS and BFS traversals in a graph and write the algorithm. (8)

14. (a) Write down the algorithm for radix sort and sort the sequence of numbers using the algorithm 42, 23, 74, 11, 65, 57, 94, 36, 99, 87, 70. (16)

Or

(b) Write down the algorithm for merge sort and sort the sequence of numbers using the algorithm 42, 23, 74, 11, 65, 57, 94, 36, 99, 87, 70. (16)

15. (a) Discuss in detail the various distribution dependent hashing functions. (16)

Or

(b) Explain a method for retrieving a record from a direct file using chaining with separate lists and algorithm. (16)