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Question Paper Code : 80494

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

Third/Fourth Semester

Electrical and Electronics Engineering

EE 2204/EE 36/080300003/10133 EE 306 — DATA STRUCTURES AND ALGORITHMS

(Common to Electronics and Instrumentation Engineering and Instrumentation and Control Engineering)

(Regulations 2008/2010)

(Also Common to PTEE 2204 for B.E. (Part - Time) Second Semester — EEE–Regulations 2009)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define an Abstract Data Type. Give example.

2. What is the postfix form of the expression $A+B*(C-D)/(P-R)$?

3. Define tree. List the tree traversal techniques.

4. Differentiate a binary tree from a binary search tree.

5. State the need for indexing.

6. What is a hash function? Give example.

7. Define big O notation.

8. Differentiate NP hard and NP complete problem.

9. What is back tracking?

10. What is meant by program testing, and proof of termination?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the implementation of cursor based Linked List with example. (8)

(ii) Write an algorithm to insert and delete a given node from doubly linked list. (8)

Or

(b) (i) Write the algorithm for inorder, preorder and postorder traversal of a tree. (9)

(ii) Draw the binary tree whose Inorder traversal is A, B, C, E, F, G, H, I and the Preorder traversal is F, B, A, D, C, E, G, I, H. (7)

12. (a) Explain with examples Binary tree and Binary-search tree ADT. (16)

Or

(b) (i) With an example explain the algorithm to convert a general tree to binary tree. (8)

(ii) With an example, explain the algorithms of inorder and postorder traversals on a binary search tree. (8)

13. (a) (i) Explain two techniques to overcome hash collision. (8)

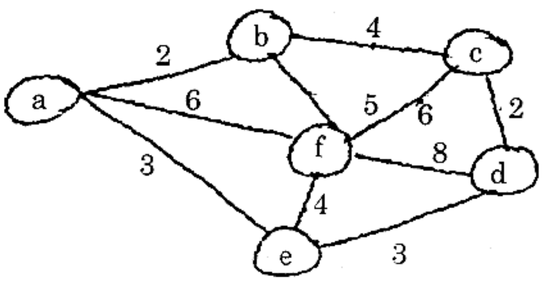
(ii) Write a function to delete the minimum element from a binary heap. (8)

Or

(b) Explain with an example the algorithm for insertion into AVL Trees. (16)

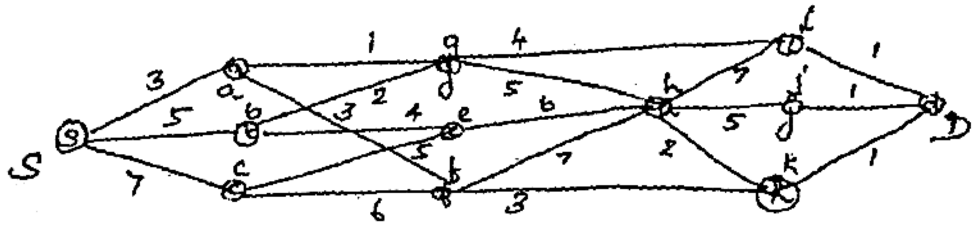
14. (a) (i) What is meant by minimum spanning tree?

(ii) Apply prim's algorithm to find the minimum spanning tree in the following graph. (2+14)



Or

(b) Explain Dijikstras shortest path finding algorithm with the following graph to travel from S to D. (16)



15. (a) Explain with an example how a greedy approximation algorithm can be used for a simple scheduling problem. (16)

Or

(b) What is backtracking? Explain the turnpike reconstruction problem with an example. (16)