

```
# Q.1 ADVANCED- LINKED LISTS:
```

```
class Node:
```

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

```
        self.data = data
```

```
        self.next = None
```

```
class LinkedList:
```

```
    def traversal(self):
```

```
        first = self.head
```

```
        while first:
```

```
            print(first.data)
```

```
            first = first.next
```

```
    def insert_new_header(self, new_data):
```

```
        new_node = Node(new_data)
```

```
        new_node.next = self.head
```

```
        self.head = new_node
```

```
    def search(self, x):
```

```
        temp = self.head
```

```
        while temp is not None:
```

```
            if temp.data == x:
```

```
                return True
```

```
            temp = temp.next
```

```
        else:
```

```
            return False
```

```
    def delete_node(self, data):
```

```
        temp = self.head
```

```
        while temp is not None:
```

```
            if temp.data == data:
```

```
                break
```

```
            prev = temp
```

```
            temp = temp.next
```

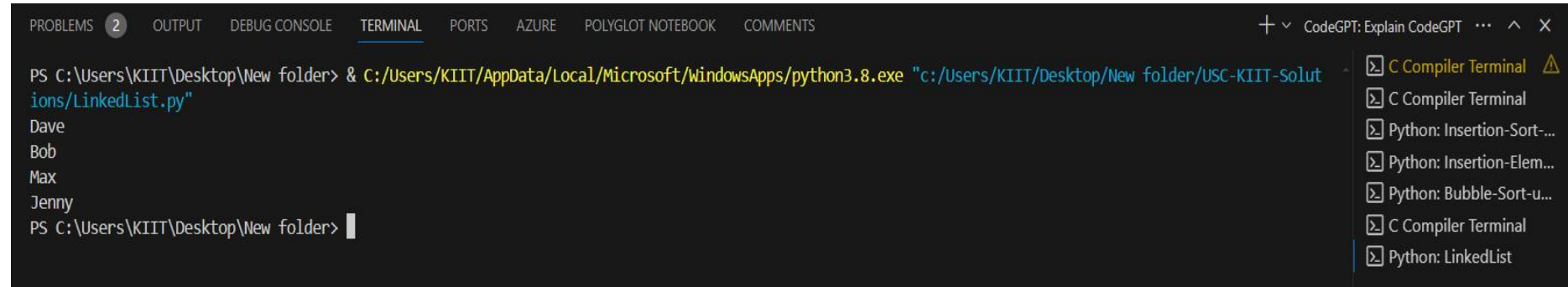
```
        prev.next = temp.next
```

```
    def delete_tail(self):
```

```
        temp = self.head
```

```
        while temp.next.next is not None:
```

```
        temp = temp.next
    temp.next = None
family = LinkedList()
family.head = Node("Bob")
wife = Node("Amy")
first_kid = Node("Max")
second_kid = Node("Jenny")
family.head.next = wife
wife.next = first_kid
first_kid.next = second_kid
family.insert_new_header("Dave")
#family.delete_tail()
#print(family.search("Bob"))
family.delete_node("Amy")
family.traversal()
```



PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL PORTS AZURE POLYGLOT NOTEBOOK COMMENTS

PS C:\Users\KIIT\Desktop\New folder> & C:/Users/KIIT/AppData/Local/Microsoft/WindowsApps/python3.8.exe "c:/Users/KIIT/Desktop/New folder/USC-KIIT-Solutions/LinkedList.py"

Dave
Bob
Max
Jenny
PS C:\Users\KIIT\Desktop\New folder> |

CodeGPT: Explain CodeGPT ... ^ X

- C Compiler Terminal
- C Compiler Terminal
- Python: Insertion-Sort-...
- Python: Insertion-Elem...
- Python: Bubble-Sort-u...
- C Compiler Terminal
- Python: LinkedList

```

# MINDBREAKER- PALINDROMIC MATRIX PATHS:

# -----UNIQUE PATHS
def paths(m, n):
    row = [1] * n
    print(row)
    for i in range(m-1):
        newRow = [1] * n
        for j in range(n-2, -1, -1):
            newRow[j] = newRow[j+1] + row[j]
        row = newRow
    return row[0]

print(paths(3, 3))

# THE PATHS
# aaaa (0, 0) -> (0, 1) -> (0, 2) -> (1, 2) -> (2, 2)
# aaba (0, 0) -> (0, 1) -> (1, 1) -> (2, 1) -> (2, 2)
# aabb (0, 0) -> (0, 1) -> (1, 1) -> (2, 1) -> (2, 2)
# abba (0, 0) -> (1, 0) -> (2, 0) -> (2, 1) -> (2, 2)
# [(0, 1), (0, 2), (1, 1), (1, 2)]
# 0, 0, 3, 2

