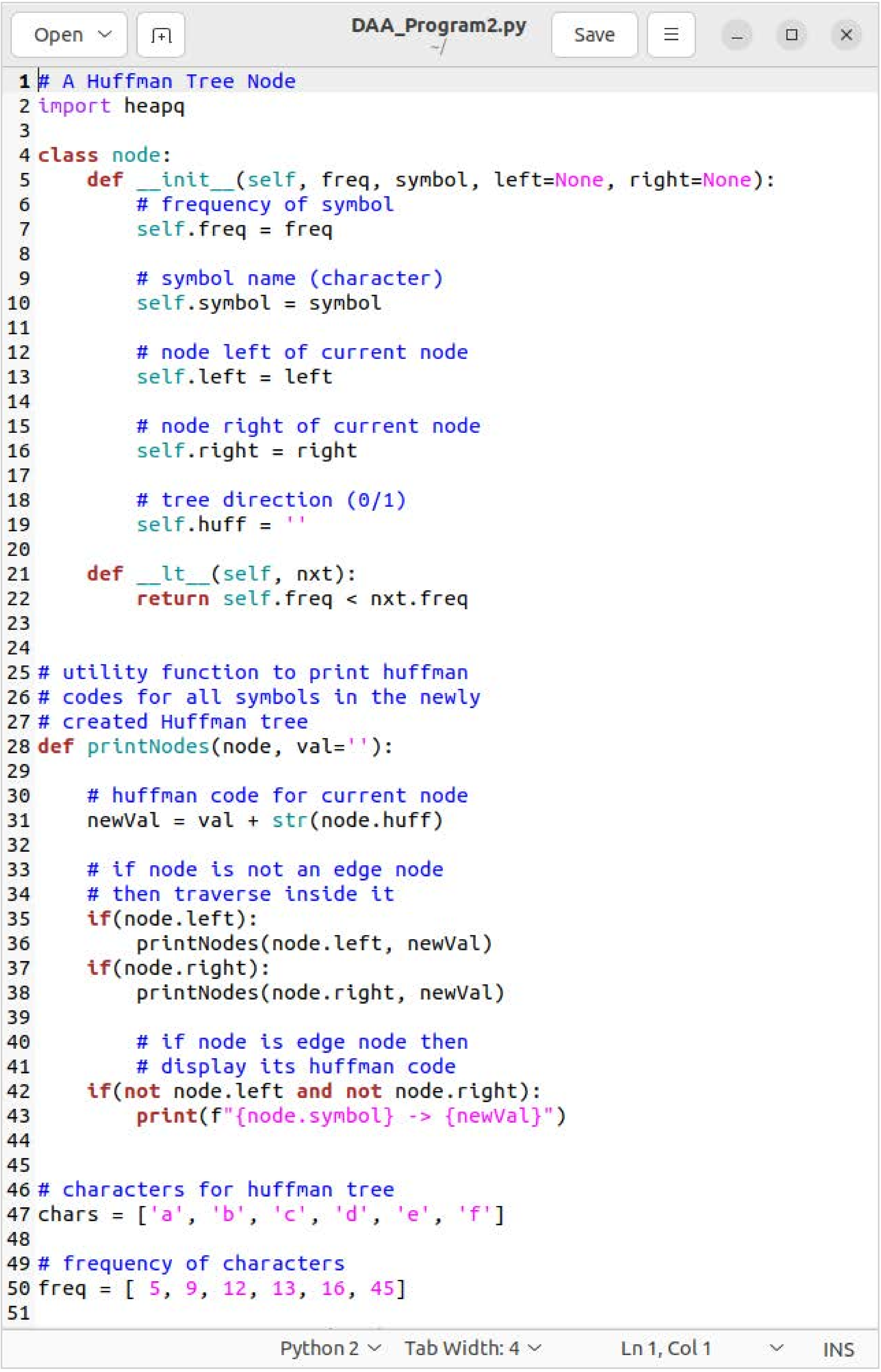
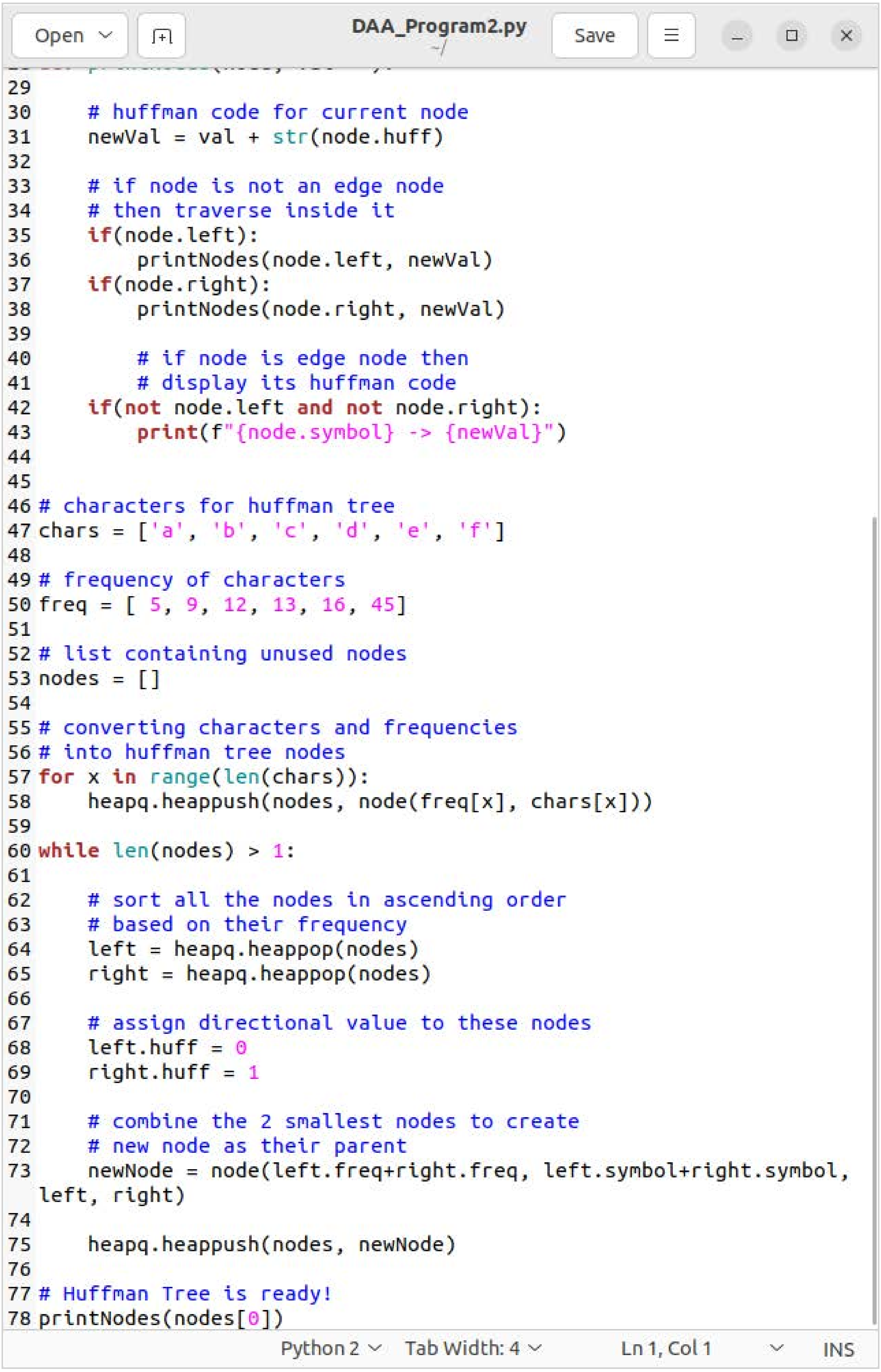


```python
# A Huffman Tree Node
import heapq

class node:
    def __init__(self, freq, symbol, left=None, right=None):
        # frequency of symbol
        self.freq = freq

        # symbol name (character)
        self.symbol = symbol

        # node left of current node
        self.left = left

        # node right of current node
        self.right = right

        # tree direction (0/1)
        self.huff = ''

    def __lt__(self, nxt):
        return self.freq < nxt.freq


# utility function to print huffman
# codes for all symbols in the newly
# created Huffman tree
def printNodes(node, val=''):

    # huffman code for current node
    newVal = val + str(node.huff)

    # if node is not an edge node
    # then traverse inside it
    if(node.left):
        printNodes(node.left, newVal)
    if(node.right):
        printNodes(node.right, newVal)

        # if node is edge node then
        # display its huffman code
    if(not node.left and not node.right):
        print(f"{node.symbol} -> {newVal}")


# characters for huffman tree
chars = ['a', 'b', 'c', 'd', 'e', 'f']

# frequency of characters
freq = [ 5, 9, 12, 13, 16, 45]

```

Python 2   Tab Width: 4   Ln 1, Col 1   INS



```python

    # huffman code for current node
    newVal = val + str(node.huff)

    # if node is not an edge node
    # then traverse inside it
    if(node.left):
        printNodes(node.left, newVal)
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        printNodes(node.right, newVal)

        # if node is edge node then
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    if(not node.left and not node.right):
        print(f"{node.symbol} -> {newVal}")


# characters for huffman tree
chars = ['a', 'b', 'c', 'd', 'e', 'f']

# frequency of characters
freq = [ 5, 9, 12, 13, 16, 45]

# list containing unused nodes
nodes = []

# converting characters and frequencies
# into huffman tree nodes
for x in range(len(chars)):
    heapq.heappush(nodes, node(freq[x], chars[x]))

while len(nodes) > 1:

    # sort all the nodes in ascending order
    # based on their frequency
    left = heapq.heappop(nodes)
    right = heapq.heappop(nodes)

    # assign directional value to these nodes
    left.huff = 0
    right.huff = 1

    # combine the 2 smallest nodes to create
    # new node as their parent
    newNode = node(left.freq+right.freq, left.symbol+right.symbol, left, right)

    heapq.heappush(nodes, newNode)

