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| **SESSION** | **Feb/MAR 2022** |
| **PROGRAM** | **BACHELOR of COMPUTER APPLICATION (BCA)** |
| **SEMESTER** | **II** |
| **course CODE & NAME** | **DCA1202 – Data structures and algorithm** |
| **CREDITS** | **4** |

**Assignment Set – 1st**

**Questions**

**1. A. What is a linked list? Discuss the algorithms for insertion and deletion of values in the beginning of a linked list.**

A linked list is a data structure where the objects are arranged in a linear order. Unlike an array, however, in which the linear order is determined by the array indices, the order in a linked list is determined by a pointer in each object.

* **Insertion**: To add a

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**b. Define queues and its enqueue and dequeue operations.**

**Ans:** In computer science, a queue is an abstract data type that follows the First-In-First-Out (FIFO) principle. It represents a collection of elements or items where the addition of new elements occurs at one end called the "rear" or "tail," and the removal of elements occurs at the

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

**ANS:** A binary tree is a special case of tree where no node of a tree can have a degree of more than two. Therefore, a binary tree is a set of zero or more nodes T such that:

i) there is a specially designated node called the root of the tree

ii) the remaining nodes are partitioned into two disjointed sets, T1 and T2, each of which is a binary tree. T1 is called the

**B. Discuss Dijkstra’s Algorithm for shortest path.**

Ans: vi,vj ) + w(vj , vk ). Using this form of definition , the weight from a vertex vs (source) to vertex vt (end of path) in the graph G for a given path (vs , v1 ), (v1 , v2 ), (v2 , v3 )……… (vi , vt ) is given by w(vs , v1 ) + w(v1 , v2 ) + w(v2 , v3 ) + …………..+ w(vi , vt ). Hence for such a graph there may be many possible paths between vs and vt. .

In this algorithm,

3. **Explain Breadth-first search and Depth-first search algorithms in graphs.**

**Ans: Breadth-first search:** This algorithm uses a queue data structure to perform the search. The effect of this is to process all nodes adjacent to the start node before we process the nodes adjacent to

**Assignment Set – 2nd**

**Questions**

**4. A. Explain the algorithms of Sequential Searching and Binary Searching.**

**Ans: Sequential Searching:** The simplest type of searching process is the sequential search or linear search. In the sequential search, each element of the array is compared to the key, in the order it appears in the array, until the first element matching the key is found. If you are looking for an element that is near the front of the array, the sequential search will find it quickly. The more data that must be searched, the longer it will take to find the data that matches the key

**B. What are the characteristics and Building Blocks of an Algorithm?**

**Ans: Characteristics of an Algorithm**

**Finiteness**

An algorithm must terminate after a finite number of steps and further each step must be executable in finite amount of time. In order to establish a sequence of steps as an algorithm, it should be established that it terminates (in finite number of steps) on all allowed inputs.

**Definiteness (no ambiguity)**

Each step of an algorithm must be precisely defined; the action to be carried out must be rigorously and

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

**Ans:** If a problem is algorithmically solvable then it may have more than one algorithmic solution. Mainly, the two computer resources taken into consideration for efficiency measures are time and space requirements for executing the program corresponding to the solution/algorithm. We will restrict to only time complexities of algorithms of the problems.

**The efficie**

**B. What is Divide and conquer strategy?**

**Ans: Divide and conquer** is a problem-solving strategy and algorithmic paradigm that involves breaking down a complex problem into smaller, more manageable sub problems, solving them independently, and combining their solutions to obtain the final solution to the original problem. It follows a recursive approach and is widely used in various algorithms and

6. **Discuss the Greedy knapsack Algorithm, with a suitable example.**

Ans: The Greedy Knapsack Algorithm, also known as the Fractional Knapsack Algorithm, is an optimization algorithm used to solve the knapsack problem, where items with certain values and weights need to be selected to maximize the total value within a given weight