

The LNM Institute of Information Technology

Computer Science & Engineering

Design & Analysis of Algorithm, CSE 325

Exam Type: End Term (Audit)

Time : 120 minutes

Date: 06/05/2017

Max. Marks: 50

Name: _____

Enrollment No: _____

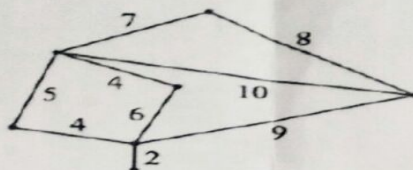
Instruction:

- Attempt all the questions.
- Marks for each question are written against them.
- Do not write anything in question-paper except Name and Enrolment Number.

1. (10*1 Marks)

- i. The complexity of Bubble sort algorithm is
a. $O(n)$ b. $O(\log n)$ c. $O(n^2)$ d. $O(n \log n)$
- ii. Which of the following case does not exist in complexity theory
a. Best case b. Worst case c. Average case d. Null case
- iii. The running time of quick sort depends heavily on the selection of
a. No of inputs b. Arrangement of elements in array c. Size of elements d. Pivot element
- iv. You have an array of n elements. Suppose you implement quicksort by always choosing the central element of the array as the pivot. Then the tightest upper bound for the worst case performance is
a. $O(n^2)$ b. $O(n \log n)$ c. $\Theta(n \log n)$ d. $O(n^3)$
- v. In linear search algorithm the Worst case occurs when
a. The item is somewhere in the middle of the array b. The item is not in the array at all
c. The item is the last element in the array d. The item is the last element in the array or is not there at all
- vi. The complexity of merge sort algorithm is
a. $O(n)$ b. $O(\log n)$ c. $O(n^2)$ d. $O(n \log n)$
- vii. Suppose that a graph $G = (V, E)$ is implemented using adjacency lists. What is the complexity of a breadth-first traversal of G ?
a. $O(|V|^2)$ b. $O(|V| + |E|)$ c. $O(|V|^2|E|)$ d. $O(|V| + |E|)$
- viii. What is generally true of Adjacency List and Adjacency Matrix representations of graphs?
a. Lists require less space than matrices but take longer to find the weight of an edge (v_1, v_2)
b. Lists require less space than matrices and they are faster to find the weight of an edge (v_1, v_2)
c. Lists require more space than matrices and they take longer to find the weight of an edge (v_1, v_2)
d. Lists require more space than matrices but are faster to find the weight of an edge (v_1, v_2)

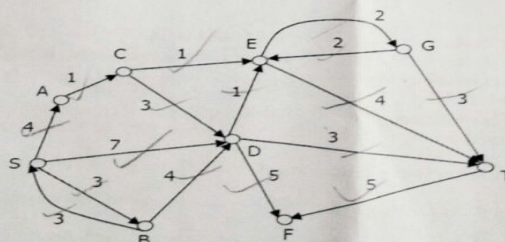
ix. The minimum cost spanning tree of the graph has cost



- a. 30 b. 31 c. 33 d. 26

x. Which is a NPC problem

- a. Shortest path problem. c. Assembly line scheduling problem.
 - b. Knapsack problem. d. Hamiltonian path problem.
2. Explain Master Method for solving asymptotic bounds of the recurrence relations. (10 Marks)
3. Explain an efficient algorithm for sorting n natural numbers. The range of elements are between some natural number N_1 and N_2 . (10 Marks)
4. What is an optimal Huffman code for the following set of frequencies, based on the first 8 Fibonacci numbers? a:1 b:1 c:2 d:3 e:5 f:8 g:13 h:21 (5 Marks)
5. Explain an algorithm for finding minimum spanning tree of a graph. Find Minimum spanning tree of the given graph (5+5 Marks)



6. Write the definition of NP, NP-Complete, NP hard Problems.

(5 Marks)

Handwritten notes:
difficult to solve
to solve, then we
don't know when
can solve it
can't be not as
No solution
possible