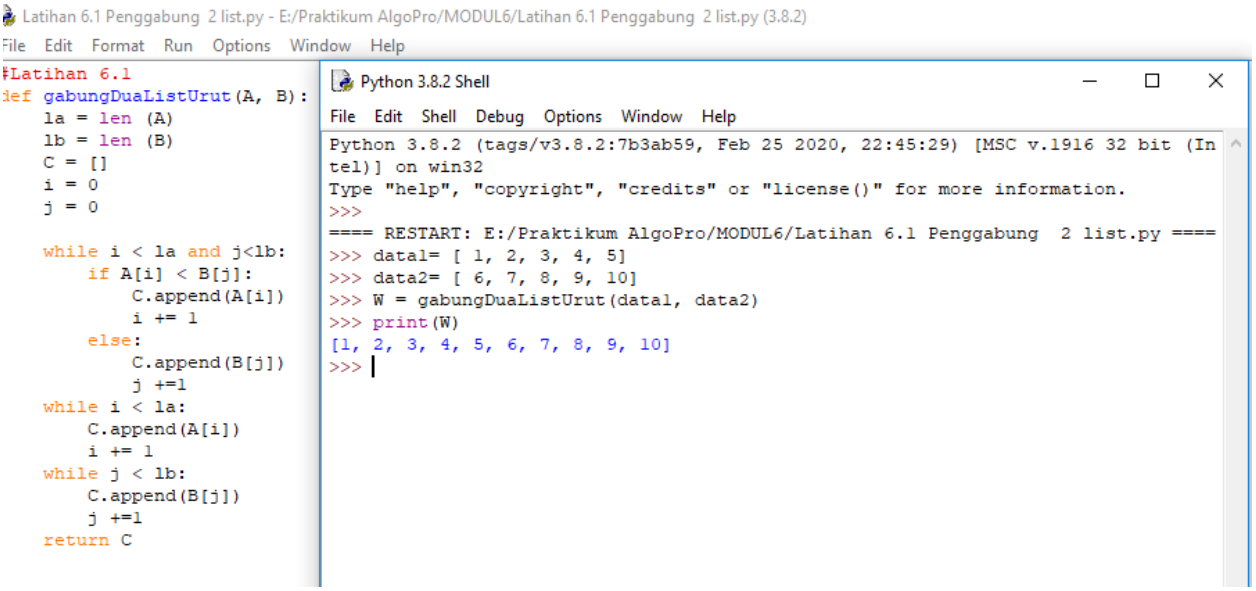
Nama : Suryo Pramuda

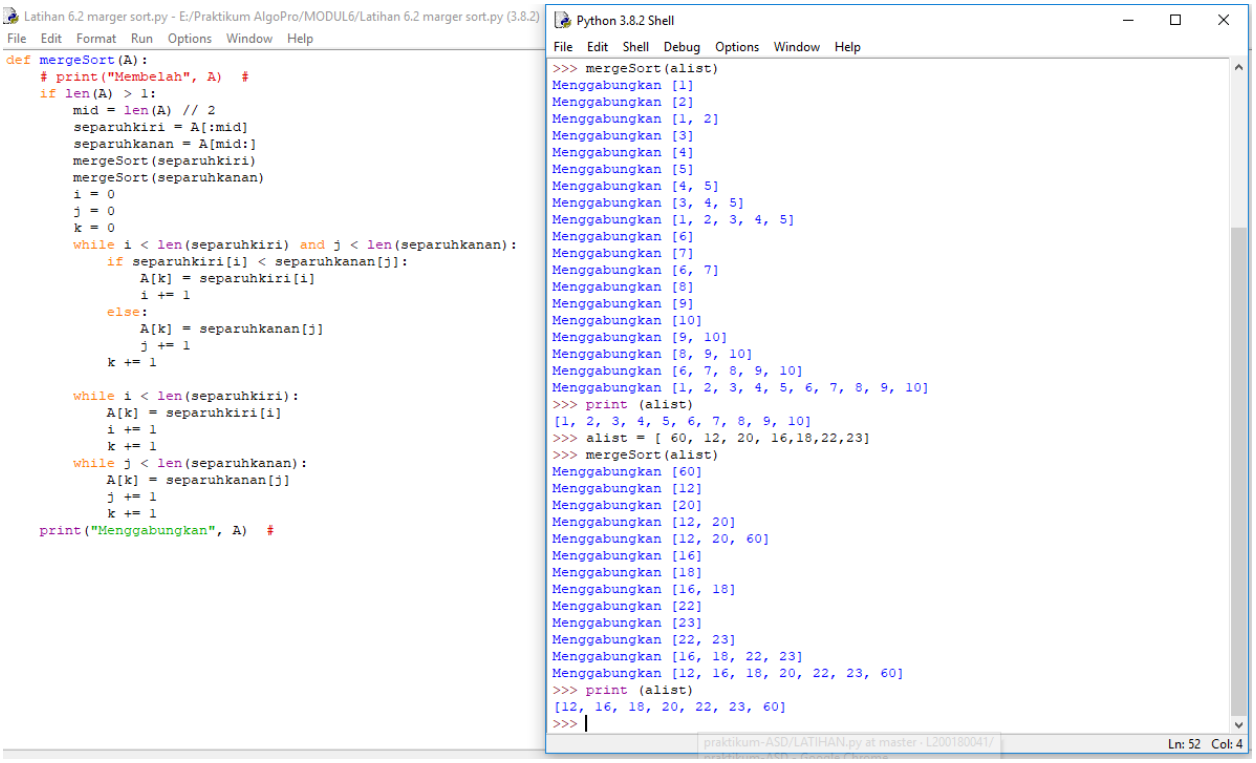
NIM : L200180053

Latihan MODUL 6

6.1 Menggabungkan dua list yang sudah urut.



6.2 Merge sort



6.3 Quick sort

Latihan 6.3 Quick Sort.py - E:\Praktikum AlgoPro\MODUL6\Latihan 6.3 Quick Sort.py (3.8.2)

File Edit Format Run Options Window Help

```
alist = [ 54, 26, 93, 17, 77, 31, 44, 55, 20 ]

def quickSort(A):
    quickSortBantu(A, 0, len(A) - 1)

def quickSortBantu(A, awal, akhir):
    if awal < akhir:
        titikBelah = partisi(A, awal, akhir)
        quickSortBantu(A, awal, titikBelah - 1)
        quickSortBantu(A, titikBelah + 1, akhir)
def partisi(A, awal, akhir):
    nilaiPivot = A[awal]
    penandaKiri = awal + 1
    penandaKanan = akhir
    selesai = False
    while not selesai:
        while penandaKiri <= penandaKanan and A[penandaKiri] <= nilaiPivot:
            penandaKiri = penandaKiri + 1
        while A[penandaKanan] >= nilaiPivot and penandaKanan >= penandaKiri:
            penandaKanan -= 1
        if penandaKanan < penandaKiri:
            selesai = True
        else:
            temp = A[penandaKiri]
            A[penandaKiri] = A[penandaKanan]
            A[penandaKanan] = temp
    temp = A[awal]
    A[awal] = A[penandaKiri]
    A[penandaKanan] = temp
    return penandaKanan
quickSort(alist)
print(alist)
```

Python 3.8.2 Shell

File Edit Shell Debug Options Window Help

```
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 22:45:29) [MSC v.1916 32 bit (In
tel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
======== RESTART: E:\Praktikum AlgoPro\MODUL6\Latihan 6.3 Quick Sort.py ========
[77, 54, 77, 54, 77, 54, 93, 77, 93]
```

Soal – soal Mahasiswa

1

no1.py - E:\Praktikum AlgoPro\MODUL6\no1.py (3.8.2)

