

Problem 10: Vertical Order Traversal Of A Binary Tree. Write a program for Vertical Order Traversal order of a Binary Tree.

```
from collections import defaultdict
```

```
class TreeNode:
```

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

```
        self.key = key
```

```
        self.left = None
```

```
        self.right = None
```

```
def vertical_order_traversal(root):
```

```
    if not root:
```

```
        return []
```

```
    vertical_levels = defaultdict(list)
```

```
    queue = [(root, 0)]
```

```
    while queue:
```

```
        node, level = queue.pop(0)
```

```
        vertical_levels[level].append(node.key)
```

```
        if node.left:
```

```
            queue.append((node.left, level + 1))
```

```
        if node.right:
```

```
            queue.append((node.right, level + 1))
```

```
sorted_levels = sorted(vertical_levels.keys())
```

```
for level in sorted_levels:
```

```
    print(*vertical_levels[level])
```

```
root = TreeNode(1)
```

```
root.left = TreeNode(2)
```

```
root.right = TreeNode(3)
```

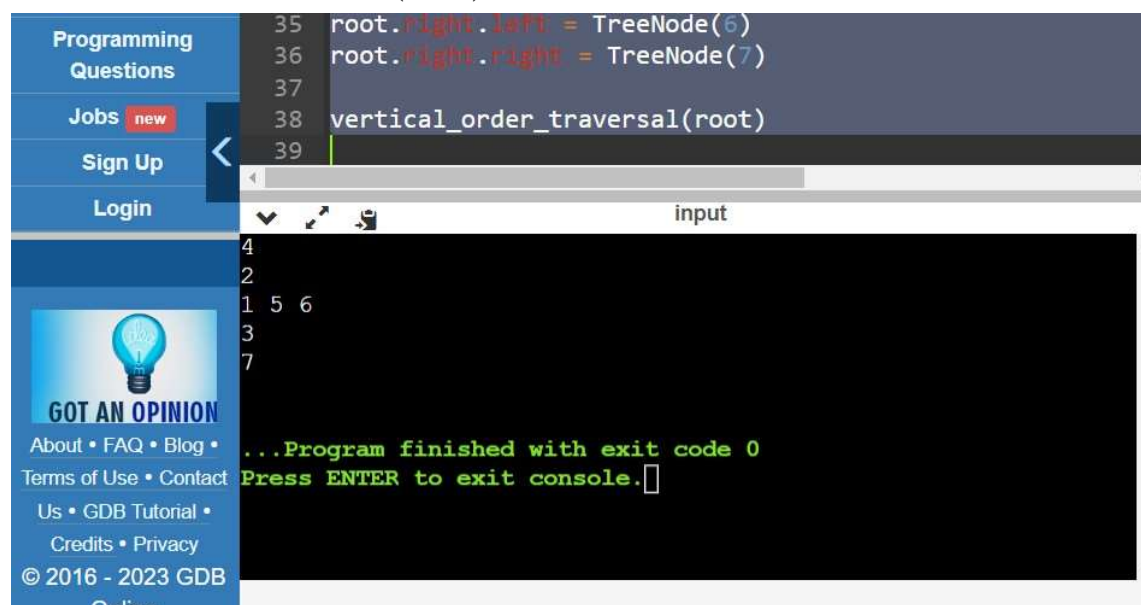
```
root.left.left = TreeNode(4)
```

```
root.left.right = TreeNode(5)
```

```
root.right.left = TreeNode(6)
```

```
root.right.right = TreeNode(7)
```

```
vertical_order_traversal(root)
```



The screenshot shows a web application interface. On the left is a blue sidebar with navigation links: 'Programming Questions', 'Jobs' (with a red 'new' badge), 'Sign Up', and 'Login'. Below these is a section titled 'GOT AN OPINION' with a lightbulb icon and links for 'About', 'FAQ', 'Blog', 'Terms of Use', 'Contact Us', 'GDB Tutorial', 'Credits', and 'Privacy'. At the bottom of the sidebar is the copyright notice '© 2016 - 2023 GDB Online'. The main area contains a code editor with a dark background. The code in the editor is:

```
35 root.right.left = TreeNode(6)
36 root.right.right = TreeNode(7)
37
38 vertical_order_traversal(root)
39
```

 Below the code editor is a console window titled 'input' with a black background. It displays the output of the program:

```
4
2
1 5 6
3
7
...Program finished with exit code 0
Press ENTER to exit console.
```