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Question Paper Code : 21757

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015

Third Semester

Information Technology

IT 2201/IT 33/080250005/10144 IT 304 — DATA STRUCTURES AND ALGORITHMS

(Regulations 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is an Abstract Data 'type?

2. What are cursor-based linked lists?

3. What are general trees? Give an example.

4. State the properties of a binary heap

5. What is meant by rehashing?

6. What is dynamic equivalence problem?

7. Define a connected graph.

8. What arc articulation points?

9. Compute the average case complexity of linear search algorithm.

10. Define NP complete and NP hard.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Formulate algorithms to implement Queue ADT using array. (10)

(ii) What are the advantages of circular linked list over linked list? (6)

Or

(b) (i) Write algorithms to insert a node in a singly linked list. (10)

(ii) Consider the following arithmetic infix expression Q. (6)

$$Q = A + (B * C - (D / E - F) * G) * H$$

Convert infix expression Q into equivalent post expression using stack.

12. (a) (i) Formulate algorithms to perform insertion and deletion in a Binary Search Tree. (10)

(ii) What are the three tree traversals. Give an example to explain it. (6)

Or

(b) (i) Write the algorithm to perform insertion into an AVL tree. (10)

(ii) For the following input list of numbers (6)

14, 15, 4, 9, 7, 18, 3, 5, 16, 4, 20, 17, 9, 14, 5

Find the binary search tree.

13. (a) (i) Explain about the Smart Union algorithms with suitable example. (10)

(ii) Discuss about improving the find() operation using path compression. (6)

Or

(b) (i) Explain about Open addressing hashing schemes. (10)

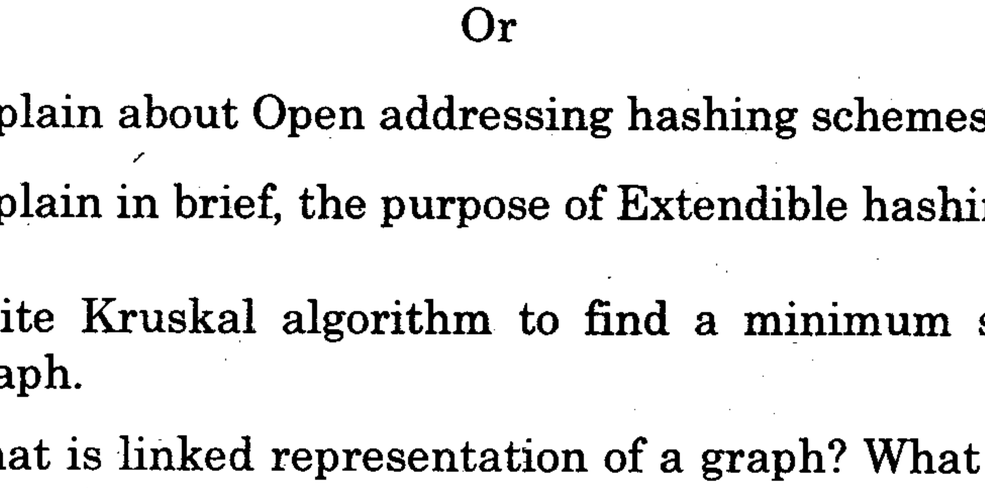
(ii) Explain in brief, the purpose of Extendible hashing. (6)

14. (a) (i) Write Kruskal algorithm to find a minimum spanning tree of a Graph. (10)

(ii) What is linked representation of a graph? What are its advantages over other representations of graph. (6)

Or

(b) Write Dijkstra's algorithm and find shortest path taking 'V_0' as starting node in the Graph. (16)



15. (a) (i) Explain the Greedy method in detail with example. (10)

(ii) What is Divide and Conquer strategy. Why recursion is most suited for divide and conquers? (6)

Or

(b) (i) Explain the basic principle of dynamic programming using a simple example. (10)

(ii) Describe in brief, the Backtracking technique. (6)