

Problem 590: N-ary Tree Postorder Traversal

Problem Information

Difficulty: Easy

Acceptance Rate: 0.00%

Paid Only: No

Problem Description

Given the

root

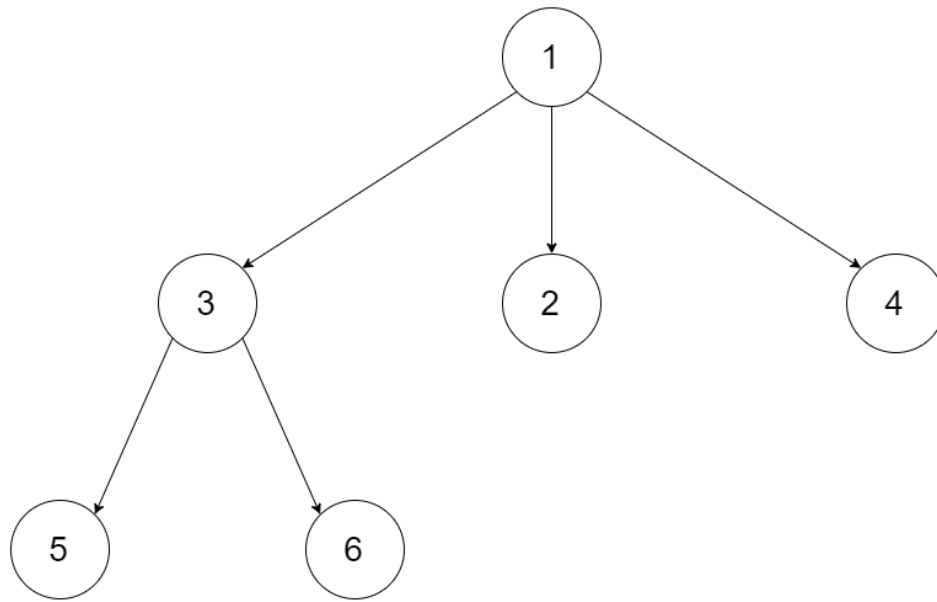
of an n-ary tree, return

the postorder traversal of its nodes' values

.

Nary-Tree input serialization is represented in their level order traversal. Each group of children is separated by the null value (See examples)

Example 1:



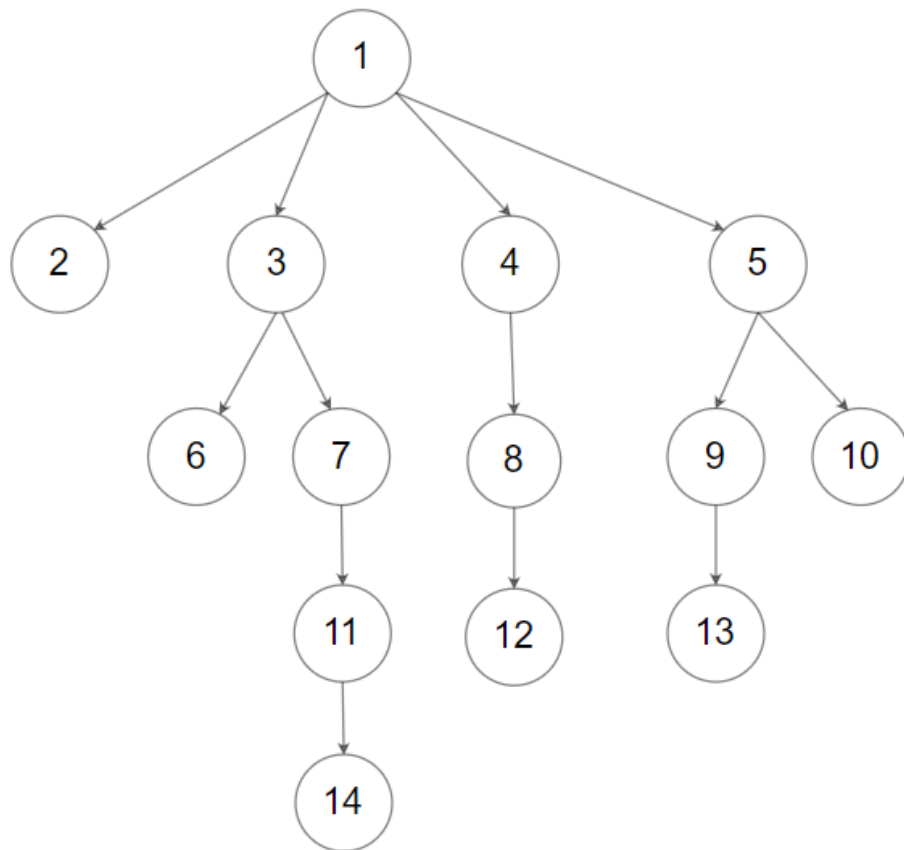
Input:

