Data Structures and Algorithms Design

(S1-21\_DSECLZG519)

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Assignment No.: 1

PS2 - Vehicle Records

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The Data Structure model you chose with justifications:

**Binary Tree:**

A binary tree is a tree-type non-linear data structure with a maximum of two children for each parent. Every node in a binary tree has a left and right reference along with the data element. The node at the top of the hierarchy of a tree is called the root node. The nodes that hold other sub-nodes are the parent nodes. There are three binary tree components. Every binary tree node has these three components associated with it. It becomes an essential concept for programmers to understand these three binary tree components:

1. Data
2. Pointer to left child
3. Pointer to right child

**Terminologies used in Binary Tree:**

**Node**: It represents a termination point in a tree.

**Root**: A tree’s topmost node.

**Parent**: Each node (apart from the root) in a tree that has at least one sub-node of its own is called a parent node.

**Child**: A node that straightway came from a parent node when moving away from the root is the child node.

**Leaf Node**: These are external nodes. They are the nodes that have no child.

**Internal Node**: As the name suggests, these are inner nodes with at least one child.

**Depth of a Tree**: The number of edges from the tree’s node to the root is.

**Height of a Tree**: It is the number of edges from the node to the deepest leaf. The tree height is also considered the root height.

Details of each operation with the time complexity:

def \_readTruckRec(tNode, Uid):

def \_updateTruckRec(tNode, Uid):

def \_printTruckRec(tNode):

def \_checkTruckRec(tNode, Uid):

def \_printOrderStatus(targetorders):

def \_highFreqTrucks(tNode, frequency):

def \_maxDeliveries(tNode):

def \_availTrucks(tNode):

One alternate way of modelling the problem with the cost implications: