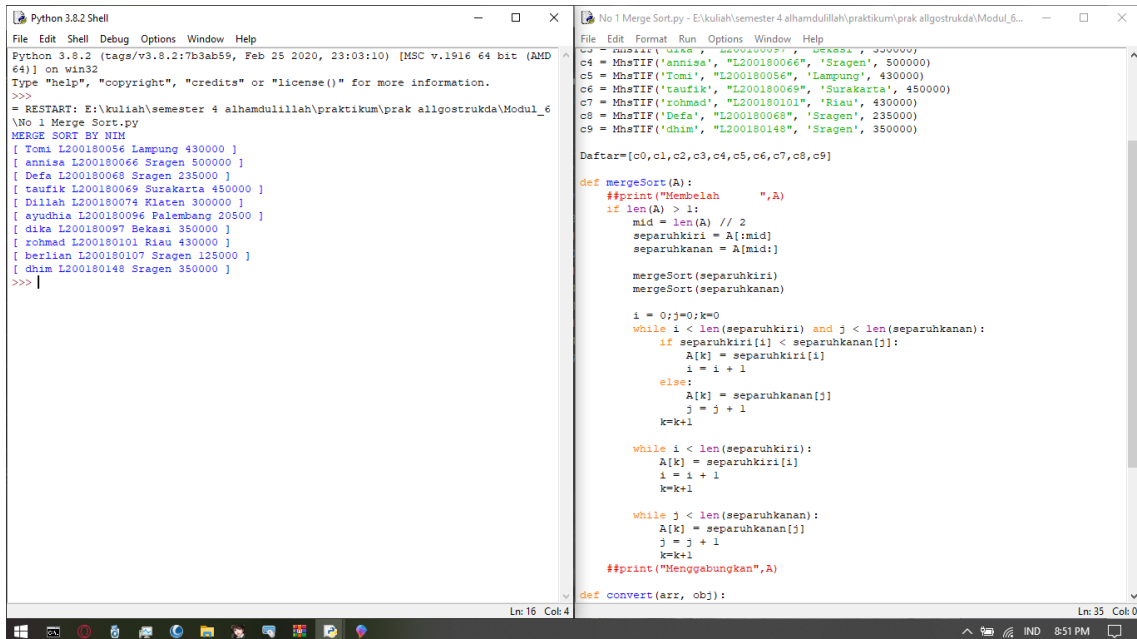


Nama : Abdillah Ahmad  
NIM : L200180074  
Kelas : C

## TUGAS PRAKTIKUM ALGORITMA STRUKTUR DATA MODUL 6

### No 1 Merge Sort



```
Python 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD
64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: E:\kuliah\semester 4 alhamdulillah\praktikum\prak allgostrukda\Modul_6
\No 1 Merge Sort.py
MERGE SORT BY NIM
[ Tomi L200180056 Lampung 430000 ]
[ annisa L200180066 Sragen 500000 ]
[ Defa L200180068 Sragen 235000 ]
[ taufik L200180069 Surakarta 450000 ]
[ Dilliah L200180074 Klaten 300000 ]
[ ayudhia L200180096 Palembang 20500 ]
[ dika L200180097 Bekasi 350000 ]
[ rohmah L200180101 Riau 430000 ]
[ berlian L200180107 Sragen 125000 ]
[ dhim L200180148 Sragen 350000 ]
>>>

No 1 Merge Sort.py - E:\kuliah\semester 4 alhamdulillah\praktikum\prak allgostrukda\Modul_6...
File Edit Format Run Options Window Help
c0 = MhsTIF('Dika', "L200180097", 'Bekasi', 350000)
c4 = MhsTIF('annisa', "L200180066", 'Sragen', 500000)
c5 = MhsTIF('Tomi', "L200180056", 'Lampung', 430000)