root = [1,null,3,2,4,null,5,6]

Output:

[5,6,3,2,4,1]

Example 2:



Input:

root = [1,null,2,3,4,5,null,null,6,7,null,8,null,9,10,null,null,11,null,12,null,13,null,null,14]

Output:

[2,6,14,11,7,3,12,8,4,13,9,10,5,1]

Constraints:

The number of nodes in the tree is in the range

[0, 10

4

]

.

$0 \leq \text{Node.val} \leq 10$

4

The height of the n-ary tree is less than or equal to

1000

.

Follow up:

Recursive solution is trivial, could you do it iteratively?

Code Snippets

C++:

```
/*
// Definition for a Node.
class Node {
public:
    int val;
    vector<Node*> children;

    Node() {}

    Node(int _val) {
        val = _val;
    }

    Node(int _val, vector<Node*> _children) {
        val = _val;
        children = _children;
    }
};
*/

class Solution {
```

```

public:
vector<int> postorder(Node* root) {

}

};

```

Java:

```

/*
// Definition for a Node.
class Node {
public int val;
public List<Node> children;

public Node() {}

public Node(int _val) {
val = _val;
}

public Node(int _val, List<Node> _children) {
val = _val;
children = _children;
}
}
*/

class Solution {
public List<Integer> postorder(Node root) {

}

}

```

Python3:

```

"""
# Definition for a Node.
class Node:
def __init__(self, val: Optional[int] = None, children:
Optional[List['Node']] = None):
self.val = val
self.children = children

```

```

"""

class Solution:
    def postorder(self, root: 'Node') -> List[int]:

```

Python:

```

"""

# Definition for a Node.
class Node(object):
    def __init__(self, val: Optional[int] = None, children:
Optional[List['Node']] = None):
        self.val = val
        self.children = children
"""

class Solution(object):
    def postorder(self, root):
        """
        :type root: Node
        :rtype: List[int]
        """

```

JavaScript:

```

/**
 * // Definition for a _Node.
 * function _Node(val,children) {
 *   this.val = val;
 *   this.children = children;
 * };
 */

/**
 * @param {_Node|null} root
 * @return {number[]}
 */
var postorder = function(root) {

};

```

TypeScript:

```

/**
 * Definition for node.
 * class _Node {
 *   val: number
 *   children: _Node[]
 *   constructor(val?: number) {
 *     this.val = (val===undefined ? 0 : val)
 *     this.children = []
 *   }
 * }
 */

function postorder(root: _Node | null): number[] {

};

```

C#:

```

/*
// Definition for a Node.
public class Node {
    public int val;
    public IList<Node> children;

    public Node() {}

    public Node(int _val) {
        val = _val;
    }

    public Node(int _val, IList<Node> _children) {
        val = _val;
        children = _children;
    }
}

*/

public class Solution {
    public IList<int> Postorder(Node root) {

    }
}

```

C:

```
/**
 * Definition for a Node.
 * struct Node {
 *   int val;
 *   int numChildren;
 *   struct Node** children;
 * };
 */

/**
 * Note: The returned array must be malloced, assume caller calls free().
 */
int* postorder(struct Node* root, int* returnSize) {

}
```

Go:

```
/**
 * Definition for a Node.
 * type Node struct {
 *   Val int
 *   Children []*Node
 * }
 */

func postorder(root *Node) []int {

}
```

