SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.Sc.Computer Science - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - III

21UCSCT3004 - Data Structures and Algorithms

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Explain the importance of performance analysis and measurement in evaluating data structures.
2. Illustrate the process of recursion by implementing the factorial function.
3. Apply the principles of a doubly linked list to reverse a given list.
4. Evaluate the efficiency of search, insertion and deletion operations in a binary search tree.
5. Describe the basic principles of hash tables and their applications.
6. Analyze the efficiency of different graph traversal algorithms in various scenarios.
7. Solve a problem using the divide and conquer approach, such as finding the maximum and minimum elements in an array.
8. Apply merge sort to the array: 38,27,43,3,9,82,10 and assess sorting process.

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Analyze the time complexity of the recursive binary search algorithm for different input sizes.
10. Implement a queue using a circular array with enqueue and dequeue operations.
11. Given a binary search tree, analyze the steps required to delete a node with two children and maintain the properties of the binary search tree.
12. Given a graph with vertices A, B and C where A is connected to B with a weight of 3 and B is connected to C with a weight of 4, analyze the shortest path from A to C. Calculate the total weight of this path.
13. Assess the time complexity of merge sort and quick sort in their best, worst, average cases and compare their performance.

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