c6 = MhsTIF('taufik', "L200180069", 'Surakarta', 450000)
c7 = MhsTIF('rohmah', "L200180101", 'Riau', 430000)
c8 = MhsTIF('Defa', "L200180068", 'Sragen', 235000)
c9 = MhsTIF('dhim', "L200180148", 'Sragen', 350000)

Daftar=[c0,c1,c2,c3,c4,c5,c6,c7,c8,c9]

def mergeSort(A):
    ##print("Membelah", A)
    if len(A) > 1:
        mid = len(A) // 2
        separuhkiri = A[:mid]
        separuhkanan = A[mid:]

        mergeSort(separuhkiri)
        mergeSort(separuhkanan)

        i = 0; j = 0; k = 0
        while i < len(separuhkiri) and j < len(separuhkanan):
            if separuhkiri[i] < separuhkanan[j]:
                A[k] = separuhkiri[i]
                i = i + 1
            else:
                A[k] = separuhkanan[j]
                j = j + 1
            k = k + 1

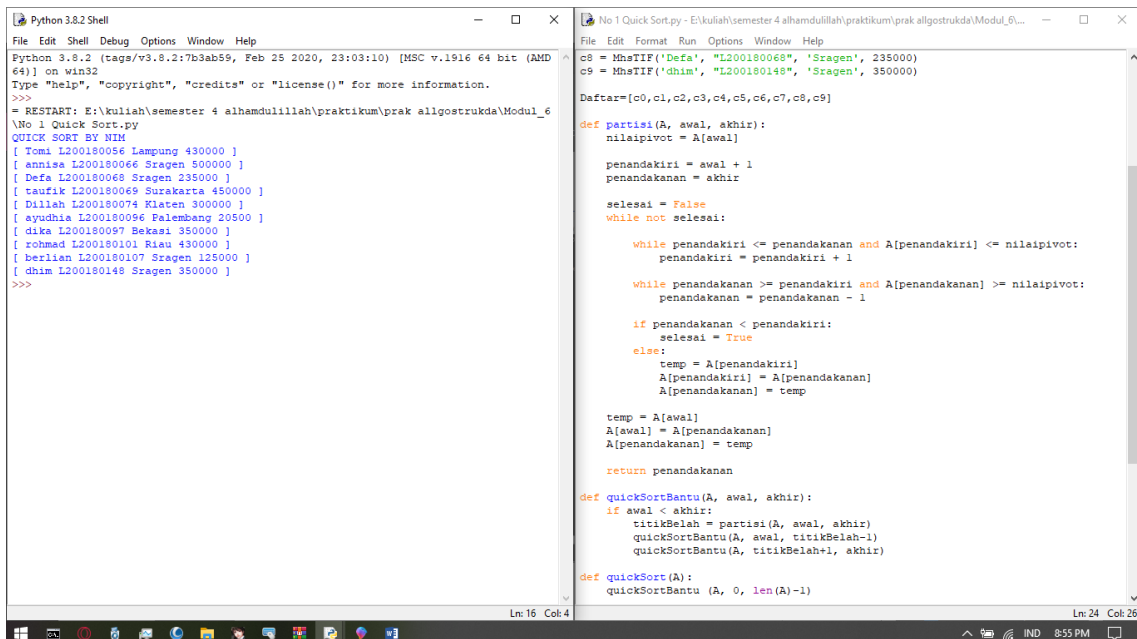
        while i < len(separuhkiri):
            A[k] = separuhkiri[i]
            i = i + 1
            k = k + 1

        while j < len(separuhkanan):
            A[k] = separuhkanan[j]
            j = j + 1
            k = k + 1

        ##print("Menggabungkan", A)

def convert(arr, obj):
```