File Edit Format Run Options Window Help

```
def quickSort(A):
    quickSortBantu(A, 0, len(A) - 1)

def quickSortBantu(A, awal, akhir):
    if awal < akhir:
        titikBelah = partisi(A, awal, akhir)
        quickSortBantu(A, awal, titikBelah - 1)
        quickSortBantu(A, titikBelah + 1, akhir)
def partisi(A, awal, akhir):
    nilaiPivot = A[awal]
    penandaKiri = awal + 1
    penandaKanan = akhir
    selesai = False
    while not selesai:
        while penandaKiri <= penandaKanan and A[penandaKiri] <= nilaiPivot:
            penandaKiri = penandaKiri + 1
        while A[penandaKanan] >= nilaiPivot and penandaKanan >= penandaKiri:
            penandaKanan -= 1
        if penandaKanan < penandaKiri:
            selesai = True
        else:
            temp = A[penandaKiri]
            A[penandaKiri] = A[penandaKanan]
            A[penandaKanan] = temp
    temp = A[awal]
    A[awal] = A[penandaKiri]
    A[penandaKanan] = temp
    return penandaKanan


mh1 = Mahasiswa("Saipul", 18, "Purodadi", 10000)
mh2 = Mahasiswa("Risma", 13, "Klaten", 13000)
mh3 = Mahasiswa("Willi Imut", 29, "Sragen", 5000)
mh4 = Mahasiswa("Chaterinaa", 47, "pekalongan", 12000)
mh5 = Mahasiswa("suwarjo", 144, "Bandung", 2000)

A = [mh1.nim, mh2.nim, mh3.nim, mh4.nim, mh5.nim]
mergeSort(A)
print(A)
```

