Reg. No. ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Question Paper Code : 86340

M.E./M.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

First Semester

Computer Science and Engineering

CP 7102 – ADVANCED DATA STRUCTURES AND ALGORITHMS

(Common to M.E. Biometrics and Cyber Security, M.E. Computer Science and Engineering (With Specialization in Networks), M.E. Multimedia Technology, M.E. Software Engineering and M.Tech. Information Technology)

(Regulations 2013)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. What is a Sub instance ?

2. Give a recursive algorithm to count the number of nodes in a binary tree.

3. What is Pruning path ?

4. Define Hill Climbing Technique.

5. What are the classifications made based on the reduction ?

6. List any three examples for NP- complete problems.

7. Define lock Object state.

8. Define the structure of Petri Net.

9. List out the types of synchronisation techniques.

10. What are the three different varieties of pool methods ?

PART – B (5 × 13 = 65 Marks)

11. (a) (i) Design an algorithm for BST for assigning an appropriate value/label to the neighbour of all nodes. (8)

    (ii) What is priority queue ? Explain its advantages ? Give an Example. (5)

OR

    (b) What are important steps to write an iterative algorithm ? Explain each step with the example of a tree traversal algorithm.

12. (a) (i) Discuss about the Primal dual hill climbing algorithm with suitable examples. (6)

   (ii) Explain Dijkstra's shortest path algorithm with suitable code, example and loop variants. (7)

OR

    (b) (i) Design an algorithm to find the sum of any path from root to leaf such that the sum of all nodes along the path is maximum compared to all other path. Analyse the algorithm. (6)

    (ii) Explain steepest ascent hill climbing algorithm. (7)

13. (a) (i) Do Bin packing problem is NP-complete ? Explain. (8)

    (ii) Construct an efficient algorithm to calculate the length of the longest common substring in the given two strings. (5)

OR

(b) Check whether the given graph is 3-colorable or not. Explain your answer.
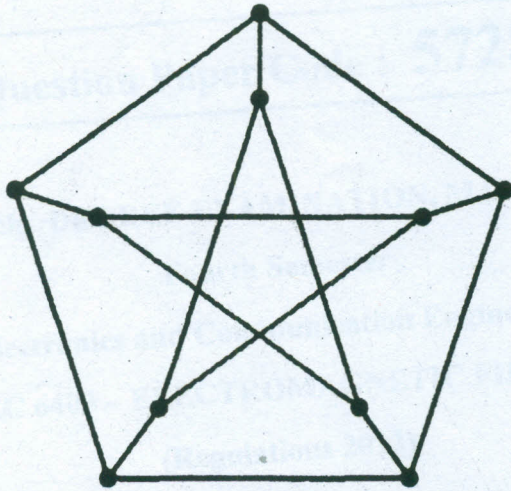
14. (a) Explain the 2-Thread solutions and State the difference b/w these and Peterson lock.

OR

(b) Write an algorithm for filter lock mutual exclusion protocol and show how it achieves mutual exclusion property.

15 (a) State ABA problem. Explain the solution with an example.

OR

(b) Explain Unbounded lock free Queue along with minimum of 3 operations.

PART C – (1 × 15 = 15)

16. (a) Design your optimisation technique for solving TSP and state under which classification of complexity it is coming under.

OR

(b) Devise your own technique to handle synchronisation among list based sets that do not involve locks and marking field.

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