

C.U.SHAH UNIVERSITY

Summer Examination-2016

Subject Name : Introduction to Algorithms and Data Structures

Subject Code : 4CS04BDS1

Branch: B.C.A.

Semester : 4

Date : 07/05/2016

Time : 02:30 To 05:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1

Attempt the following questions:

(14)

- a) Which of the following is required condition for binary search algorithm?
 - a. The list must be sorted
 - b. The list must not be sorted
 - c. There must be mechanism to delete and/or insert elements in list
 - d. none of above
- b) Before inserting into stack one must check the condition
 - a. Overflow
 - b. Underflow
 - c. Maximum elements
 - d. Existing elements
- c) Which of the following data structure is non-linear type?
 - a. Strings
 - b. Lists
 - c. Stacks
 - d. Tree
- d) The situation when in a linked list START=NULL is _____
 - a. underflow
 - b. Overflow
 - c. Housefull
 - d. Saturated
- e) Which of the following case does not exist in complexity theory?
 - a. Best case
 - b. Worst case
 - c. Average case
 - d. Null case
- f) The operation of processing each element in the list is known as _____
 - a. Sorting
 - b. Merging
 - c. Inserting
 - d. Traversal
- g) Define: leaf node
- h) Define Balance Factor with respect to AVL tree?
- i) Which symbol is used for assignment statement in algorithm?
 - a. =
 - b. ->
 - c. -<
 - d. <-
- j) If we have 2 nested loops in algorithm the order of growth is _____
- k) Logarithm product rule,
 $\log_b(x \times y) =$ _____
- l) Write full name of MST
- m) What is Linked List?
- n) What is a loop?



- Q-2 Attempt all questions**
- Write an algorithm for linear search (5)
 - What is stack? Explain Push and pop operation on a stack (5)
 - Define: algorithm, process, program and Flow chart (4)
- Q-3 Attempt all questions**
- Explain different asymptotic notations in brief. (5)
 - Explain characteristics of an algorithm. (5)
 - Explain one to one and onto function. (4)
- Q-4 Attempt all questions**
- Explain complexity of algorithm (5)
 - Write recursive algorithm for merge sort. (5)
 - Construct binary tree for following and write in, pre and post order traversal (4)
170,104,100,135,234,180,190
- Q-5 Attempt all questions**
- Write an algorithm and function code for delete first node in singly linked list. (5)
 - Write an algorithm and function code for check whether given number is prime or not (5)
 - Write a note on Red Black Tree. (4)
- Q-6 Attempt all questions**
- Explain graph representation methods with example. (07)
 - Explain AVL Tree Rotations with example. (07)
- Q-7 Attempt all questions**
- Write an algorithm for binary search (5)
 - Write a program for creation and traversal of singly linked list. (5)
 - Write a program that print factorial of a given number. (4)
- Q-8 Attempt all questions**
- Explain Dijkstra's algorithm with example. (07)
 - Construct MST for following graph using Prim's algorithm. (07)