```










PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL PORTS AZURE POLYGLOT NOTEBOOK COMMENTS

+ CodeGPT: Explain CodeGPT ... ^ X

```

PS C:\Users\KIIT\Desktop\New folder> & C:/Users/KIIT/AppData/Local/Microsoft/WindowsApps/python3.8.exe "c:/Users/KIIT/Desktop/New folder/USC-KIIT-Solutions/Palindromic_Mind_Breaks.py"
[1, 1, 1]
6
PS C:\Users\KIIT\Desktop\New folder>

```

-  C Compiler Terminal 
-  C Compiler Terminal
-  Python: Insertion-Sort-...
-  Python: Insertion-Elem...
-  Python: Bubble-Sort-u...
-  C Compiler Terminal
-  Python: LinkedList
-  Python

```

import numpy as np

def split(matrix):
    row, col = matrix.shape
    row2, col2 = row // 2, col // 2
    return matrix[:row2, :col2], matrix[row2, col2:], matrix[row2:, :col2], matrix[row2:, col2:]

def strassen_recur(x, y):
    # Base case: 1x1 matrix
    if len(x) == 1:
        return x * y

    # Splitting the matrices into quadrants
    a, b, c, d = split(x)
    e, f, g, h = split(y)

    # Computing the 7 products using the Strassen algorithm
    p1 = strassen_recur(a, f - h)
    p2 = strassen_recur(a + b, h)
    p3 = strassen_recur(c + d, e)
    p4 = strassen_recur(d, g - e)
    p5 = strassen_recur(a + d, e + h)
    p6 = strassen_recur(b - d, g + h)
    p7 = strassen_recur(a - c, e + f)

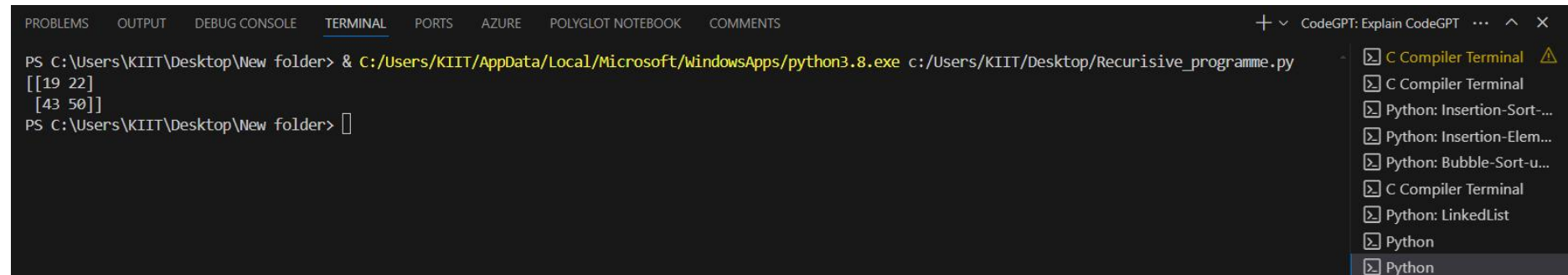
    # Computing the values of the 4 quadrants of the final matrix
    c1 = p5 + p4 - p2 + p6
    c2 = p1 + p2
    c3 = p3 + p4
    c4 = p1 + p5 - p3 - p7

    # Combining the 4 quadrants into a single matrix
    c = np.vstack((np.hstack((c1, c2)), np.hstack((c3, c4))))
    return c

# Example usage:
x = np.array([[1, 2], [3, 4]])
y = np.array([[5, 6], [7, 8]])
result = strassen_recur(x, y)

```

```
print(result)
```



The image shows a Visual Studio Code interface with a terminal window open. The terminal displays the command to run a Python script and its output. To the right of the terminal, a list of open terminals is visible, with 'Python' selected at the bottom.

Terminal Output:

```
PS C:\Users\KIIT\Desktop\New folder> & C:/Users/KIIT/AppData/Local/Microsoft/WindowsApps/python3.8.exe c:/Users/KIIT/Desktop/Recursive_programme.py
[[19 22]
 [43 50]]
PS C:\Users\KIIT\Desktop\New folder> 
```

Open Terminals:

- C Compiler Terminal
- C Compiler Terminal
- Python: Insertion-Sort...
- Python: Insertion-Elem...
- Python: Bubble-Sort-u...
- C Compiler Terminal
- Python: LinkedList
- Python
- Python