

B. Tech Third Year : 5th Semester
ADVANCED DATA STRUCTURES, DEC., 2010-JAN., 2011
(BRANCH OF ENGINEERING)

Times : 3 Hours

Min. Passing Marks : 24

Total Marks : 80

Instructions to Candidates : Attempt overall five questions selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit-I

1. (a) Draw the order -7 B-Tree resulting from inserting the following keys into an initially empty tree T :
 4, 40, 23, 52, 11, 34, 62, 78, 66, 22, 90, 59, 25, 72, 64, 77, 39, 12 [10]
- (b) Write Pseudo code for Right Rotate in Red Black tree. [6]

OR

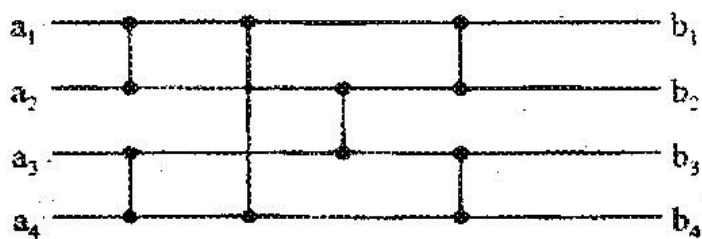
- (a) Discuss union - find problem for implementation of disjoint sets. [8]
- (b) Explain concatenable queues using 2-3 trees with an example. [8]

Unit-II

2. (a) What is Amortization analysis? Find the amortized cost of ENQUEUE AND DEQUEUE operation in Queue. [8]
- (b) Describe a concrete implementation of mergable heap ADT that achieves $O(\log n)$ performance for all its operation. [8]

OR

- (a) Describe comparison network with the help of an example. [8]
- (b) Use the zero-one principle to prove that the comparison network show in figure below, is a sorting network.



Unit-III

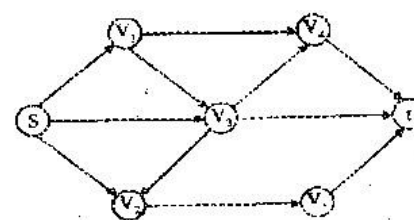
3. Write short note (any four):
 (a) Isomorphic components
 (b) Spanning Tree
 (c) Cut set and cut vertices
 (d) Fundamental circuits
 (e) Kuratovski's two graph. [4x4]

OR

Draw a simple, connected, undirected, weighted graph with 8 vertices and 16 edges, each with unique edge weights. Illustrate the execution of Kruskal's algorithm on this graph. [16]

Unit-IV

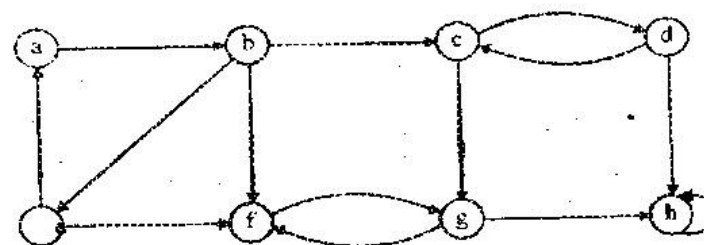
4. (a) Explain depth first search with an example and write algorithm of depth first search.
- (b) Describe strongly connected components and show how the procedure strongly connected components work on the following graph



OR

Answer the following questions:

- (a) What is flow network and cuts.
- (b) What is residual capacity and Augmenting path.
- (c) Illustrate the execution of ford-fulkerson algorithm in the following flow network [5+5+6]



Unit-V

5. (a) Explain Euclid GCD algorithm and show the execution of method Euclid GCD (14300, 5915).
- (b) What is public-key cryptosystems? Describe briefly RSA cryptosystem with example. [8]

OR

Write short note (any four):

- (a) Chinese remainder theorem
- (b) Division theorem
- (c) Modular Arithmetic
- (d) Integer Factorization
- (e) Primality testing