

Solution 1Solution 2

```
1 // Copyright © 2020 AlgoExpert, LLC. All rights reserved.
2
3 #include <vector>
4 using namespace std;
5
6 class BinaryTree {
7 public:
8     int value;
9     BinaryTree *left = NULL;
10    BinaryTree *right = NULL;
11
12    BinaryTree(int value);
13 };
14
15 vector<BinaryTree *> flattenTree(BinaryTree *node);
16 void connectNodes(BinaryTree *one, BinaryTree *two);
17 BinaryTree *getLeftMost(BinaryTree *node);
18
19 // O(n) time | O(d) space - where n is the number of nodes in the Binary Tree
20 // and d is the depth (height) of the Binary Tree
21 BinaryTree *flattenBinaryTree(BinaryTree *root) {
22     flattenTree(root);
23     return getLeftMost(root);
24 }
25
26 vector<BinaryTree *> flattenTree(BinaryTree *node) {
27     BinaryTree *leftMost;
28     BinaryTree *rightMost;
29
30     if (node->left == NULL) {
31         leftMost = node;
32     } else {
33         vector<BinaryTree *> leftAndRightMostNodes = flattenTree(node->left);
34         connectNodes(leftAndRightMostNodes[1], node);
35         leftMost = leftAndRightMostNodes[0];
36     }
37
38     if (node->right == NULL) {
39         rightMost = node;
40     } else {
41         vector<BinaryTree *> leftAndRightMostNodes = flattenTree(node->right);
42         connectNodes(node, leftAndRightMostNodes[0]);
43         rightMost = leftAndRightMostNodes[1];
44     }
45
46     return {leftMost, rightMost};
47 }
48
49 void connectNodes(BinaryTree *left, BinaryTree *right) {
50     left->right = right;
51     right->left = left;
52 }
53
54 BinaryTree *getLeftMost(BinaryTree *node) {
55     while (node->left != NULL) {
56         node = node->left;
57     }
58     return node;
59 }
60
```

