108. Convert Sorted Array to Binary Search Tree

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• Depth-first Search + Tree

Description

Given an array where elements are sorted in ascending order, convert it to a height balanced BST.

For this problem, a height-balanced binary tree is defined as a binary tree in which the depth of the two subtrees of every node never differ by more than 1.

Example:

```
Given the sorted array: [-10,-3,0,5,9],

One possible answer is: [0,-3,9,-10,null,5], which represents the following height balanced BST:

0
/\
-3 9
/ /
-10 5
```

1. Thought line

• Height-balanced BST

2. Depth-first Search + Tree

```
/**
 * Definition for a binary tree node.
 * struct TreeNode {
 * int val;
 * TreeNode *left;
 * TreeNode *right;
 * TreeNode (int x) : val(x), left(NULL), right(NULL) {}
 * };
 */
void arrayRootFind(vector<int>6 nums, int st, int ed, TreeNode* node, string str = "toRightChild"){
 if (st>ed) return;
 int mid = (st+ed)/2;
 if (str == "toRightChild"){
    node->right = new TreeNode(nums[(st+ed)/2]);
    arrayRootFind(nums, st, mid-1, node->right, "toLeftChild");
    arrayRootFind(nums, mid+1, ed, node->right, "toRightChild");
 }
 else if (str == "toLeftChild"){
```

```
node->left = new TreeNode(nums[(st+ed)/2]);
    arrayRootFind(nums, st, mid-1, node->left, "toLeftChild");
    arrayRootFind(nums, mid+1, ed, node->left, "toRightChild");
}

class Solution {
public:
    TreeNode* sortedArrayToBST(vector<int>& nums) {
        if (nums.empty()) return nullptr;
        TreeNode* dummyHead = new TreeNode(INT_MIN);
        arrayRootFind(nums, 0, nums.size()-1, dummyHead);
        return dummyHead->right;
    }
};
```