EASTERN UNIVERSITY, SRI LANKA
EXTERNAL DEGREE
SECOND EXAMINATION IN SCIENCE -2010/2011
FIRST SEMESTER (Apr. / May, 2017)
EXTCS 201 – DATA STRUCTURES AND DESIGN OF ALGORITHMS
SPECIAL REPEAT

Answer all questions

Time: Two hours

1)

1. What is meant by an algorithm?
2. List down five distinct areas of algorithm.
3. Linear List is one of the data structure.
   Write algorithms for the following Linear List operations which:
   a. Insert an element in to a Linear List;
   b. Remove an element from a Linear List.
4. Let L= (E, U, S, L, C, S, 1, 0, 2) be a Linear List.
   What is the result of each of the following operations?
   a) L.isEmpty()
   b) L.size()
   c) L.get(4)
   d) L.indexOf(0)
   e) L.add(6,5)
   f) L.remove(2)

2)

1. Write algorithms for the following Stack operations which:
   a. Create a Stack;
   b. Check empty Stack;
   c. Return front element of the Stack;
   d. Insert an element in to a Stack;
   e. Remove an element from a Stack.

2. Write an algorithm that determines whether or not an input string is a palindrome, that is, whether **or** not it can be read the same way forward and backward. At each point, you can read only one character of the input string. You can use Stack Operations to solve this problem.

   For example,

   Input Strings: "MADAM"   is   palindrome;
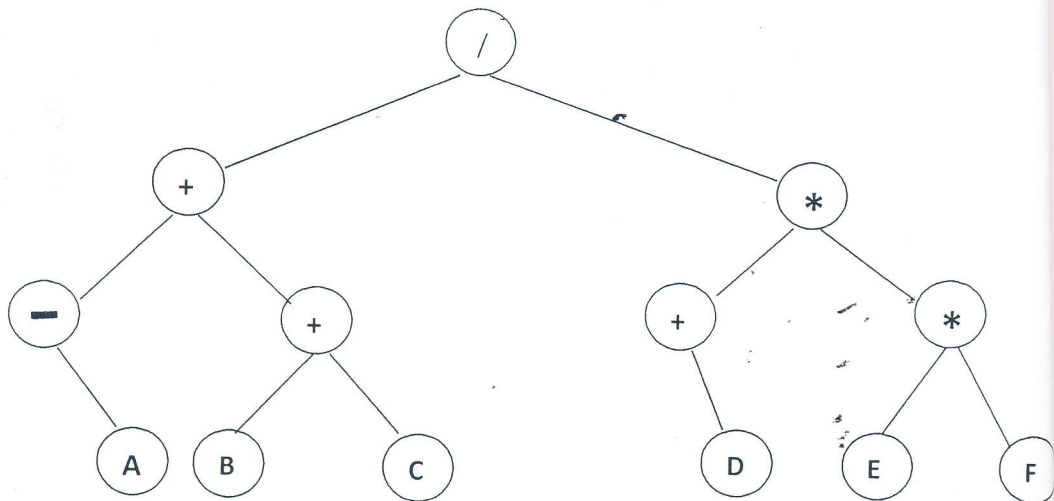   "AMMA"   is   palindrome;
                "NANPAN" is **not** palindrome.

Q3)

1. Briefly describe the binary tree.
2. The following figure is shown a complete binary tree.

   Write down the following traversal visit each node in this tree:

   a. PreOrder;
   b. InOrder;
   c. PostOrder;
   d. LevelOrder.

3. Let T be a binary tree of 11 nodes that are labeled A to K in some order. If the in-order traversal and pre-order traversal visit the nodes in the order

   E, I, A, F, B, K, C, G, D, J, H   and

   K, I, E, F, A, B, J, G, C, D, H   respectively

   i. Construct the binary tree.

   ii. In what order will the post-order traversal visit the nodes?

Q4)

1. What is meant by Bubble sort?
2. Write down the algorithm of Bubble sort.
3. Sort the following numbers into ascending order using Bubble sort.

   [29, 10 , 26 , 20 , 14 , 83 , 82]
   (You should write each step)
4. Write the Depth First Search algorithm (DFS).
5. By using DFS traversal algorithm, write down the traversal order of the graph from the node P.

   (Draw the graph for each step).