



ALGORITHM DESIGN 1

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Quiz Test 1

Semester: 3rd | Section: CSE H | Full Marks: 10 | Time: 10 mins | Date: 20/10/22

1. Solve the recurrence $T(n) = T(n - 1) + T(n - 2) + 2$ using substitution method.
2. Solve the recurrence $T(n) = T(n/10) + T(9n/10) + \theta(n)$ using recursion tree method.

Quiz Test 2

Semester: 3rd | Section: CSE H | Full Marks: 10 | Time: 10 mins | Date: 18/11/2022

1. How algorithm fits in the process of problem solving in Computer Science?
2. What are the information included in the definition of a computable problem?
3. Which of the following is not an essential characteristic of an algorithm?
 - a. Unambiguous instructions
 - b. Finite number of steps
 - c. Precise input
 - d. At least one input
4. Define the effectiveness property of the algorithm.
5. The efficiency of an algorithm does not depends on _____
 - a. Key operation
 - b. Input data
 - c. Output format
 - d. Number of loops

Quiz Test 3

Semester: 3rd | Section: CSE H | Full Marks: 15 | Time: 40 mins | Date: 1/12/2022

1. Derive and solve the recurrence relation for the MAXHEAPIFY procedure. Check the array $A = \{42, 18, 31, 26, 18, 2, 18, 22, 18, 7\}$ to identify the node violating the heap property. Show the steps to maintain the heap property at that node. (5 marks)
2. Suppose $f(n) = \theta(g(n))$. Prove that, $h(n) = O(f(n))$ iff. $h(n) = O(g(n))$. (2 marks)
3. Solve the recurrence $T(n) = T\left(\frac{n}{2}\right) + n^2$ assuming $T(1) = 1$. (2 marks)
4. "Worst case time complexity is of primary concern"-Justify the statement. (2 marks)
5. Differentiate between Priori analysis and Posterior analysis. Which is preferred and why? (2 marks)
6. Distinguish between monotonically increasing and decreasing functions with examples. (2 marks)

Quiz Test 4

Semester: 3rd | Section: CSE H | Full Marks: 5 | Time: 5 mins | Date: 05/01/2023

1. What is the space complexity of DFS algorithm on a graph G? Discuss about the data space, instruction space and the environmental stack space requirements.
2. Discuss the possible parenthesization structure for the discovery and finishing times of any two vertices (u, v) in a complete graph with 10 vertices 45 edges where degree of each vertex is 9?
3. How can we identify a tree edge and a cross edge in a graph through DFS traversal?
4. Find the value of m for which, the BFS traversal of a complete m-ary tree will be unique. Give a proper justification with example.
5. If the weight of an MST T of a graph G with 10 vertices and 20 edges is 67, what will be the weight of the MST T' obtained by increasing the weight of each edge of G by 2.

Quiz Test 5

Semester: 3rd | Section: CSE H | Full Marks: 5 | Time: 5 mins | Date: 12/01/2023

1. Let the cache contain (a,b,c) initially. If the memory requests are coming in the order d,e,b,a,c,f,d,e,c,b,f,a,d. How many cache misses will occur using Farthest-In-Future scheduling?
2. Let the cache contain (a,b,c,d) initially. If the memory requests are coming in the order d,b,a,e,c,f,d,e,c,b,f,a,d. How many cache miss will occur using LRU scheduling?.
3. What will be the length of encoded text for a given message "IAMANENGINEER" using Huffman's encoding??
4. Discuss the various methods for optimality analysis of the greedy algorithms with examples.
5. In a given schedule, an inverted pair of jobs (p, q) exist such that $s_p > s_q$. What can we say about the lateness of p and q?

Quiz Test 6

Semester: 3rd | Section: CSE H | Full Marks: 10 | Time: 10 mins | Date: 20/01/2023

1. Give a comparative analysis between Greedy algorithms and Dynamic Programming.
2. Critically compare Divide and Conquer and Dynamic Programming.
3. What is Memoization? How it is different from the traditional tabulation approach used in Dynamic Programming?
4. Define the optimal substructure for the problem of finding the binomial coefficient. Compare the space complexities of the top down recursive approach and the bottom up dynamic programming approach to solve this problem.
1. Write the memorized version of the top-down recursive algorithm mentioned in Qn.-4, find its time, and space complexity?