NED UNIVERSITY OF ENGINEERING & TECHNOLOGY, KARACHI
FIRST YEAR (COMPUTER SCIENCE AND INFORMATION TECHNOLOGY)
ANNUAL EXAMINATION 2008
BATCH 2007-08

Time: 3 Hours

Dated: 25-10-2008
Max. Marks: 75/80

DATA STRUCTURE ALGORITHMS & APPLICATIONS
(CT-157)

INSTRUCTIONS: Attempt any **FIVE** Questions, all Questions carry equal marks.

Q.1) (a) Q and T are strings with length M and N respectively and are stores as array with one character per element. Write algorithm, which finds the index of Q in T.

(b) The complexity of above algorithm is measured by the numbers of comparisons between characters in Q and T. Find complexity of:
(i) T = abcbacdacdadac & Q = abcd
(ii) T = aabcabaabba & Q = abb

(c) Write down the algorithm which replaces every occurrence of Q in T by P.

Q.2) (a) Using the Bubble sort algorithm, find the number C of comparisons and the number D of interchanges which alphabetize the n = 8 letter in "COMPUTER".
Show the stepwise result of algorithm.

(b) Let DATA be the following sorted 14 elements array: 08, 10, 14, 22, 26, 32, 38, 44, 50, 58, 66, 74, 82, 88. Apply the binary search algorithm stepwise to find the location of ITEM in DATA if (i) ITEM = 22 (ii) ITEM = 74 (iii) ITEM = 36

Q.3) (a) Suppose an array A [-15, 64] is stored in memory, whose starting address is 459. Assume that word size for each element is 2. Then obtain the following:
(i) How many elements are there in A.
(ii) What is the location for A [50].
(iii) Which element is located at 589.

(b) Write the algorithm of intersection and deletion into an array.

Q.4) (a) Describe the three types of structures used for storing string.

(b) Write the algorithm to find the roots of quadratic equations.

Q.5) (a) (i) Consider the algebraic expression (x + 2y) + (2a – 3b) * (f + 2g). Draw the corresponding binary tree.
(ii) Consider the following ten numbers which are to be inserted in order into an empty BST. 70, 42, 82, 16, 58, 72, 62, 56, 88, 32. Draw the BST.

(b) Consider the binary tree in figure- 1. Find the pre-order traversal of binary tree. (Use algorithm).

Q.6) (a) Write down the algorithm of intersection into sorted linked list.

(b) Consider the alphabetize list of students in figure- 2
(i) If students G & M are added to list. How should table be upgraded?

P.T.O

(ii) If students N & E are deleted from the list. How should table be upgraded?

Q.7) **(a)** Define the following terms:
Multigraph, Linear Array, Complexity, Floor and Ceiling Function.

(b) Figure- 3 represents the daily flights between cities of some airlines. Use Breadth First search algorithm to find the minimum numbers of stops to fly from city A to city **M.**

Q.8) Write notes on the following:
(i) Control Structures (ii) Word Processing (iii) Sub-Algorithm