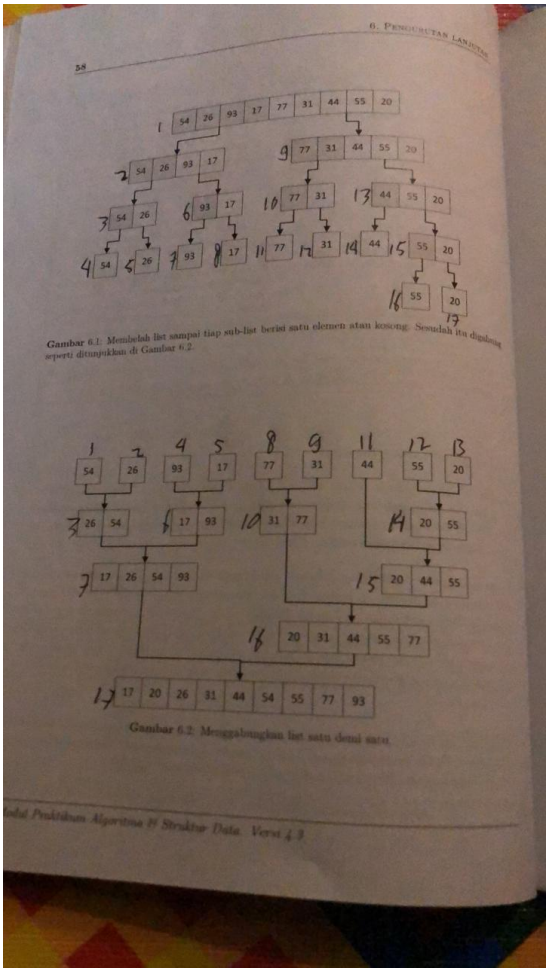
Python 3.8.2 Shell

File Edit Shell Debug Options Window Help

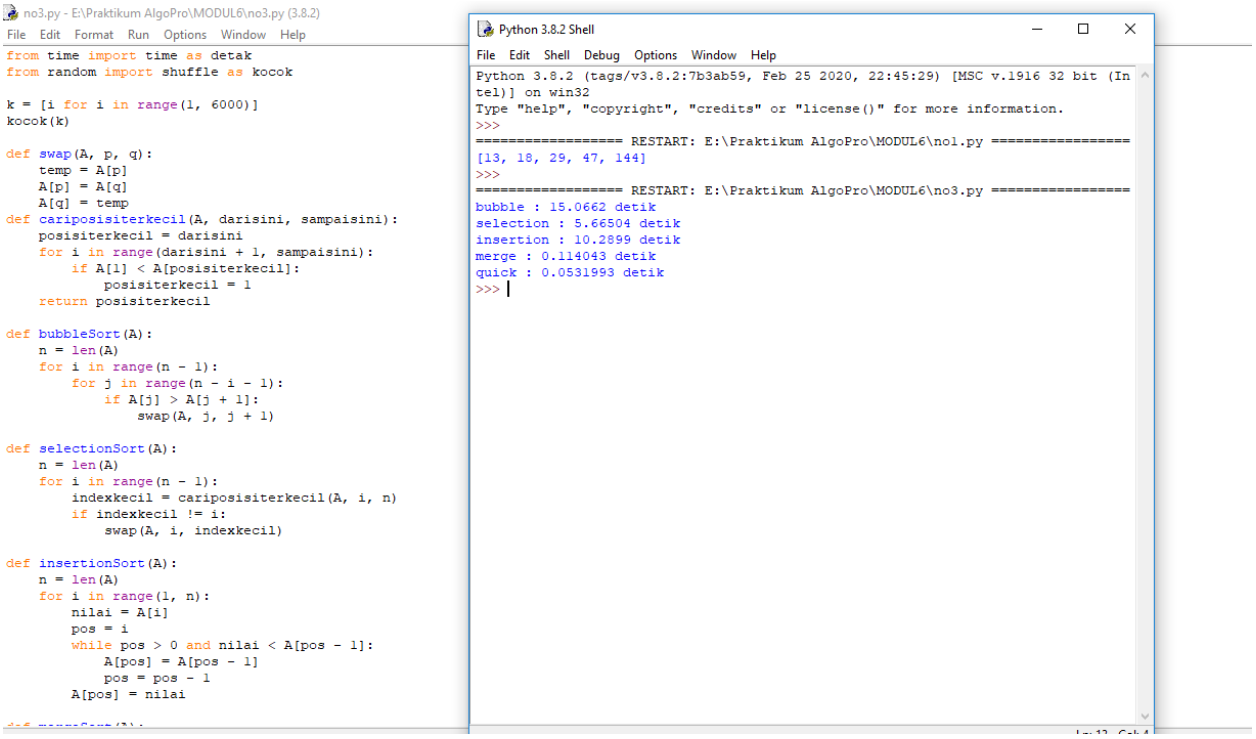
```
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 22:45:29) [MSC v.1916 32 bit (In
tel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no1.py ==================
[13, 18, 29, 47, 144]
>>>
```

praktikum-ASD/LATIHAN.py at master · L200180041/

2.



3.



```
no3.py - E:\Praktikum AlgoPro\MODUL6\no3.py (3.8.2)
File  Edit  Format  Run  Options  Window  Help
from time import time as detak
from random import shuffle as kocok

k = [i for i in range(1, 6000)]
kocok(k)

def swap(A, p, q):
    temp = A[p]
    A[p] = A[q]
    A[q] = temp
def cariposisiterkecil(A, darisini, sampaisini):
    posisiterkecil = darisini
    for i in range(darisini + 1, sampaisini):
        if A[i] < A[posisiterkecil]:
            posisiterkecil = i
    return posisiterkecil

def bubbleSort(A):
    n = len(A)
    for i in range(n - 1):
        for j in range(n - i - 1):
            if A[j] > A[j + 1]:
                swap(A, j, j + 1)

def selectionSort(A):
    n = len(A)
    for i in range(n - 1):
        indexkecil = cariposisiterkecil(A, i, n)
        if indexkecil != i:
            swap(A, i, indexkecil)

def insertionSort(A):
    n = len(A)
    for i in range(1, n):
        nilai = A[i]
        pos = i
        while pos > 0 and nilai < A[pos - 1]:
            A[pos] = A[pos - 1]
            pos = pos - 1
        A[pos] = nilai
```

```
Python 3.8.2 Shell
File  Edit  Shell  Debug  Options  Window  Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 22:45:29) [MSC v.1916 32 bit (In
tel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: E:\Praktikum AlgoPro\MODUL6\no1.py ==========
[13, 18, 29, 47, 144]
>>>
========== RESTART: E:\Praktikum AlgoPro\MODUL6\no3.py ==========
bubble : 15.0662 detik
selection : 5.66504 detik
insertion : 10.2899 detik
merge : 0.114043 detik
quick : 0.0531993 detik
>>>
```

