

1. Find the height of a binary tree represented by the parent array.

Given an array representing the parent-child relationship in a binary tree, find the tree's height without building it. The parent-child relationship is defined by $(A[i], i)$ for every index i in array A . The root node's value will be i if -1 is present at index i in the array.

The depth of a "node" is the total number of edges from the node to the tree's root node. The root is the only node whose depth is 0.

The height of a "node" is the total number of edges on the longest path from the node to a leaf. The height of a "tree" would be the height of its root node, or equivalently, the depth of its deepest node. A leaf node will have a height of 0.

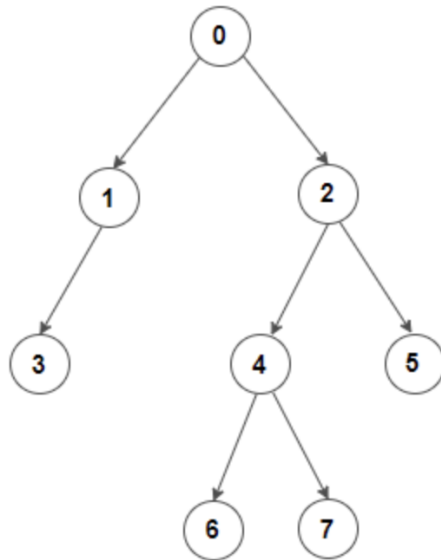
For example,

Parent: [-1, 0, 0, 1, 2, 2, 4, 4]

Index: [0, 1, 2, 3, 4, 5, 6, 7]

- -1 is present at index 0, which implies that the binary tree root is node 0.
- 0 is present at index 1 and 2, which implies that the left and right children of node 0 are 1 and 2.
- 1 is present at index 3, which implies that the left or the right child of node 1 is 3.
- 2 is present at index 4 and 5, which implies that the left and right children of node 2 are 4 and 5.
- 4 is present at index 6 and 7, which implies that the left and right children of node 4 are 6 and 7.

The corresponding binary tree is:



- Find the square root of a number using a binary search.
Given a positive number, return the square root of it. If the number is not a perfect square, return the floor of its square root.

For example,

Input: $x = 12$

Output: 3

Input: $x = 16$

Output: 4

3. Find the square of a number without using the multiplication and division operator
Given an integer, find its square without using multiplication and division operator. Also, the use of the power function from any programming language library is not allowed.
4. Segregate positive and negative integers using merge sort
Given an array of positive and negative integers, segregate them without changing the relative order of elements. The output should contain all positive numbers follow negative numbers while maintaining the same relative ordering.

For example,

Input: [9, -3, 5, -2, -8, -6, 1, 3]

Output: [-3, -2, -8, -6, 9, 5, 1, 3]