Index #	Students	Link
1	E	8
2	D	1
3		5
4	A	2
5		7
6	N	0
7		9
8	J	10
9		0
10	L	6

START = 4, AVAIL = 3

Figure- 2

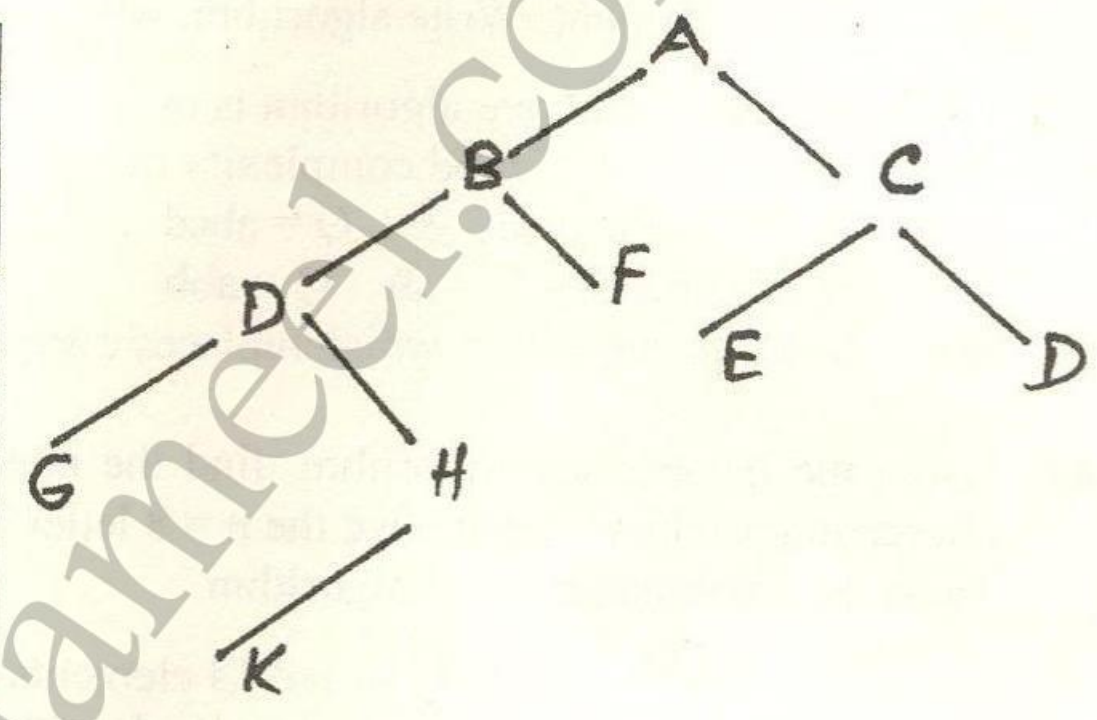

Figure- 1

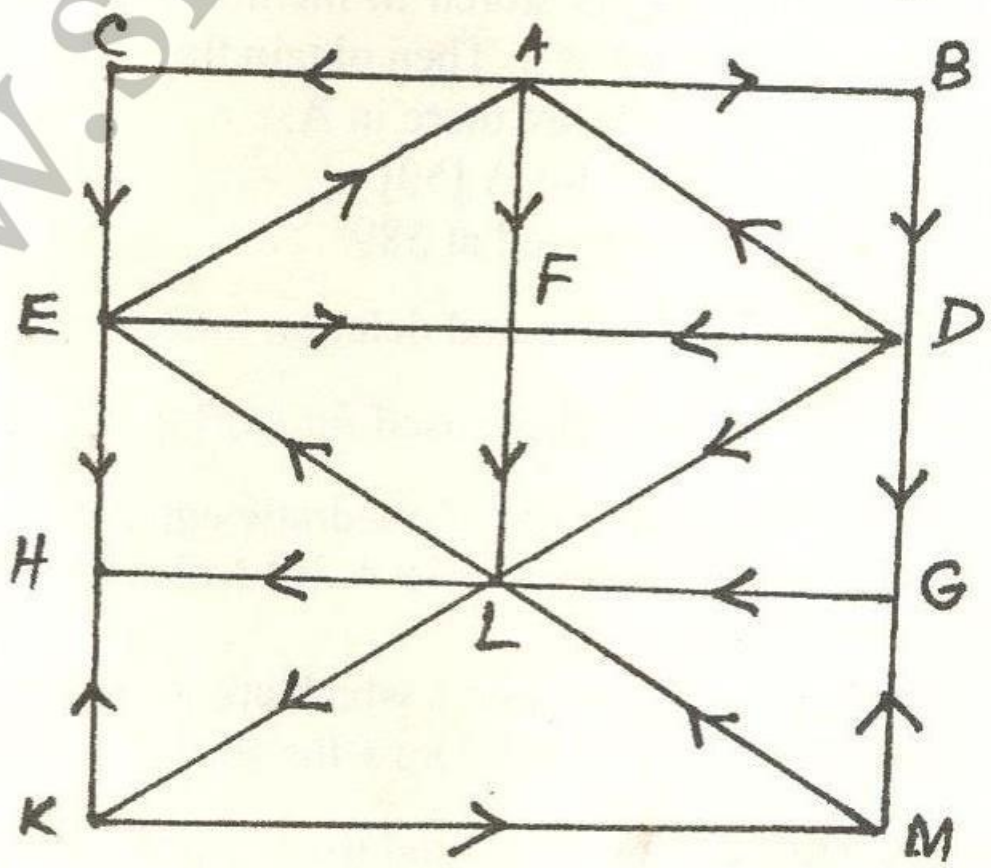

Figure- 3