

CENTER FOR DISTANCE AND ONLINE EDUCATION



**INTEGRAL
UNIVERSITY**
LUCKNOW



ASSIGNMENT-JULY 2024

SUB. NAME: - DATA STRUCTURE & ALGORITHMS

MCA-103: Online Mode

- Q-1** *What is Data Structure, why is it important in Programming? In how many ways you can categorize Data Structure?*
- Q-2** *What is Analysis of algorithm? Explain the Asymptotic Notations (Big O, Ω , θ) used while analyzing an algorithm.*
- Q-3** *What is linked list? Write and explain the algorithm for create, insertion and traverse operations in doubly linked list with example*
- Q-4** *A. What is a binary search tree? How do you insert an element into a binary search tree?
B. Explain how to delete an element from the binary search tree.
C. Discuss B-Trees with insert and delete operations.*
- Q-5** *A. Write a Routine for sorting elements using quick sort method. Explain the working of the routing with an example.
B. Define Searching. Differentiate the time complexities of Linear and Binary search with examples*
- Q-6** *What is a binary search tree? Write an algorithm to insert a node in a binary search tree.*
- Q-7** *Write a function to perform a binary search on a sorted array. Include both the iterative and recursive versions of the algorithm*
- Q-8** *Given an array of integers, write an algorithm to find the maximum sum of a contiguous subarray. Explain your approach and provide the code.*
- Q-9** *Write an algorithm for adding and deleting nodes from an ascending order*
- Q-10** *A. Differentiate between tree and graph. B. Write Prim's algorithm.
C. Write heap sorting algorithm. D. Write a short note on "Asymptotic Notation".*