5E3256-Q

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B. Tech. (V Sem.) (Main/Back) Examination, December - 2011
Computer Science
5CS6.1 Advanced Data Structure
Common for Computer & IT

Time : **3** Hours] [Maximum Marks : **80**
[Min. Passing Marks : **24**

Instructions to Candidates :

*Attempt any **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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. NIL 2. NIL

UNIT - I

1 (a) State the condition under which insertion of a vertex in a Red-Black tree will result in a sequence of recolouring steps that terminate with the root changing colour. 8

(b) Will the root of Red-Black tree always be black after performing a deletion operation ? Justify with an example. 8

OR

1 (a) Construct a 2-3 tree for the list 9, 5, 8, 3, 2, 4 and 7 by successive insertion. 8

(b) Define Dictionary and Dictionary with duplicates. List the operation performed on dictionary. 8

UNIT - II

2 (a) Show the result of inserting 10, 12, 1, 14, 6, 5, 8, 15, 3, and 9. One at a time into an initially empty min heap ?

8

(b) Explain the implementation of a binomial heap and its operation with suitable example.

8

OR

2 Write short note on :

(a) Binomial trees

(b) Implementing fibonancy heap

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UNIT - III

3 A network G = (V,E) as follows

V = {a, b, c, d, e, f}

E = {(ab, 2), (Cb, 2), (Cd, 2), (ed, 2), (ef, 2), (ac, 4), (be, 4), (df, 4) }

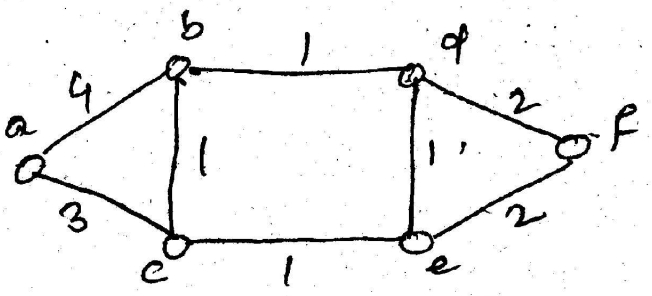
where the number following each edge is the capacity of that edge :

(i) A function f is defined on the edge of G with each edge e having f (e) equal to the capacity of e. Explain why this defines a valid st. flow on G for suitably chosen vertices S and t.

(ii) State the Max-flow Min-cut theorem and explain how your answer to part (a) illustrate this theorem.

OR

3 Consider the following graph :



(a) Apply Kruskal's algorithm to G. List the edge of the forest that is grown, in the order that they added.

(b) What is the weight of minimum spaning tree in G ? 10

6

UNIT - IV

4 (a) What is zero-one principle ? Describe in detail.

(b) Prove that if a comparison network with n input sorts all 2^n binary string of length n correctly, then it sort all sequence correctly. 8

8

OR

4 (a) Explain the bitonic sorting network with suitable example.

(b) Write short note on : 8
(i) Priority Queue
(ii) Operations on disjoint sets.

8

UNIT - V

5 (a) Describe the Chinese remainder theorem.

(b) What is Division theorem ? Explain. 8

8

OR

5 Write short note on :
(a) Computation of Discrete logarithm
(b) Modular Arithmetic

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