

Problem 4: Find a pair with a given sum in BST

class Node:

```
def __init__(self, val):
```

```
    self.val = val
```

```
    self.left = None
```

```
    self.right = None
```

```
def insert(root, val):
```

```
    if root is None:
```

```
        return Node(val)
```

```
    if val < root.val:
```

```
        root.left = insert(root.left, val)
```

```
    else:
```

```
        root.right = insert(root.right, val)
```

```
    return root
```

```
def in_order_traversal(root, target):
```

```
    stack_left = []
```

```
    stack_right = []
```

```
    curr_left = root
```

```
    curr_right = root
```

```
    done_left = False
```

```
    done_right = False
```

```
    val_left = None
```

```
    val_right = None
```

```
    while True:
```

```
        while not done_left:
```

```
            if curr_left is not None:
```

```
                stack_left.append(curr_left)
```

```
    curr_left = curr_left.left
else:
    if len(stack_left) > 0:
        curr_left = stack_left.pop()
        val_left = curr_left.val
        curr_left = curr_left.right
    else:
        done_left = True
```

```
while not done_right:
    if curr_right is not None:
        stack_right.append(curr_right)
        curr_right = curr_right.right
    else:
        if len(stack_right) > 0:
            curr_right = stack_right.pop()
            val_right = curr_right.val
            curr_right = curr_right.left
        else:
            done_right = True
```

```
if val_left != val_right and val_left + val_right == target:
    return val_left, val_right
```

```
if val_left >= val_right:
    return None
```

```
def find_pair(root, target):
    return in_order_traversal(root, target)
```

```
root = None
```

```
elements = [5, 8, 2, 6, 10]
```

```
for element in elements:
```

```
    root = insert(root, element)
```

```
target_sum = 9
```

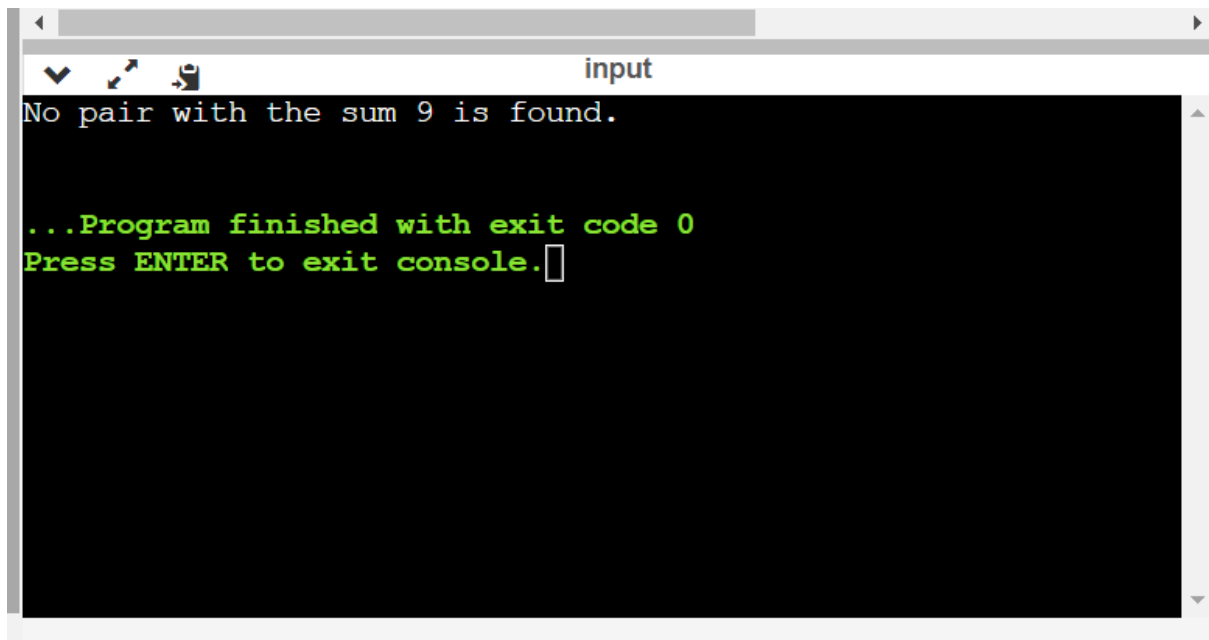
```
pair = find_pair(root, target_sum)
```

```
if pair is not None:
```

```
    print(f"A pair with the sum {target_sum} is found: {pair[0]} and {pair[1]}")
```

```
else:
```

```
    print(f"No pair with the sum {target_sum} is found.")
```



```
input
No pair with the sum 9 is found.

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