Registration No. | | | | | | | | | |

M.E./M.Tech. Degree Examinations, January 2017

First Semester

COMPUTER SCIENCE AND ENGINEERING

CP16102 - ADVANCED DATA STRUCTURES AND ALGORITHMS

(Regulation 2016)

QP Code: 478176

Time: Three hours **Maximum : 100 marks**

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. What is meant by Loop Invariants?
2. Give a recursive algorithm to count the number of nodes in a binary tree.
3. Estimate the running time of Dijsktra's Shortest Path Edge.
4. Define Satisfiability Problem.
5. What is Principle of Optimality?
6. What is Bipartite matching?
7. List the communication occurs in concurrent system.
8. State the Principal Drawbacks of Sequential Consistency.
9. Define Pools and its varieties.
10. What is the role of locking in synchronization?

PART B - (5 X16 = 80 Marks)

11. (a) (i) Illustrate the steps involved in developing an Iterative algorithm. **(6)**

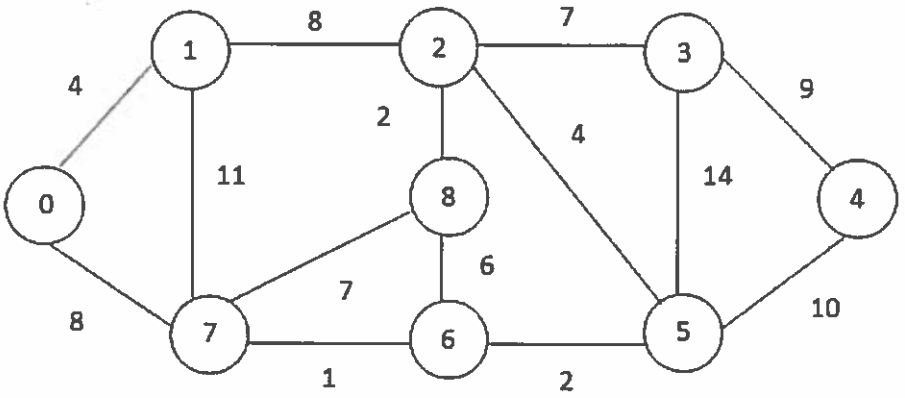
(ii) Explain in detail about the different types of Iterative algorithm. **(10)**

(OR)

(b) Explain Ackermann's Function using suitable algorithm. Also derive Recurrence relation for the above function and solve it. **(16)**

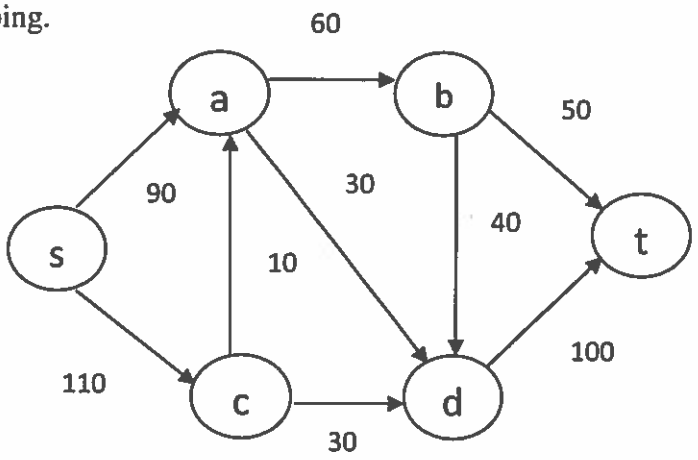
12. (a) Explain Dijkstra's Shortest Path graph search algorithm with pseudo code. **(16)**

Find the shortest path for the following graph using Dijkstra's algorithm.



(OR)

(b) Calculate the Maximum Flow for the following graph using Primal Dual Hill Climbing. **(16)**

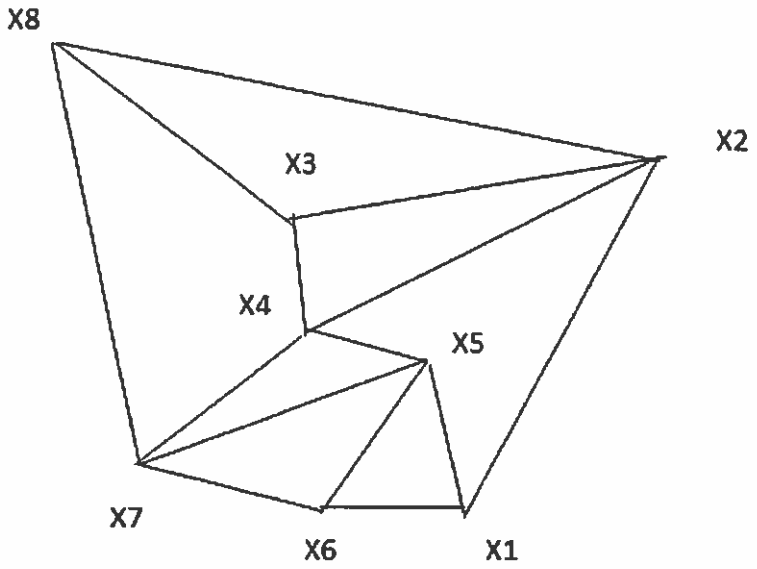


13. (a) (i) Develop an efficient algorithm to calculate the length of the longest common substring in the given two strings. **(8)**

(ii) Discuss the steps involved in developing dynamic programming algorithm with an example. **(8)**

(OR)

(b) (i) What is the three-color problem? Check whether the given graph is 3-colorable. **(16)**



14. (a) Justify and solve the producer and consumer problem satisfy the synchronization. **(16)**

(OR)

(b) Explain 2-Thread solutions with respect to LockOne, LockTwo and Peterson Lock algorithm. **(16)**

15. (a) Compare lazy synchronization and optimistic synchronization. **(16)**

(OR)

(b) What is ABA problem? How it is related with memory reclamation, Show the steps involved in the process of memory reclamation using diagram and algorithm. **(16)**