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Subject code - CSI-217 (Data structure)

Answer to the Question - 1 (a)

(a) Ans: A Data structure is a specialized for arranging, organizing-processing retrieving and storing data. There are several basic and Advanced types of Data structures, all designed to arrange data to suit a specific purpose.

(b) Array Operators: Array operators means the platform which enables as to define array attributes - blob attributes that represent numeric arrays of 64 bit integer or Double values. The + operator return the right-hand Array appended to the left-hand array, for keys that exist in both arrays the Elements form the left-hand array will be Array.

1.

(b) Answer : Operation of Data Structure:

Data Structure is the way of storing data in computers Memory so that it can be used easily and efficiently There are different data structure used for the storage of Data.

Advantages:

(1) The structure is a good solution for storing data on framework.

(2) Data structure make it easier for as to handle data.

(3) Data Structure also aid as in efficiently. Storing data or circles so that we can recover the Data.

(4) Data structure are critical for planning. Computations.

(5) As we have seen data structure are a mechanism for arranging data in to a specified structure.

(c) Answer:

Array types:

An computer science, array is a data type that represents a collection of elements, each selected by one or more indices that can be computed at run time during program execution. Such, a collection is usally called on ary variable or array of value.

There are mayorly three types of Array:

1. one - dimensional array (1-D Arrays).
2. two - dimensional (2D) Array.
3. Theree - dimensional array.

Array operator: The + operator returns the right-hand array appended to the left-hand array's for keys that exist in both arrays, the elements from the left-hand array. Array operator ([]) you can used one of the following sytax variations of the array operators ([]) to referenee specific all variations, an element index number can also be provided as an expression that evaluates to an integer.

Answere to the Question - No - 2

2.

(a) Ans: Basic operations on stack: There are Basically three operations that can be performed on stacks. They are:

(1) Inserting an item in to a stack (push).

(2) Deleting an item from the stack (pop)

(3) Displaying the contents of the staack (peek or top)

(b) stacks's Application. A stack can be used for evaluating expressions cosisting of operands and operator.

(a) Evaluation of Arothmetic Expressiins.

(b) Backtracking.

(c) Delimiter checking.

(d) Reverse a data.

(e) processing function calls.

2

(b) Ans: A graph can be represented using 3 data ~~stru~~ structures - Adjacency matrix, Adjacency matrix can be thought of as a table and column labels represent the Nodes of a graph. A graph ~~as~~ is a non-linear data structure consisting of vertices and edges. The vertices are sometime also referred to as nodes and the edges.

(c) Ans: ⇒ The formula for Calculating Arithmetic mean is (sum of all observations) / (Number of observations)

for example the Arithmatic mean of a set of Numbers {10, 20, 30, 40} can be found need,

Arithmatics mean = $\frac{(10+20+30+40)}{4}$

$= \frac{100}{4} = 25$

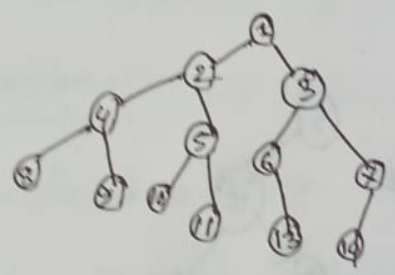
$= 25$ Ans

(Ans)

Answer to the Question - No - 3

3

(a) Ans: Define Binary tree: Binary tree is defined as a tree Data structure where each node has at most 2 children. Since each element in a binary tree can have only 2 children, we typically Name them the left and right child.



Binary tree Representation: A binary tree is representation by a pointer to the topmost node. (Commonly know as the "root" of the the tree. If the tree is empty, then the value of the root is Null. Each node of a binary ~~the~~ tree contains the following part.

① Data, ② ~~pr~~pointer to left child.
③ pointer to right child.

Basic Operation on Binary tree:

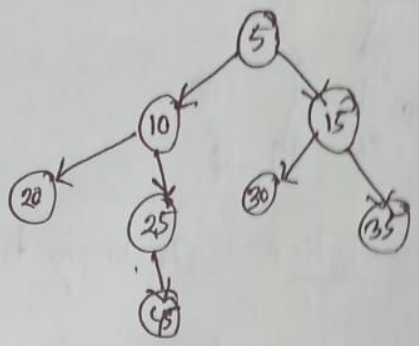
① Inserting an element ② Removing an element.
③ Searching for an element. ④ Traversing the tree.

02/04/2024 16:55

Auxiliary Operation on binary tree:

1. Finding the height of the tree.
2. Find the level of a node the tree.
3. Finding the size of the tree.

Given nodes in a binary tree, find the distance between them.



→ Distance between (20, 45) = 3.

→ Distance between (30, 35) = 2

→ Distance between (20, 35) = 4.

Approach:

1. Distance (X, Y) = Distance (root, x) + Distance (root, y) - 2*(Distance (root to LCA(x,y)).
2. where LCA(x,y) = Lowest common Ancestor of x,y
3. In the above Example if Distance (20,45) = 3
4. Distance (root, 20) = 2

02/04/2024 16:55

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(5) Distance (root, 45) = 2

(6) LCA (20, 45) = 10.

(7) Distance (root, 10) = 1

(8) Distance (20, 45) = 2 + 3 − 2*1 = 3.

⇒ Now the problem is reduced to : How to find distance from root to any given node.

⇒ Related problem.

→ Construct a binary tree from given Indorr and Depth First − Search − (Hard)

→ print All the Nodes which are x distance from the left Node (Medium)

→ Reverse a linked List in group of given size k (medium)

→ Inorder Successor in binary Search tree using parent line (Hard)

→ Backtracking − knight's tour problem (Hard)

→ Find the max element in a given Binary tree (Beginner)

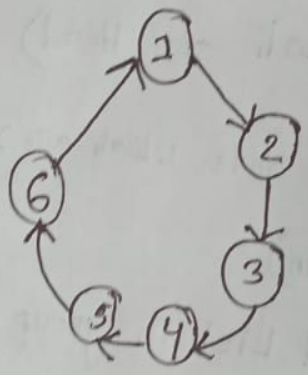
→ Given the Binary tree, print All the Nodes that don't have sibling (Beginner)

→ Lowest Common Ancestor in a Binary Search tree (medium)

02/04/2024 16:56

3 (b) Answer: Graph: Graph in Data Structures

are non-linear data structures made up of a finite Number of nodes or vertices and the edges that Connect them. Graphs in data structure are used to Address real-word problems in which it present the problem area as a Network like telephone Networks and social Networks.



The Application of graph data structure is used in Computer Since, mathmatics, and physics and has many practical application in fields such as Computer Networks. Artificial intelligence and logistics.

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III Application of Graph Data structure

Real-life Application of graph data structure in various fields are:

⇒ Computer Science: Graph are used to model many problems and Solutions in Computer Science, such as Representing Networks, web-page, and Social media Connection. Graph algorithms are used in path finding data compression.

⇒ Social Network: graphs represent and analyze social Network. such as the connection between individuals and group.

⇒ Transportation: graph can be used to model transportation System, such as roads and flights. and to find the shortest of quickest routes between location.

⇒ Computer vision: graph represent and analyze image and video, such as tracking objects.

⇒ Telecomunication.

02/04/2024 16:56