

# 124. Binary Tree Maximum Path Sum

## Difficulty : Hard

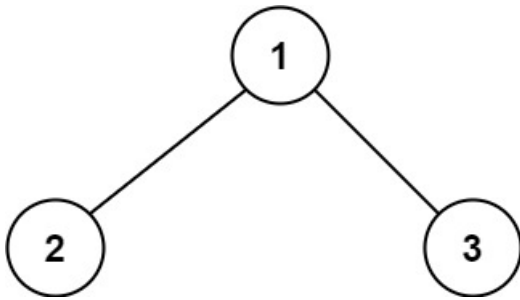
<https://leetcode.com/problems/binary-tree-maximum-path-sum>

A **path** in a binary tree is a sequence of nodes where each pair of adjacent nodes in the sequence has an edge connecting them. A node can only appear in the sequence **at most once**. Note that the path does not need to pass through the root.

The **path sum** of a path is the sum of the node's values in the path.

Given the `root` of a binary tree, return *the maximum path sum of any non-empty path*.

**Example 1:**

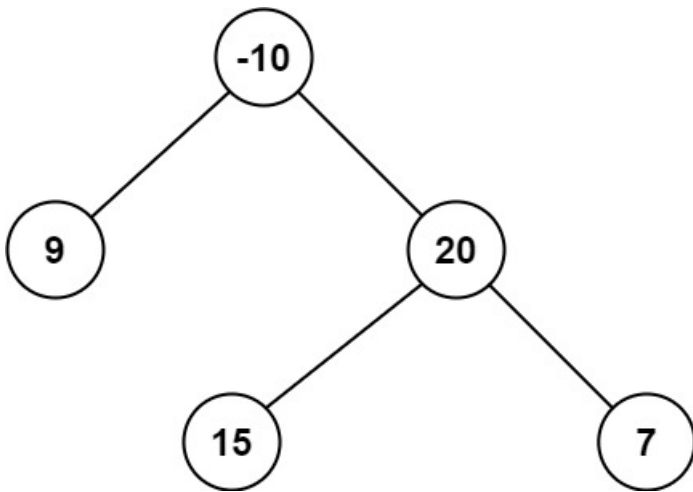


**Input:** `root = [1,2,3]`

**Output:** 6

**Explanation:** The optimal path is 2 -> 1 -> 3 with a path sum of 2 + 1 + 3 = 6.

**Example 2:**



**Input:** `root = [-10,9,20,null,null,15,7]`

**Output:** 42

**Explanation:** The optimal path is 15 -> 20 -> 7 with a path sum of 15 + 20 + 7 = 42.

**Constraints:**

- The number of nodes in the tree is in the range  $[1, 3 \times 10^4]$ .
- $-1000 \leq \text{Node.val} \leq 1000$