4. Merge sort

L=[80,7,24,16,43,91,35,2,19,72]

80	7	24	16	43	91	35	2	19	72

Proses 1

7	80	26	24	43	91	2	35	19	72

Proses 2

7	16	24	80	2	35	43	91	19	72

Proses 3

2	7	16	24	35	43	80	91	19	72

Proses 4

2	7	16	19	24	35	43	72	80	91

Quick Sort

L=[80,7,24,16,43,91,35,2,19,72]

80	7	24	16	43	91	35	2	19	72

pivot

80	7	24	16	43	91	35	2	19	72
Low									High

pivot

72	7	24	16	43	91	35	2	19	80
Low									High

pivot

72	7	24	16	43	91	35	2	19	80
					Low				High

pivot

72	7	24	16	43	80	35	2	19	91
					Low				High

pivot

72	7	24	16	43	19	35	2	80	91
					Low			High	

5.

no5.py - E:\Praktikum AlgoPro\MODUL6\no5.py (3.8.2)

File Edit Format Run Options Window Help

```
def _merge_sort(indices, the_list):
    start = indices[0]
    end = indices[1]
    half_way = (end - start) // 2 + start
    if start < half_way:
        _merge_sort((start, half_way), the_list)
    if half_way + 1 <= end and end - start != 1:
        _merge_sort((half_way + 1, end), the_list)
    sort_sub_list(the_list, indices[0], indices[1])
    return the_list

def sort_sub_list(the_list, start, end):
    orig_start = start
    initial_start_second_list = (end - start) // 2 + start + 1
    list2_first_index = initial_start_second_list
    new_list = []
    while start < initial_start_second_list and list2_first_index <= end:
        first1 = the_list[start]
        first2 = the_list[list2_first_index]
        if first1 > first2:
            new_list.append(first2)
            list2_first_index += 1
        else:
            new_list.append(first1)
            start += 1
    while start < initial_start_second_list:
        new_list.append(the_list[start])
        start += 1
    while list2_first_index <= end:
        new_list.append(the_list[list2_first_index])
        list2_first_index += 1
    for i in new_list:
        the_list[orig_start] = i
        orig_start += 1
    return the_list

def merge_sort(the_list):
    return _merge_sort((0, len(the_list) - 1), the_list)
```

Python 3.8.2 Shell

File Edit Shell Debug Options Window Help

```
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 22:45:29) [MSC v.1916 32 bit (In
tel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no1.py ==================
[13, 18, 29, 47, 144]
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no3.py ==================
bubble : 15.0662 detik
selection : 5.66504 detik
insertion : 10.2899 detik
merge : 0.114043 detik
quick : 0.0531993 detik
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no5.py ==================
>>> print(marge_sort([11,15,20,3,25]))
Traceback (most recent call last):
  File "<pyshell#0>", line 1, in <module>
    print(marge_sort([11,15,20,3,25]))
NameError: name 'marge_sort' is not defined
>>> print(merge_sort([11,15,20,3,25]))
[3, 11, 15, 20, 25]
>>>
```

6.

no6.py - E:\Praktikum AlgoPro\MODUL6\no6.py (3.8.2)

File Edit Format Run Options Window Help

```
def quickSort(A):
    quicksorthelp(A, 0, len(A))

def quicksorthelp(A, low, high):
    result = 0
    if low < high:
        pivot_location, result = Partition(A, low, high)
        result += quicksorthelp(A, low, pivot_location)
        result += quicksorthelp(A, pivot_location + 1, high)
    return result

def Partition(A, low, high):
    result = 0
    pivot, pidx = median_of_three(A, low, high)
    A[low], A[pidx] = A[pidx], A[low]
    i = low + 1
    for j in range(low + 1, high, 1):
        result += 1
        if A[j] < pivot:
            A[i], A[j] = A[j], A[i]
            i += 1
    A[low], A[i - 1] = A[i - 1], A[low]
    return i - 1, result

def median_of_three(A, low, high):
    mid = (low + high - 1) // 2
    a = A[low]
    b = A[mid]
    c = A[high - 1]
    if a <= b <= c:
        return b, mid
    if c <= b <= a:
        return b, mid
    if a <= c <= b:
        return c, high - 1
    if b <= c <= a:
        return c, high - 1
    return a, low

daftar = [22, 45, 110, 134, 18, 113, 36]
```

