

Problem 4: Construct a BST from a preorder traversal

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class TreeNode:
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```
    def __init__(self, value):
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```
        self.val = value
```

```
        self.left = None
```

```
        self.right = None
```

```
def construct_bst(preorder):
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```
    if not preorder:
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```
        return None
```

```
    root = TreeNode(preorder[0])
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```
    stack = [root]
```

```
    for value in preorder[1:]:
```

```
        node = TreeNode(value)
```

```
        if value < stack[-1].val:
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```
            stack[-1].left = node
```

```
        else:
```

```
            while stack and value > stack[-1].val:
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```
                last = stack.pop()
```

```
            last.right = node
```

```
        stack.append(node)
```

```
    return root
```

```

def inorder_traversal(root):
    if root is None:
        return []

    result = []
    stack = []

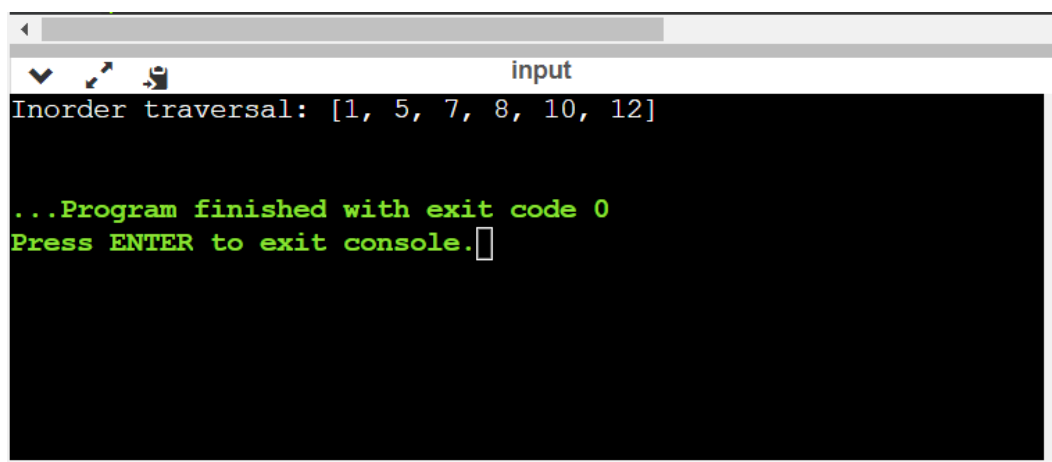
    while stack or root:
        if root:
            stack.append(root)
            root = root.left
        else:
            node = stack.pop()
            result.append(node.val)
            root = node.right

    return result

preorder = [8, 5, 1, 7, 10, 12]
bst = construct_bst(preorder)

inorder = inorder_traversal(bst)
print("Inorder traversal:", inorder)

```



The screenshot shows a terminal window titled "input". The output of the program is displayed in a monospaced font. The first line shows the inorder traversal result: "Inorder traversal: [1, 5, 7, 8, 10, 12]". The second line shows the program's exit status: "...Program finished with exit code 0". The third line shows a prompt to exit the console: "Press ENTER to exit console." followed by a cursor icon.

```

input
Inorder traversal: [1, 5, 7, 8, 10, 12]

...Program finished with exit code 0
Press ENTER to exit console.

```