

Total No. of Questions—8]

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[5057]-252

S.E. (Computer) (First Semester) EXAMINATION, 2016

DATA STRUCTURE AND PROBLEM SOLVING

(2012 PATTERN)

Time : Two Hours

Maximum Marks : 50

- N.B. :—**
- (i) Attempt Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.
 - (ii) Neat diagrams must be drawn wherever necessary.
 - (iii) Figures to the right indicate full marks.
 - (iv) Use of non-programable electronic pocket calculator and steam tables is allowed.
 - (v) Assume suitable data, if necessary.

1. (a) Explain big-oh, omega and theta notation with example. [4]
- (b) Sort the following numbers using quick sort :
44, 75, 23, 43, 55, 12, 64, 77, 33.
State its time complexity and space complexity. [4]
- (c) Explain an algorithm of Merge Sort with suitable example. [4]

Or

2. (a) Explain circular queue using link list. Write C code for enqueue operation. [4]

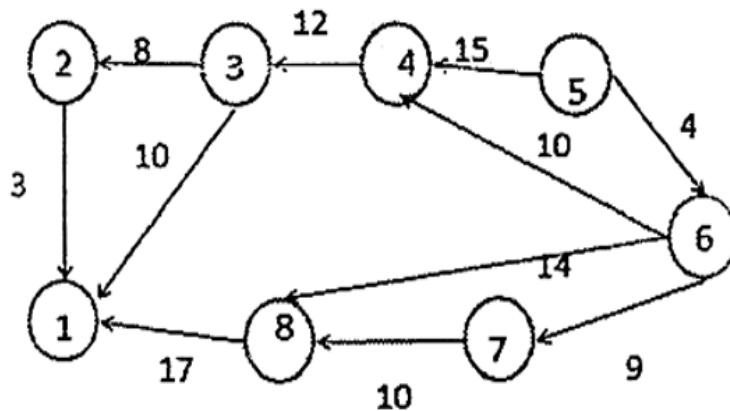
P.T.O.

(b) Suppose character a, b, c, d, e, f have probabilities 0.7, 0.9, 0.12, 0.22, 0.23, 0.27 respectively. Find optimal huffman code and draw huffman tree. What is the average code length ? [8]

3. (a) Explain the following terms of the below given graph :

(i) In degree of and out degree of each vertex.

(ii) Adjancy list representation. [4]



(b) Explain the algorithm for depth first search for graph. [4]

(c) What is Threaded Binary Tree (TBT) ? Explain the TBT for in order and pre-order traversal. [5]

Or

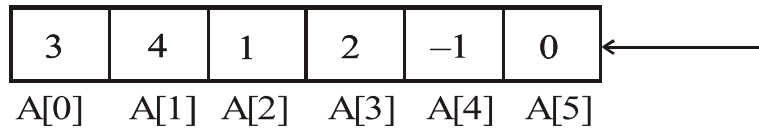
4. (a) Construct the AVL tree for the following data by inserting each data item one at a time 3, 2, 1, 4, 5, 6, 7, 16, 15, 14. [6]

- (b) What is OBST ? List binary search tree with three words
(w1, w2, w3) = (do, if, stop) words occur with probabilities
(p1, p2, p3) = (0.4, 0.5, 0.1). Find the expected access time
in each case. [7]
5. (a) Create B-tree of order 4 for the following data : [6]
5, 3, 21, 9, 1, 13, 2, 7, 10, 12, 4, 8, 2, 21, 10.
- (b) What is Max Heap ? Sort the following data in ascending
order using Heap Sort 15, 19, 10, 7, 17, 16. [7]

Or

6. (a) What is B+ Tree. Construct B+ tree of order 4 for the following
data : [5]
4, 7, 10, 17, 21, 31, 25, 19, 20, 28, 42.
- (b) Explain Quadratic probing and rehashing with a suitable
example. [4]
- (c) Discuss the following operation on sequential file with
their basic primitives in c Creation, Reading, Insertion,
Deletion. [4]
7. (a) Calculate prefix sum of given list using pointer jumping : [4]
(5, 3, 2, 7, - 4, 5).

- (b) Consider the input as given below, calculate rank of each node. [4]



- (c) Explain the various models used for parallel computation. [4]

Or

8. (a) Explain Odd even merge sort with a suitable example. [4]
(b) Write parallel algorithm to perform the addition of given number using complete binary tree method. Solve the following example 8, 4, -3, 2 for addition using complete binary tree. [8]