Q1. Merge Sorted Array

You are given two integer arrays nums1 and nums2, sorted in non-decreasing order, and two integers m and n, representing the number of elements in nums1 and nums2 respectively. Merge nums1 and nums2 into a single array sorted in non-decreasing order. The final sorted array should not be returned by the function, but instead be stored inside the array nums1. To accommodate this, nums1 has a length of m + n, where the first m elements denote the elements that should be merged, and the last n elements are set to 0 and should be ignored. nums2 has a length of n.

Example 1:

Input: nums1 = [1,2,3,0,0,0], m = 3, nums2 = [2,5,6], n = 3; Output: [1,2,2,3,5,6]

Q2. Valid Parentheses

Given a string s containing just the characters '(', ')', '{', '}', '[' and ']', determine if the input string is valid.

An input string is valid if:

Open brackets must be closed by the same type of brackets.

Open brackets must be closed in the correct order.

Every close bracket has a corresponding open bracket of the same type.

Example 1:

Input: s = "()"; Output: true

Q3. Lowest Common Ancestor of a Binary Tree

Given a binary tree, find the lowest common ancestor (LCA) of two given nodes in the tree.

According to the definition of LCA on Wikipedia: "The lowest common ancestor is defined between two nodes p and q as the lowest node in T that has both p and q as descendants (where we allow a node to be a descendant of itself)."

Example 1:

Input: root = [3,5,1,6,2,0,8,null,null,7,4], p = 5, q = 1; Output: 3

Q4. 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