Kotlin:

```
/**
 * Definition for a Node.
 * class Node(var `val`: Int) {
 *   var children: List<Node?> = listOf()
 * }
 */

class Solution {
    fun postorder(root: Node?): List<Int> {
```

```
}  
}
```

Swift:

```
/**  
 * Definition for a Node.  
 * public class Node {  
 * public var val: Int  
 * public var children: [Node]  
 * public init(_ val: Int) {  
 * self.val = val  
 * self.children = []  
 * }  
 * }  
 */  
  
class Solution {  
func postorder(_ root: Node?) -> [Int] {  
  
}  
}
```

Ruby:

```
# Definition for a Node.  
# class Node  
# attr_accessor :val, :children  
# def initialize(val)  
# @val = val  
# @children = []  
# end  
# end  
  
# @param {Node} root  
# @return {List[int]}  
def postorder(root)  
  
end
```

PHP:

```

/**
 * Definition for a Node.
 * class Node {
 * public $val = null;
 * public $children = null;
 * function __construct($val = 0) {
 * $this->val = $val;
 * $this->children = array();
 * }
 * }
 */

class Solution {
/**
 * @param Node $root
 * @return integer[]
 */
function postorder($root) {

}

}

```

Scala:

```

/**
 * Definition for a Node.
 * class Node(var _value: Int) {
 * var value: Int = _value
 * var children: List[Node] = List()
 * }
 */

object Solution {
def postorder(root: Node): List[Int] = {

}

}

```

Solutions

C++ Solution:

```

/*
 * Problem: N-ary Tree Postorder Traversal
 * Difficulty: Easy
 * Tags: tree, search, stack
 *
 * Approach: DFS or BFS traversal
 * Time Complexity: O(n) where n is number of nodes
 * Space Complexity: O(h) for recursion stack where h is height
 */

/*
// Definition for a Node.
class Node {
public:
    int val;
    vector<Node*> children;

    Node() {}

    Node(int _val) {
        val = _val;
    }

    Node(int _val, vector<Node*> _children) {
        val = _val;
        children = _children;
    }
};
*/

class Solution {
public:
    vector<int> postorder(Node* root) {

    }
};

```

Java Solution:

```

/**
 * Problem: N-ary Tree Postorder Traversal
 * Difficulty: Easy

```

```

* Tags: tree, search, stack
*
* Approach: DFS or BFS traversal
* Time Complexity: O(n) where n is number of nodes
* Space Complexity: O(h) for recursion stack where h is height
*/

/*
// Definition for a Node.
class Node {
public int val;
public List<Node> children;

public Node() {}

public Node(int _val) {
    val = _val;
}

public Node(int _val, List<Node> _children) {
    val = _val;
    children = _children;
}
}
*/

class Solution {
public List<Integer> postorder(Node root) {

}
}

```

Python3 Solution:

```

"""
Problem: N-ary Tree Postorder Traversal
Difficulty: Easy
Tags: tree, search, stack

Approach: DFS or BFS traversal
Time Complexity: O(n) where n is number of nodes

```

```

Space Complexity: O(h) for recursion stack where h is height
"""

"""
# Definition for a Node.
class Node:
    def __init__(self, val: Optional[int] = None, children:
Optional[List['Node']] = None):
        self.val = val
        self.children = children
"""

class Solution:
    def postorder(self, root: 'Node') -> List[int]:
        # TODO: Implement optimized solution
        pass

```

Python Solution:

```

"""
# Definition for a Node.
class Node(object):
    def __init__(self, val: Optional[int] = None, children:
Optional[List['Node']] = None):
        self.val = val
        self.children = children
"""

class Solution(object):
    def postorder(self, root):
        """
        :type root: Node
        :rtype: List[int]
        """

```

JavaScript Solution:

```

/**
 * Problem: N-ary Tree Postorder Traversal
 * Difficulty: Easy
 * Tags: tree, search, stack

