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| **SESSION** | **MAY 2023** |
| **PROGRAM** | **Master of COMPUTER APPLICATION (MCA)** |
| **SEMESTER** | **II** |
| **course CODE & NAME** | **DCA6202 - Advanced Data Structure** |
| **CREDITS** | **4** |

**Assignment Set – 1**

**1. A. What do you understand by data structures? Discuss briefly on types of data structures.**

**ANS: Data structures** refer to the way data is organized, stored, and manipulated in computer memory. They provide a systematic way to manage and access data efficiently, enabling various operations likes insertion, deletion, searching, and sorting.

**Here are brief discussions on**

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**B. Explain asymptotic notations in detail.**

**ANS:** One way to compare the function C(n) with the standard functions is to use the asymptotic notations. We have various asymptotic notations they are,

Oh notation (O)

Omega notation (Ω)

Theta notation

**2. A. Define linked list and it types. Explain the algorithm for inserting a new node at beginning.**

**ANS:** A linked list is a data structure that consists of a collection of nodes, where each node contains data and a reference (or link) to the next node in the sequence. Unlike an array, the elements in a linked list are

**B. Evaluate the value the following postfix expressions using STACK:**

**6 3 ^ 9 1 - + +**

**ANS:** To evaluate the given postfix expression using a stack, we can follow these steps:

Initialize an empty stack.

Read the expression from left to right.

If the current element is

**3. A. Define and explain the concept of binary search tree and discuss the algorithm for insertion in BST.**

**ANS:** A binary search tree (BST) is a binary tree data structure where each node has a key/value pair and satisfies the following properties:

The key in the left child is less than the key in the parent node.

The key in the right child is

**B. Explain different types of traversing techniques for Binary Tree.**

**ANS:** There are three commonly used techniques for traversing (visiting) the nodes of a binary tree: in-order traversal, pre-order traversal, and post-order traversal.

**Each technique follows a specific order for visiting the nodes.**

**In-order Traversal:**

In in-order traversal,

**Assignment Set – 2**

**4. A. What is static memory allocation and dynamic memory allocation?**

**ANS:** Static memory allocation and dynamic memory allocation are two approaches to allocate memory in a program, and they differ in their characteristics and usage.

**Static Memory Allocation:** Static memory allocation refers to the allocation of memory at compile-time or

**B. Explain algorithm for BFS. Demonstrate BFS using suitable example?**

**ANS:** The Breadth-First Search (BFS) algorithm is used to traverse or search a graph or tree data structure. It explores all the vertices or nodes at the same level before moving on to the next level.

**5. A. Write an algorithm to implement Selection sort with suitable example.**

**ANS:** The selection sort algorithm is a simple sorting algorithm that repeatedly selects the smallest element from the unsorted portion of the array and swaps it with the element in the appropriate position.

**Algorithm for**

**B. What is Static hashing? Discuss its disadvantages.**

**ANS: Static hashing,** also known as fixed-size hashing, is a hashing technique where the size of the hash table is predetermined and does not change during the lifetime of the data structure. In static hashing, each record or key is hashed into a specific slot or bucket in the hash table based on a hash function.

**Here are some disadvantages of**

**6. A. Explain how Dijkstra’s algorithm is used to find the shortest path of Directed weighted graph.**

**ANS:** Dijkstra's algorithm is a popular algorithm used to find the shortest path in a directed weighted graph. It operates by iteratively expanding the frontier of explored vertices, ensuring that the shortest path to each vertex is considered.

**Here's a step-by-step**