educative

Grokking the Coding Interview: Patterns for Coding Questions

31% completed

Search Course

Pattern: Tree Breadth First Search

Introduction
Binary Tree Level Order Traversal (easy)
Reverse Level Order Traversal (easy)
Zigzag Traversal (medium)
Level Averages in a Binary Tree (easy)
Minimum Depth of a Binary Tree (easy)
Level Order Successor (easy)
Connect Level Order Siblings (medium)
Problem Challenge 1
Solution Review: Problem Challenge 1
Problem Challenge 2
Solution Review: Problem Challenge 2

Pattern: Tree Depth First Search

Introduction
Binary Tree Path Sum (easy)
All Paths for a Sum (medium)
Sum of Path Numbers (medium)
Path With Given Sequence (medium)
Count Paths for a Sum (medium)
Problem Challenge 1
Solution Review: Problem Challenge 1
Problem Challenge 2
Solution Review: Problem Challenge 2

Pattern: Two Heaps

Introduction
Find the Median of a Number Stream (medium)
Sliding Window Median (hard)
Maximize Capital (hard)
Problem Challenge 1
Solution Review: Problem Challenge 1

Pattern: Subsets

Introduction
Subsets (easy)
Subsets With Duplicates (easy)
Permutations (medium)
String Permutations by changing case (medium)
Balanced Parentheses (hard)
Unique Generalized Abbreviations (hard)
Problem Challenge 1
Solution Review: Problem Challenge 1

Zigzag Traversal (medium)

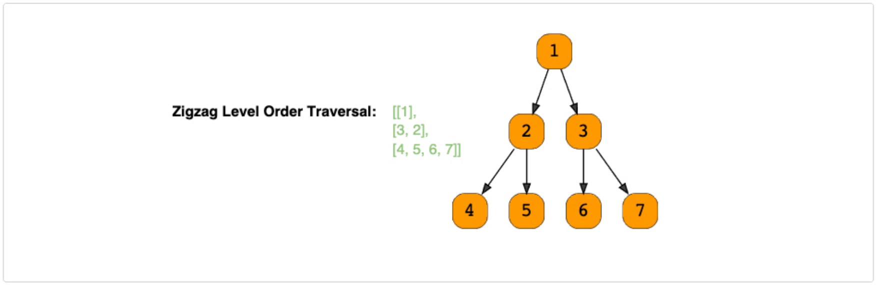
We'll cover the following

- Problem Statement
- Try it yourself
- Solution
- Code
  - Time complexity
  - Space complexity

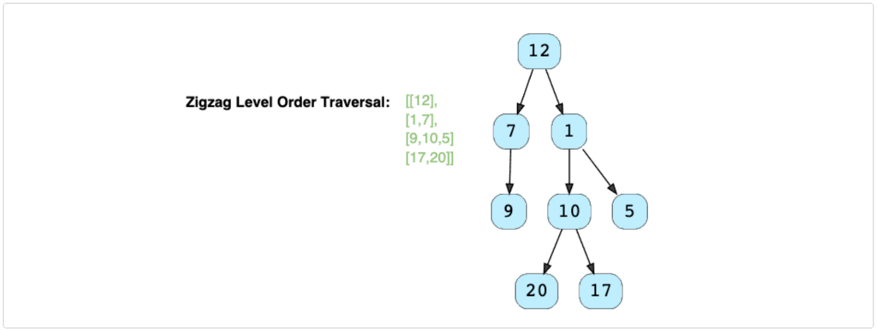
Problem Statement

Given a binary tree, populate an array to represent its zigzag level order traversal. You should populate the values of all **nodes of the first level from left to right**, then **right to left for the next level** and keep alternating in the same manner for the following levels.

Example 1:



Example 2:



Try it yourself

Try solving this question here:

Java | Python3 | JS | C++

```
class TreeNode {

  constructor(value) {
    this.value = value;
    this.left = null;
    this.right = null;
  }
};


const traverse = function(root) {
  result = [];
  // TODO: Write your code here
  return result;
};


var root = new TreeNode(12)
root.left = new TreeNode(7)
root.right = new TreeNode(1)
root.left.left = new TreeNode(9)
root.right.left = new TreeNode(10)
root.right.right = new TreeNode(5)
root.right.left.left = new TreeNode(20)
root.right.left.right = new TreeNode(17)
console.log(`Zigzag traversal: ${traverse(root)}`)

```

Problem Challenge 2
Solution Review: Problem Challenge 2
Problem Challenge 3
Solution Review: Problem Challenge 3

Pattern: Modified Binary Search

Introduction
Order-agnostic Binary Search (easy)
Ceiling of a Number (medium)
Next Letter (medium)
Number Range (medium)
Search in a Sorted Infinite Array (medium)
Minimum Difference Element (medium)
Bitonic Array Maximum (easy)
Problem Challenge 1
Solution Review: Problem Challenge 1
Problem Challenge 2
Solution Review: Problem Challenge 2
Problem Challenge 3
Solution Review: Problem Challenge 3

Pattern: Bitwise XOR

Introduction
Single Number (easy)
Two Single Numbers (medium)
Complement of Base 10 Number (medium)
Problem Challenge 1
Solution Review: Problem Challenge 1

Pattern: Top 'K' Elements

Introduction
Top 'K' Numbers (easy)
Kth Smallest Number (easy)
'K' Closest Points to the Origin (easy)
Connect Ropes (easy)
Top 'K' Frequent Numbers (medium)
Frequency Sort (medium)
Kth Largest Number in a Stream (medium)
'K' Closest Numbers (medium)
Maximum Distinct Elements (medium)
Sum of Elements (medium)
Rearrange String (hard)
Problem Challenge 1
Solution Review: Problem Challenge 1
Problem Challenge 2
Solution Review: Problem Challenge 2
Problem Challenge 3
Solution Review: Problem Challenge 3

Pattern: K-way merge

MW
Explore
Tracks
My Courses
Edpresso
Refer a Friend
Create

RUN SAVE RESET

Solution

This problem follows the Binary Tree Level Order Traversal pattern. We can follow the same **BFS** approach. The only additional step we have to keep in mind is to alternate the level order traversal, which means that for every other level, we will traverse similar to Reverse Level Order Traversal.

Code

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

Java Python3 C++ JS

```
const Deque = require('./collections/deque'); //http://www.collectionsjs.com


class TreeNode {
  constructor(val) {
    this.val = val;
    this.left = null;
    this.right = null;
  }
}

function traverse(root) {
  result = [];
  if (root === null) {
    return result;
  }

  const queue = new Deque();
  queue.push(root);
  leftToRight = true;
  while (queue.length > 0) {
    levelSize = queue.length;
    currentLevel = new Deque();
    for (i = 0; i < levelSize; i++) {
      currentNode = queue.shift();

      // add the node to the current level based on the traverse direction
      if (leftToRight) {
```

RUN SAVE RESET

Close

Output 4.439s

```
Zigzag traversal: 12,1,7,9,10,5,17,20
```

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 $O(N)$ as we need to return a list containing the level order traversal. We will also need $O(N)$ space 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.

Interviewing soon? We've partnered with Hired so that companies apply to you, instead of the other way around. See how

✓ MARK AS COMPLETED

← Back
Reverse Level Order Traversal (easy)

Next →
Level Averages in a Binary Tree (easy)

Report an Issue