Python 3.8.2 Shell

File Edit Shell Debug Options Window Help

```
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 22:45:29) [MSC v.1916 32 bit (In
tel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no1.py ==================
[13, 18, 29, 47, 144]
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no3.py ==================
bubble : 15.0662 detik
selection : 5.66504 detik
insertion : 10.2899 detik
merge : 0.114043 detik
quick : 0.0531993 detik
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no5.py ==================
>>> print(marge_sort([11,15,20,3,25]))
Traceback (most recent call last):
  File "<pyshell#0>", line 1, in <module>
    print(marge_sort([11,15,20,3,25]))
NameError: name 'marge_sort' is not defined
>>> print(merge_sort([11,15,20,3,25]))
[3, 11, 15, 20, 25]
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no6.py ==================
>>> quickSort(daftar)
>>> print(daftar)
[4, 10, 12, 14, 26, 123, 124]
>>> quickSort(daftar)
>>> print(daftar)
[4, 10, 12, 14, 26, 123, 124]
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no6.py ==================
>>> quickSort(daftar)
>>> print(daftar)
[18, 22, 36, 45, 110, 113, 134]
>>>
```

Ln: 35 Col: 4

7.

no7.py - E:\Praktikum AlgoPro\MODUL6\no7.py (3.8.2)

File Edit Format Run Options Window Help

```
from time import time as detak
from random import shuffle as kocok
import no5
import no6
import no3
k = [i for i in range(1, 6000)]
kocok(k)

merA = k[:]
merB = k[:]
quiA = k[:]
quiB = k[:]

# merge Sort baru
aw = detak(); no5.merge_sort(merB); ak = detak(); print('merge sort baru : %g detik' % (ak-aw))
# Quick Sort baru
aw = detak(); no6.quickSort(quiB); ak = detak(); print('quick sort baru : %g detik' % (ak-aw))

# Merge Sort dan Quick Sort awal
aw = detak(); no3.mergeSort(merA); ak = detak(); print('merge sort awal : %g detik' % (ak-aw))
aw = detak(); no3.quickSort(quiA); ak = detak(); print('quick sort awal : %g detik' % (ak-aw))
```

Python 3.8.2 Shell

File Edit Shell Debug Options Window Help

```
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 22:45:29) [MSC v.1916 32 bit (In
tel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no7.py ==================
bubble : 14.245 detik
selection : 5.75656 detik
insertion : 6.81815 detik
merge : 0.0822372 detik
quick : 0.0796192 detik
merge sort baru : 0.115604 detik
quick sort baru : 0.0841854 detik
merge sort awal : 0.0782762 detik
quick sort awal : 0.0468807 detik
>>>
```

8.

no8.py - E:\Praktikum AlgoPro\MODUL6\no8.py (3.8.2)

File Edit Format Run Options Window Help

```
class Node:
    def __init__(self, data):
        self.data = data
        self.next = None

class LinkedList:
    def __init__(self):
        self.head = None

    def appendList(self, data):
        node = Node(data)
        if self.head == None:
            self.head = node
        else:
            curr = self.head
            while curr.next != None:
                curr = curr.next
        curr.next = node

    def appendSorted(self, data):
        node = Node(data)
        curr = self.head
        prev = None

        while curr is not None and curr.data < data:
            prev = curr
            curr = curr.next

        if prev == None:
            self.head = node
        else:
            prev.next = node

        node.next = curr

    def printList(self):
        curr = self.head
        while curr != None:
            print("%d" % curr.data),
            curr = curr.next
```

Python 3.8.2 Shell

File Edit Shell Debug Options Window Help

```
================== RESTART: E:\Praktikum AlgoPro\MODUL6\no8.py ==================
List 1 :
3
7
12
13
14
List 2 :
1
10
26
Merged List :
1
3
7
10
12
13
14
26
>>>
```

Ln: 21 Col: 2