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| **SESSION** | **NOV-DEC2023** |
| **PROGRAM** | **BACHELOR OF COMPUTER APPLICATIONS (BCA)** |
| **SEMESTER** | **II** |
| **COURSE CODE & NAME** | **DCA1202 – DATA STRUCTURES AND ALGORITHM** |
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**Assignment Set – 1**

**1a. What is a linked list? Discuss the algorithms for insertion and deletion of values from the start of a linked list.**

**b. Define stacks and what are the applications of Stack.**

**Ans 1.**

**a. Linked list**

A linked list is a fundamental data structure commonly used in computer science. It consists of a series of nodes, where each node contains a data value and a reference (or link) to the next node in the sequence. This structure allows for efficient insertion and deletion of elements at any position, as it only requires updating the links between nodes, rather than moving the entire Its Half solved only

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**2a. What are Binary trees? How many types of Binary trees are there, discuss?**

**b. What is a List Structure? Explain Adjacency list and Incidence list.**

**Ans 2.**

**a. Binary trees**

A binary tree is a tree data structure in which each node has at most two children, referred to as the left child and the right child. This simple structure underpins many more complex data structures and algorithms, making binary trees an essential concept in computer science and programming.

**Types of Binary Trees**

There are several

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**3. Discuss the types of directed graphs and their matrix representation.**

**Ans 3.**

Directed graphs, also known as digraphs, are fundamental structures in graph theory and have numerous applications in computer science, engineering, and mathematics. They consist of a set of vertices (or nodes) connected by edges, where each edge has a direction indicating the relationship from one vertex to another. There are several types of directed graphs, each with unique characteristics, and they can be represented mathematically using matrices. In this discussion, we will

**Assignment Set – 2**

**4a. Explain the algorithms of Bubble sort and Binary Search.**

**b. What are NP and NP hard problems?**

**Ans 4.**

**a. Bubble Sort and Binary Search Algorithms**

**Bubble Sort Algorithm** Bubble sort is a straightforward sorting algorithm that repeatedly steps through the list, compares adjacent elements, and swaps them if they are in the wrong order. The algorithm gets its name because smaller elements "bubble" to the top of the list.

Here's how it works:

1. Starting from

**5a. How is the Efficiency of an Algorithm measured?**

**b. What is Divide and conquer strategy? Discuss the Quick search algorithm.**

**Ans 5.**

**a. Measuring the Efficiency of an Algorithm**

The efficiency of an algorithm is a critical measure in computer science, indicating how effectively the algorithm performs in terms of time and space resources. This efficiency is generally evaluated using two main metrics: time complexity and space complexity. Time complexity refers to the amount of

**6. Discuss about All Pair Shortest Paths and Travelling Salesman Problem.**

**Ans 6.**

All Pair Shortest Paths and the Traveling Salesman Problem are two fundamental concepts in the field of computer science, particularly in the study of algorithms and graph theory. Both address critical challenges in the optimization of paths within a graph, but they differ significantly in their applications, complexities, and solutions.

**All Pair**