```

```

*
* Approach: DFS or BFS traversal
* Time Complexity: O(n) where n is number of nodes
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*/

/**
 * // Definition for a _Node.
 * function _Node(val,children) {
 *   this.val = val;
 *   this.children = children;
 * };
 */

/**
 * @param {_Node|null} root
 * @return {number[]}
 */
var postorder = function(root) {

};

```

TypeScript Solution:

```

/**
 * Problem: N-ary Tree Postorder Traversal
 * Difficulty: Easy
 * Tags: tree, search, stack
 *
 * Approach: DFS or BFS traversal
 * Time Complexity: O(n) where n is number of nodes
 * Space Complexity: O(h) for recursion stack where h is height
 */

/**
 * Definition for node.
 * class _Node {
 *   val: number
 *   children: _Node[]
 *   constructor(val?: number) {
 *     this.val = (val===undefined ? 0 : val)

```

```

    * this.children = []
    * }
    * }
    */

function postorder(root: _Node | null): number[] {

};

```

C# Solution:

```

/*
 * Problem: N-ary Tree Postorder Traversal
 * Difficulty: Easy
 * Tags: tree, search, stack
 *
 * Approach: DFS or BFS traversal
 * Time Complexity: O(n) where n is number of nodes
 * Space Complexity: O(h) for recursion stack where h is height
 */

/*
// Definition for a Node.
public class Node {
    public int val;
    public IList<Node> children;

    public Node() {}

    public Node(int _val) {
        val = _val;
    }

    public Node(int _val, IList<Node> _children) {
        val = _val;
        children = _children;
    }
}
*/

public class Solution {

```

```

public IList<int> Postorder(Node root) {

}

}

```

C Solution:

```

/*
 * Problem: N-ary Tree Postorder Traversal
 * Difficulty: Easy
 * Tags: tree, search, stack
 *
 * Approach: DFS or BFS traversal
 * Time Complexity: O(n) where n is number of nodes
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 */

/**
 * Definition for a Node.
 * struct Node {
 *   int val;
 *   int numChildren;
 *   struct Node** children;
 * };
 */

/**
 * Note: The returned array must be malloced, assume caller calls free().
 */
int* postorder(struct Node* root, int* returnSize) {

}

```

Go Solution:

```

// Problem: N-ary Tree Postorder Traversal
// Difficulty: Easy
// Tags: tree, search, stack
//
// Approach: DFS or BFS traversal
// Time Complexity: O(n) where n is number of nodes

```

```
// Space Complexity: O(h) for recursion stack where h is height

/**
 * Definition for a Node.
 * type Node struct {
 *     Val int
 *     Children []*Node
 * }
 */

func postorder(root *Node) []int {

}
```

Kotlin Solution:

```
/**
 * Definition for a Node.
 * class Node(var `val`: Int) {
 *     var children: List<Node?> = listOf()
 * }
 */

class Solution {
    fun postorder(root: Node?): List<Int> {

    }
}
```

Swift Solution:

```
/**
 * Definition for a Node.
 * public class Node {
 *     public var val: Int
 *     public var children: [Node]
 *     public init(_ val: Int) {
 *         self.val = val
 *         self.children = []
 *     }
 * }
 */
```

```

*/

class Solution {
func postorder(_ root: Node?) -> [Int] {

}

}

```

Ruby Solution:

```

# Definition for a Node.
# class Node
# attr_accessor :val, :children
# def initialize(val)
# @val = val
# @children = []
# end
# end

# @param {Node} root
# @return {List[int]}
def postorder(root)

end

```

PHP Solution:

```

/**
 * Definition for a Node.
 * class Node {
 * public $val = null;
 * public $children = null;
 * function __construct($val = 0) {
 * $this->val = $val;
 * $this->children = array();
 * }
 * }
 */

class Solution {
/**

```

```
* @param Node $root
* @return integer[]
*/
function postorder($root) {

}
}
```

Scala Solution:

```
/**
 * Definition for a Node.
 * class Node(var _value: Int) {
 *   var value: Int = _value
 *   var children: List[Node] = List()
 * }
 */

object Solution {
  def postorder(root: Node): List[Int] = {

  }
}
```