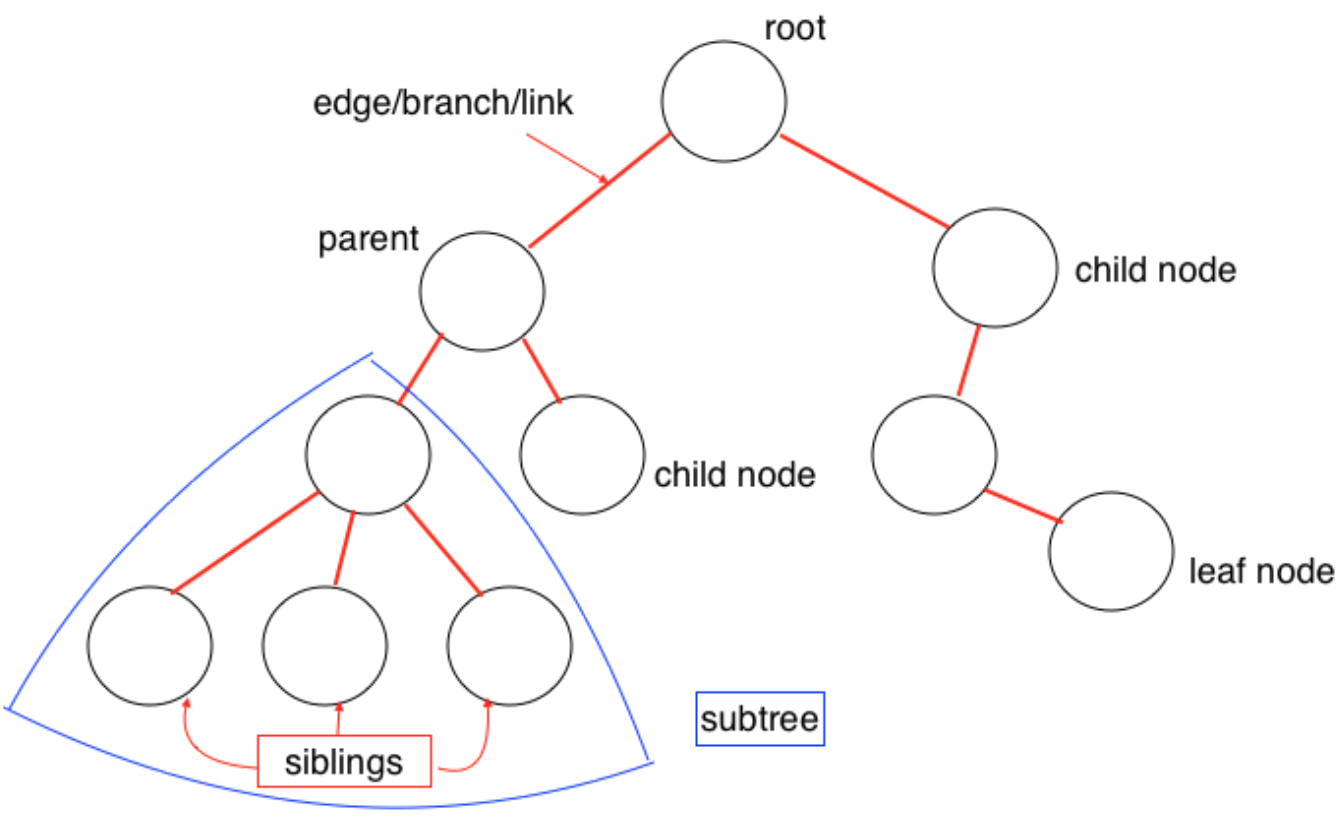
Binary Trees in Python

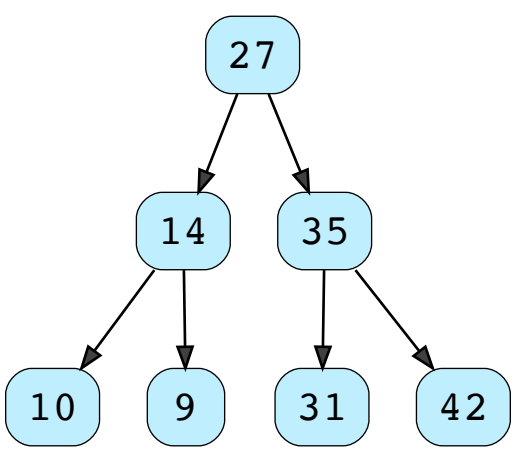
binary tree | Create node | insert a node | search a node | communitycreator

Trees are non-linear data structures that represent nodes connected by edges. Each tree consists of a root node as the Parent node, and the left node and right node as Child nodes.



Binary tree

A tree whose elements have at most two children is called a binary tree. Each element in a binary tree can have only two children. A node's left child must have a value less than its parent's value, and the node's right child must have a value greater than its parent value.



Implementation

Here we have created a `node` class and assigned a value to the node.

```
# node class
class Node:

    def __init__(self, data):
        # left child
        self.left = None
        # right child
        self.right = None
        # node's value
        self.data = data

    # print function
    def PrintTree(self):
        print(self.data)

root = Node(27)

root.PrintTree()


```

The above code will create node 27 as parent node.

Insertion

The `insert` method compares the value of the node to the parent node and decides whether to add it as a left node or right node.

> Remember: if the node is greater than the parent node, it is inserted as a right node; otherwise, it's inserted left.

Finally, the `PrintTree` method is used to print the tree.

```
class Node:

    def __init__(self, data):

        self.left = None
        self.right = None
        self.data = data

    def insert(self, data):
# Compare the new value with the parent node
        if self.data:
            if data < self.data:
                if self.left is None:
                    self.left = Node(data)
                else:
                    self.left.insert(data)
            elif data > self.data:
                if self.right is None:
                    self.right = Node(data)
                else:
                    self.right.insert(data)
        else:
            self.data = data

# Print the tree
    def PrintTree(self):
        if self.left:
            self.left.PrintTree()
```

The above code will create root node as 27, left child as 14, and right child as 35.

Searching

While searching for a value in the tree, we need to traverse the node from left to right and with a parent.

```
class Node:

    def __init__(self, data):

        self.left = None
        self.right = None
        self.data = data

# Insert method to create nodes
    def insert(self, data):

        if self.data:
            if data < self.data:
                if self.left is None:
                    self.left = Node(data)
                else:
                    self.left.insert(data)
            elif data > self.data:
                if self.right is None:
                    self.right = Node(data)
                else:
                    self.right.insert(data)
        else:
            self.data = data
# findval method to compare the value with nodes

    def findval(self, lkpval):
        if lkpval < self.data:
```

Here it creates tree 10 19 14 27 31 35 nodes. In this tree 7 nodes is not there so it gives the output as 7 not found. 14 is the left child root.