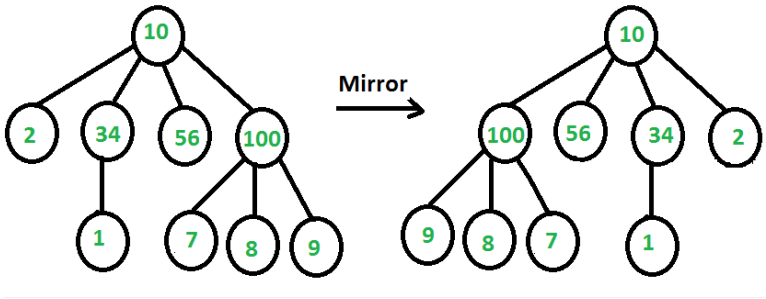
Mirror of n-ary Tree

Given a Tree where every node contains variable number of children, convert the tree to its mirror. Below diagram shows an example.



We strongly recommend you to minimize your browser and try this yourself first.

Node of tree is represented as a key and a variable sized array of children pointers. The idea is similar to mirror of Binary Tree. For every node, we first recur for all of its children and then reverse array of children pointers. We can also do these steps in other way, i.e., reverse array of children pointers first and then recur for children.

Below is C++ implementation of above idea.

C++

```
// C++ program to mirror an n-ary tree
#include <bits/stdc++.h>
using namespace std;

// Represents a node of an n-ary tree
struct Node
{
    int key;
    vector<Node *>child;
};

// Function to convert a tree to its mirror
void mirrorTree(Node * root)
{
    // Base case: Nothing to do if root is NULL
    if (root==NULL)
        return;

    // Number of children of root
    int n = root->child.size();

    // If number of child is less than 2 i.e.
    // 0 or 1 we do not need to do anything
    if (n < 2)
        return;

    // Calling mirror function for each child
    for (int i=0; i<n; i++)
        mirrorTree(root->child[i]);

    // Reverse vector (variable sized array) of child
    // pointers
    reverse(root->child.begin(), root->child.end());
}

// Utility function to create a new tree node
Node *newNode(int key)
{
```

```
    Node *temp = new Node;
    temp->key = key;
    return temp;
}

// Prints the n-ary tree level wise
void printNodeLevelWise(Node * root)
{
    if (root==NULL)
        return;

    // Create a queue and enqueue root to it
    queue<Node *>q;
    q.push(root);

    // Do level order traversal. Two loops are used
    // to make sure that different levels are printed
    // in different lines
    while (!q.empty())
    {
        int n = q.size();
        while (n>0)
        {
            // Dequeue an item from queue and print it
            Node * p = q.front();
            q.pop();
            cout << p->key << " ";

            // Enqueue all childrent of the dequeued item
            for (int i=0; i<p->child.size(); i++)
                q.push(p->child[i]);
            n--;
        }

        cout << endl; // Separator between levels
    }
}

// Driver program
int main()
{
    /*   Let us create below tree
    *              10
    *        /   /    \   \
    *        2  34    56   100
    *                 |   /  | \
    *                 1   7  8  9
    */
    Node *root = newNode(10);
    (root->child).push_back(newNode(2));
    (root->child).push_back(newNode(34));
    (root->child).push_back(newNode(56));
    (root->child).push_back(newNode(100));
    (root->child[2]->child).push_back(newNode(1));
    (root->child[3]->child).push_back(newNode(7));
    (root->child[3]->child).push_back(newNode(8));
    (root->child[3]->child).push_back(newNode(9));

    cout << "Level order traversal Before Mirroring\n";
    printNodeLevelWise(root);

    mirrorTree(root);

    cout << "\nLevel order traversal After Mirroring\n";
    printNodeLevelWise(root);

    return 0;
}
```

Python

```
# Python program to mirror an n-ary tree

# Represents a node of an n-ary tree
class Node :

    # Utility function to create a new tree node
    def __init__(self ,key):
        self.key = key
        self.child = []


# Function to convert a tree to its mirror
def mirrorTree(root):

    # Base Case : nothing to do if root is None
    if root is None:
        return

    # Number of children of root
    n = len(root.child)

    # If number of child is less than 2 i.e.
    # 0 or 1 we don't need to do anything
    if n <2 :
        return

    # Calling mirror function for each child
    for i in range(n):
        mirrorTree(root.child[i]);

    # Reverse variable sized array of child pointers
    root.child.reverse()


# Prints the n-ary tree level wise

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

    # create a queue and enqueue root to it
    queue = []
    queue.append(root)

    # Do level order traversal. Two loops are used
    # to make sure that different levels are printed
    # in different lines
    while(len(queue) >0):

        n = len(queue)
        while(n > 0) :

            # Dequeue an item from queue and print it
            p = queue[0]
            queue.pop(0)
            print p.key,

            # Enqueue all children of the dequeued item
            for index, value in enumerate(p.child):
                queue.append(value)

            n -= 1
        print "" # Seperator between levels


# Driver Program

    """   Let us create below tree
    *             10
    *        /   /    \   \
    *        2  34    56   100
```

```
    *                |   /  | \
    *                1   7  8  9
    """

root = Node(10)
root.child.append(Node(2))
root.child.append(Node(34))
root.child.append(Node(56))
root.child.append(Node(100))
root.child[2].child.append(Node(1))
root.child[3].child.append(Node(7))
root.child[3].child.append(Node(8))
root.child[3].child.append(Node(9))

print "Level order traversal Before Mirroring"
printNodeLevelWise(root)

mirrorTree(root)

print "\nLevel Order traversal After Mirroring"
printNodeLevelWise(root)
```

Output:

```
Level order traversal Before Mirroring
10
2 34 56 100
1 7 8 9

Level order traversal After Mirroring
10
100 56 34 2
9 8 7 1
```