NED UNIVERSITY OF ENGINEERING AND TECHNOLOGY, KARACHI
FIRST YEAR (BACHELOR OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY)
ANNUAL EXAMINATION 2007 (BATCH 2006-07)
Data Structure Algorithm & Application (CT–157)

Time: 3 hours

Date: 29-10-2007
Max. Marks 80

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

Q.1) **(a)** Q and T are strings with length X and Y 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 = abcbacbacdadac & Q = acbd
(ii) T = aabcabacbba & Q = cbb

Q.2) **(a)** Using the Bubble sort algorithm to alphabetize the n = 9 letter in "LOGARITHM". Show the stepwise result of algorithm.

(b) Let DATA be the following sorted 14 elements array: 16,22,26,30,36,42,48.56,60,66,72,84, 89,96. Apply the binary search algorithm stepwise to find the location of ITEM in DATA if **(i)** ITEM = 26 **(ii)** ITEM = 84 **(iii)** ITEM = 41

Q.3) **(a)** Consider the linear array P(-6,16), Q(130,180), R(84).
(i) Find the number of elements in each array.
(ii) If Base = 240 & W = 3 words per memory cell. Find the address of Q(162), P(11).

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

Q.4) **(a)** Write algorithm to find the location LOC and value of MAX of the largest elements of DATA in array with n elements. Consider the complexity which measures the number of times LOC an MAX are updated. Describe and find complexity for the (i) worst case (ii) best case (iii) average case.

(b) Suppose a 10 element array A contains the values a_1 , a_2 , a_3 ,----------, a_9 ,a_{10} .
Find the value in A after each loop.

1. Repeat for K = 1 to 9.
   Set A [K+1] = A [K]
   [End of loop]

2. Repeat for K = 9 to 1 by -1.
   Set A [K+1] = A [K].
   [End of loop]

Q.5) **(a)** (i) Consider the algebraic expression $(a + 2b) + (2x + 6y)^2 * (2d + 5e)$. Draw the corresponding binary tree.
(ii) Consider the following ten numbers which are to be inserted in order into an empty BST. 60,34,69,14,39,46,64,59,72,48. Draw the BST.

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

P.T.O

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

Q.7) (a) Define the following terms:
Complete graph, Linked List, Stack and Queue, Complexity.

(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 K.

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

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

START = 4, AVAIL = 3

Figure- 2

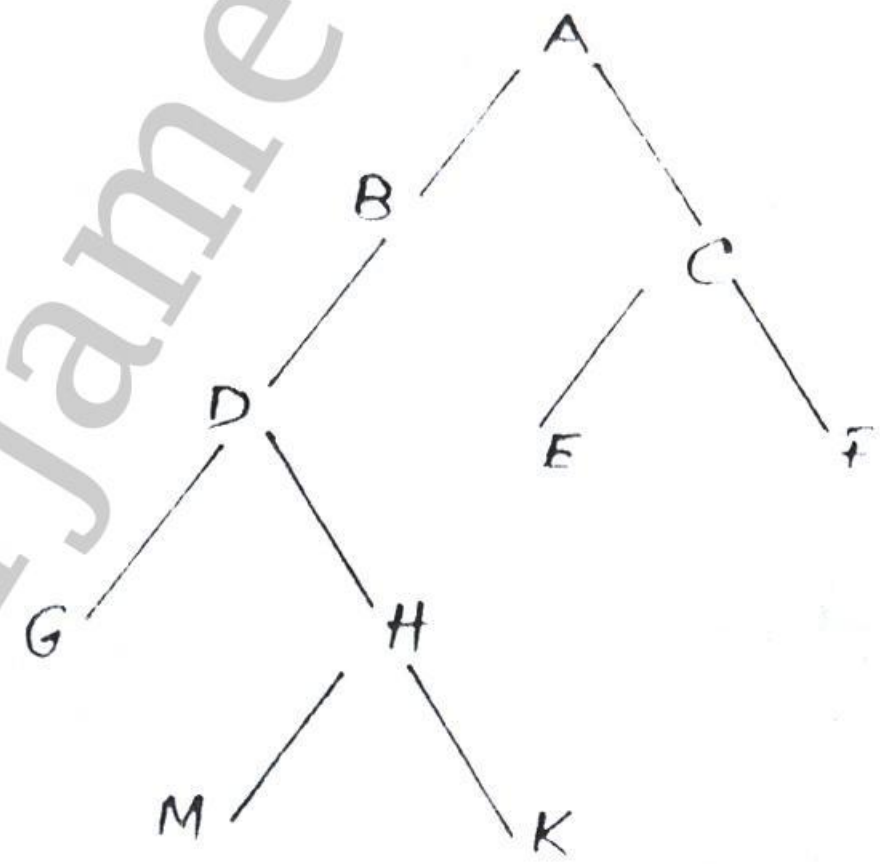

Figure - 1.

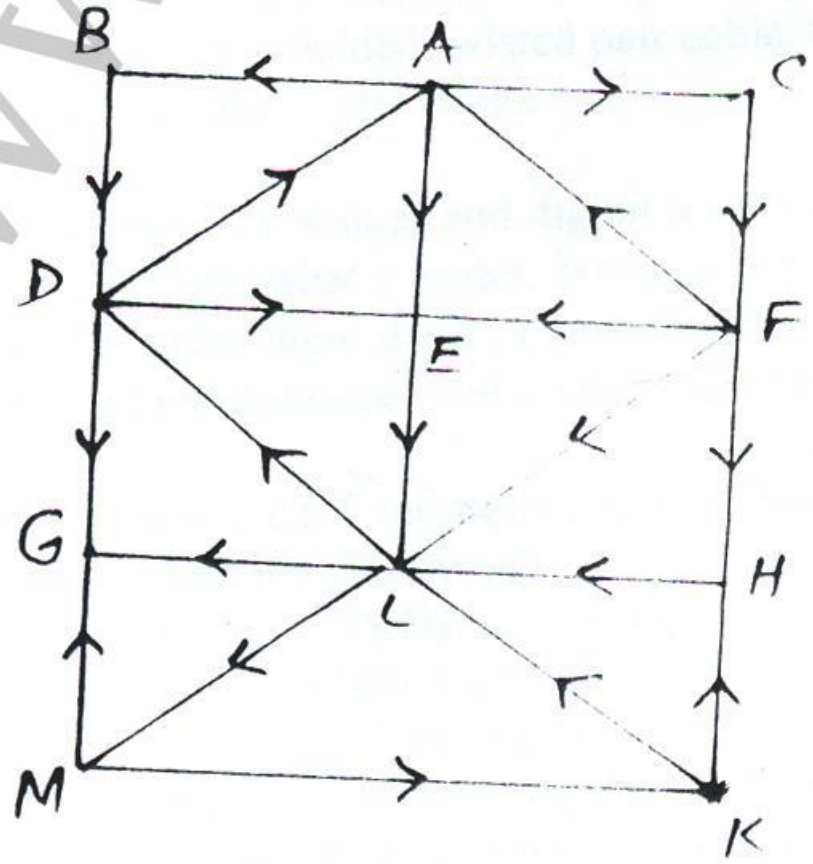

Figure - 3.