

# Find the Node With the Max Difference in the Total Number of Descendants in its left Subtree and Right Subtree

```
1 # Time : O(n)
2 # Space : O(h)
3
4 # Method 1
5 global_max = -1
6 res = None
7
8 def node_diff(root):
9     if root is None:
10         return 0
11     left_total = node_diff(root.left)
12     right_total = node_diff(root.right)
13     global global_max
14     global res
15     if abs(left_total - right_total) > global_max:
16         global_max = abs(left_total - right_total)
17         res = root
18     return left_total + right_total + 1
19
20 def get_max_diff(root):
21     global res
22     node_diff(root)
23     return res
24
25 # Method 2
26 class ResultWrapper:
27     def __init__(self):
28         self.global_max = -1
29         self.solution = None
30
31 def max_diff_node(root, res):
32     if not root:
33         return 0
34     left_total = max_diff_node(root.left, res)
35     right_total = max_diff_node(root.right, res)
36     if abs(left_total - right_total) > res.global_max:
37         res.global_max = abs(left_total - right_total)
38         res.solution = root
```

```
39     return left_total + right_total + 1
40
41 def max_diff(root):
42     res = ResultWrapper()
43     max_diff_node(root, res)
44     return res.solution
```