# Huffman Tree is ready!
printNodes(nodes[0])
```

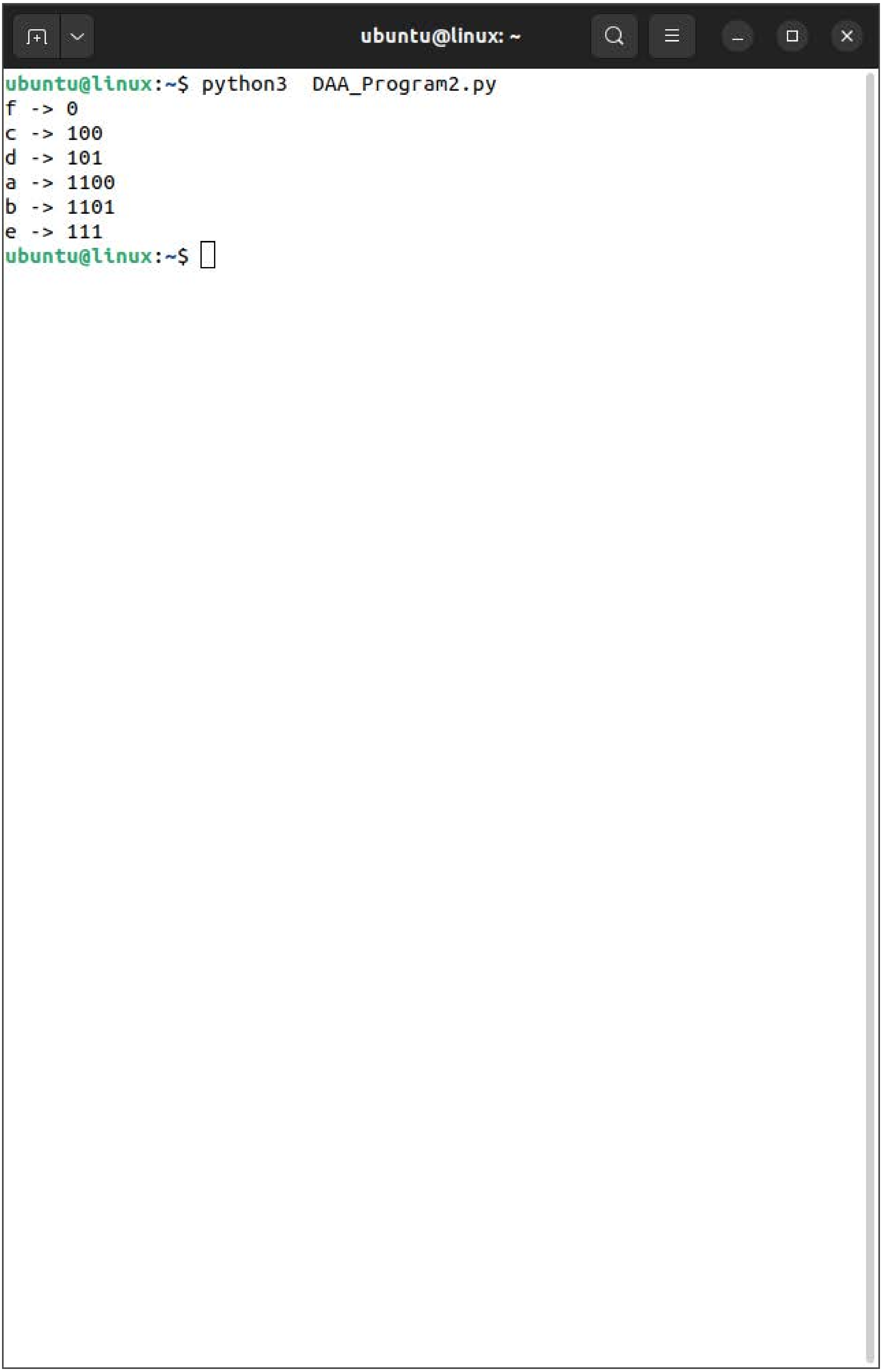

```
ubuntu@linux:~$ python3  DAA_Program2.py
f -> 0
c -> 100
d -> 101
a -> 1100
b -> 1101
e -> 111
ubuntu@linux:~$ 
```