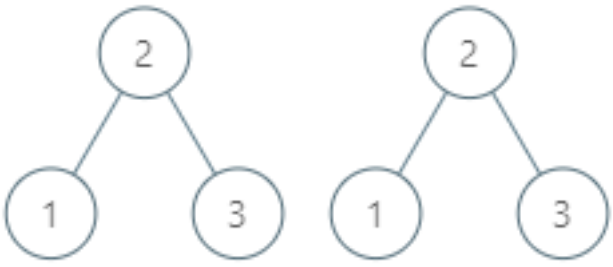
```
/**
 * Definition for a binary tree node.
 * public class TreeNode {
 *     int val;
 *     TreeNode left;
 *     TreeNode right;
 *     TreeNode(int x) { val = x; }
 * }
 */
class Solution {
    public TreeNode inorderSuccessor(TreeNode root, TreeNode p) {
        if (root == null)
            return null;
        if (root.val <= p.val) {
            return inorderSuccessor(root.right, p);
        }
        TreeNode node = inorderSuccessor(root.left, p);
        return node == null ? root : node;
    }
}
```

Given a binary search tree and a node in it, find the in-order successor of that node in the BST.

The successor of a node `p` is the node with the smallest key greater than `p.val`.

**Example 1:**

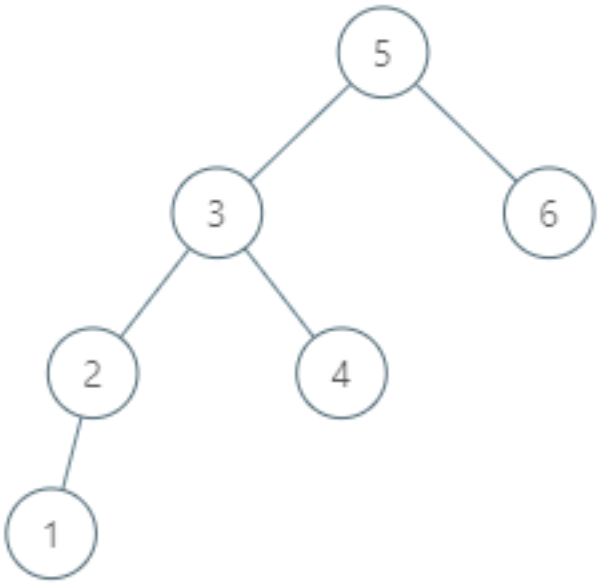


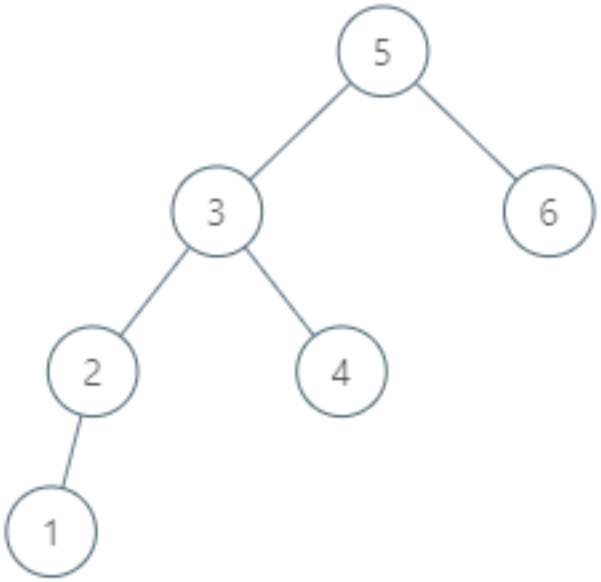

**Input:** root = [2,1,3], p = 1

**Output:** 2

**Explanation:** 1's in-order successor node is 2. Note that both p and the return value is of TreeNode type.

**Example 2:**




**Input:** root = [5,3,6,2,4,null,null,1], p = 6
**Output:** `null`
**Explanation:** `There is no in-order successor of the current node, so the answer is null.`

**Note:**

1. If the given node has no in-order successor in the tree, return `null`.
2. It's guaranteed that the values of the tree are unique.