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Question Paper Code : 40388

B.E/B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Third/Sixth/Seventh/Eighth Semester

Computer Science and Engineering

CS 8391 – DATA STRUCTURES

(Common to Computer and Communication Engineering/Electrical and Electronics Engineering/Electronics and Instrumentation Engineering/ Instrumentation and Control Engineering/Information Technology

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. When arrays are better than linked list? Give an example.

2. What is the benefit of circularly linked list over singly linked list in search applications?

3. What are the necessary conditions for insertion and deletion operations on static Stack?

4. What conversion is required for a queue data structure to behave as a circular queue?

5. Give the structure of a node in a B+ tree.

6. Mention some problems for which heaps are more applicable.

7. Differentiate between weakly connected graph and strongly connected graph.

8. What is the significance of articulation points in graphs?

9. Write the procedure for shell sort algorithm.

10. What is the reason for collision in hashing technique?

PART B — (5 × 13 = 65 marks)

11. (a) Write procedures or pseudo codes for the following operations on circular linked lists:

(i) insertion. (4)

(ii) deletion. (5)

(iii) count. (4)

Or

(b) Implement the polynomial addition using singly linked list. Have procedures for insertion, comparison and addition of node values of this polynomial application. (4+5+4)

12. (a) Write procedures for significant operations on a Stack data structure. Apply stack, to convert the following infix expression to the corresponding postfix expression: a + b / (d - e) – f. (9+4)

Or

(b) Write procedures for significant operations on a Queue data structure. List any four applications of queue data structure. (9+4)

13. (a) Construct a binary search tree by inserting 3, 1, 4, 9, 6, 5, 2, 8, and 7 into an initially empty tree. Show the results of deleting the nodes 1 6 and 7 one after the other of the constructed tree. (8+5)

Or

(b) (i) Illustrate the construction procedure of Expression trees with suitable example. (8)

(ii) Distinguish between binary trees and threaded binary tree. (5)

14. (a) (i) Give the graph traversal procedures for DFS and BFS. (9)

(ii) Give the order of traversing the nodes of the graph given in figure: Q.14(a), when DFS and BFS are applied on the same. (4)

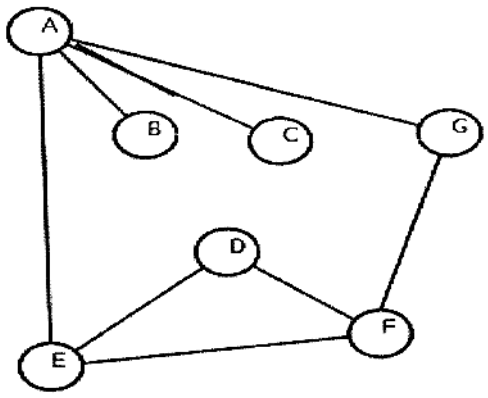

Figure. Q.14(a)

Or

(b) (i) What are Eulerian circuits and Eulerian paths? (4)

(ii) Give the procedure to determine Euler circuit. (5)

(iii) Does the figure: Q.14(b) has Euler circuit(s)? (2)

(iv) Does it have any Euler path. If so, list. (2)

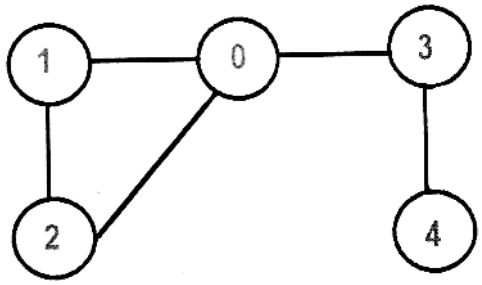

Figure. Q.14(b)

15. (a) (i) Illustrate the linear search algorithm with suitable example. (6)

(ii) Trace the working of insertion sod algorithm on an unordered dataset of size. (7)

Or

(b) Explain the various collision resolution strategies followed in hashing techniques. (13)

PART C — (1 × 15 = 15 marks)

16. (a) Construct an AVL tree by inserting 4, 1, 2, 5, 6, 17, 3, and 7 into an initially empty tree. Show the results of deleting the nodes 1, 6 and 7 one after the other of the constructed tree. Give the order of visiting the nodes by applying the post order traversal algorithm. (6+6+3)

Or

(b) Consider the following problem scenario:

In recording scores for a golf tournament, we enter the name and score of the player as the player finishes. This information is to be retrieved in each of the following ways:

* Scores and names can be printed in order by ascending or by descending scores.

* Given the name of a player, other players with the same score can be printed.

Give procedures by using the doubly linked list data structure, for implementing a solution for the problem. (8+7)

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