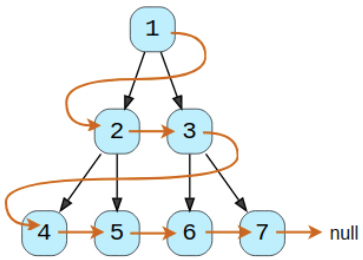
Solution Review: Problem Challenge 1

We'll cover the following

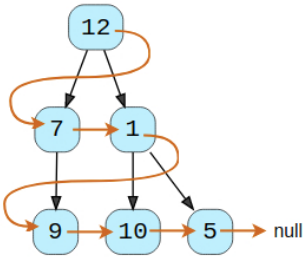
Connect All Level Order Siblings (medium)

Given a binary tree, connect each node with its level order successor. The last node of each level should point to the first node of the next level.

Example 1:



Example 2:



Solution

This problem follows the Binary Tree Level Order Traversal pattern. We can follow the same **BFS** approach. The only difference will be that while traversing we will remember (irrespective of the level) the previous node to connect it with the current node.

Code

Here is what our algorithm will look like; only the highlighted lines have changed:

Java | Python3 | C++ | JS

```
from __future__ import print_function
from collections import deque
```

```python
class TreeNode:
  def __init__(self, val):
    self.val = val
    self.left, self.right, self.next = None, None, None

  # tree traversal using 'next' pointer
  def print_tree(self):
    print("Traversal using 'next' pointer: ", end='')
    current = self
    while current:
      print(str(current.val) + " ", end='')
      current = current.next


def connect_all_siblings(root):
  if root is None:
    return

  queue = deque()
  queue.append(root)
  currentNode, previousNode = None, None
  while queue:
    currentNode = queue.popleft()
    if previousNode:
      previousNode.next = currentNode
    previousNode = currentNode

    # insert the children of current node in the queue
    if currentNode.left:
      queue.append(currentNode.left)
    if currentNode.right:
      queue.append(currentNode.right)


def main():
  root = TreeNode(12)
  root.left = TreeNode(7)
  root.right = TreeNode(1)
  root.left.left = TreeNode(9)
  root.right.left = TreeNode(10)
  root.right.right = TreeNode(5)
  connect_all_siblings(root)
  root.print_tree()


main()

```

Run Save Reset

Time complexity

The time complexity of the above algorithm is $O(N)$, where 'N' is the total number of nodes in the tree. This is due to the fact that we traverse each node once.

Space complexity

The space complexity of the above algorithm will be $O(N)$ which is required for the queue. Since we can have a maximum of $N/2$ nodes at any level (this could happen only at the lowest level), therefore we will need $O(N)$ space to store them in the queue.

Back
Problem Challenge 1

Next
Problem Challenge 2

Completed

Report an Issue Ask a Question