### Quick Sort



```
Python 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD
64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: E:\kuliah\semester 4 alhamdulillah\praktikum\prak allgostrukda\Modul_6
\No 1 Quick Sort.py
QUICK SORT BY NIM
[ Tomi L200180056 Lampung 430000 ]
[ annisa L200180066 Sragen 500000 ]
[ Defa L200180068 Sragen 235000 ]
[ taufik L200180069 Surakarta 450000 ]
[ Dilliah L200180074 Klaten 300000 ]
[ ayudhia L200180096 Palembang 20500 ]
[ dika L200180097 Bekasi 350000 ]
[ rohmah L200180101 Riau 430000 ]
[ berlian L200180107 Sragen 125000 ]
[ dhim L200180148 Sragen 350000 ]
>>>

No 1 Quick Sort.py - E:\kuliah\semester 4 alhamdulillah\praktikum\prak allgostrukda\Modul_6...
File Edit Format Run Options Window Help
c8 = MhsTIF('Defa', "L200180068", 'Sragen', 235000)
c9 = MhsTIF('dhim', "L200180148", 'Sragen', 350000)

Daftar=[c0,c1,c2,c3,c4,c5,c6,c7,c8,c9]

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 penandakanan >= penandakiri and A[penandakanan] >= nilaipivot:
            penandakanan = penandakanan - 1

        if penandakanan < penandakiri:
            selesai = True
        else:
            temp = A[penandakiri]
            A[penandakiri] = A[penandakanan]
            A[penandakanan] = temp

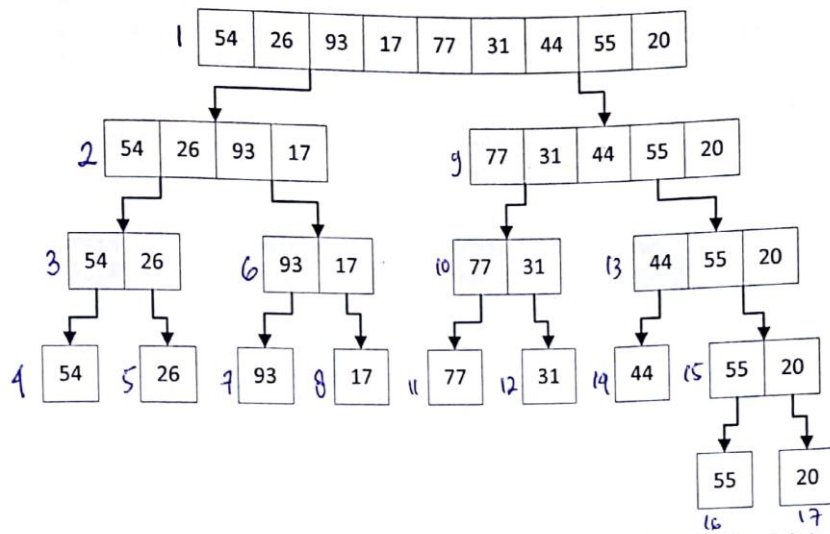
    temp = A[awal]
    A[awal] = A[penandakanan]
    A[penandakanan] = temp

    return penandakanan

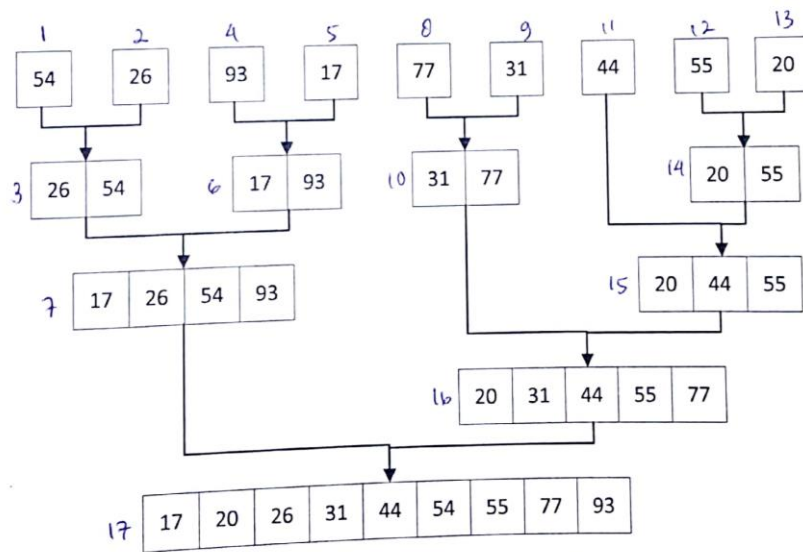
def quickSortBantu(A, awal, akhir):
    if awal < akhir:
        titikBelah = partisi(A, awal, akhir)
        quickSortBantu(A, awal, titikBelah-1)
        quickSortBantu(A, titikBelah+1, akhir)

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

No 2



**Gambar 6.1:** Membelah list sampai tiap sub-list berisi satu elemen atau kosong. Sesudah itu digabung seperti ditunjukkan di Gambar 6.2.



**Gambar 6.2:** Menggabungkan list satu demi satu.

### No 3

```

Python 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD
64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= BESTART: E:\kuliah\semester 4 alhamdulillah\praktikum\prak algostrukda\Modul_6
\No 3.py
bubble: 12.8413 detik
selection: 5.74383 detik
insertion: 5.9693 detik
merge: 0.0698147 detik
quick: 0.0449816 detik
>>>

No 3.py - E:\kuliah\semester 4 alhamdulillah\praktikum\prak algostrukda\Modul_6\No 3.py (3...
File Edit Format Run Options Window Help
penandakanan = penandakiri - 1

while penandakanan >= penandakiri and A[penandakanan] >= nilaipivot:
    penandakanan = penandakanan - 1

if penandakanan < penandakiri:
    selesai = True
else:
    temp = A[penandakiri]
    A[penandakiri] = A[penandakanan]
    A[penandakanan] = temp

temp = A[awal]
A[awal] = A[penandakanan]
A[penandakanan] = temp

return penandakanan

def quickSortBantu(A, awal, akhir):
    if awal < akhir:
        titikBelah = partisi(A, awal, akhir)
        quickSortBantu(A, awal, titikBelah-1)
        quickSortBantu(A, titikBelah+1, akhir)

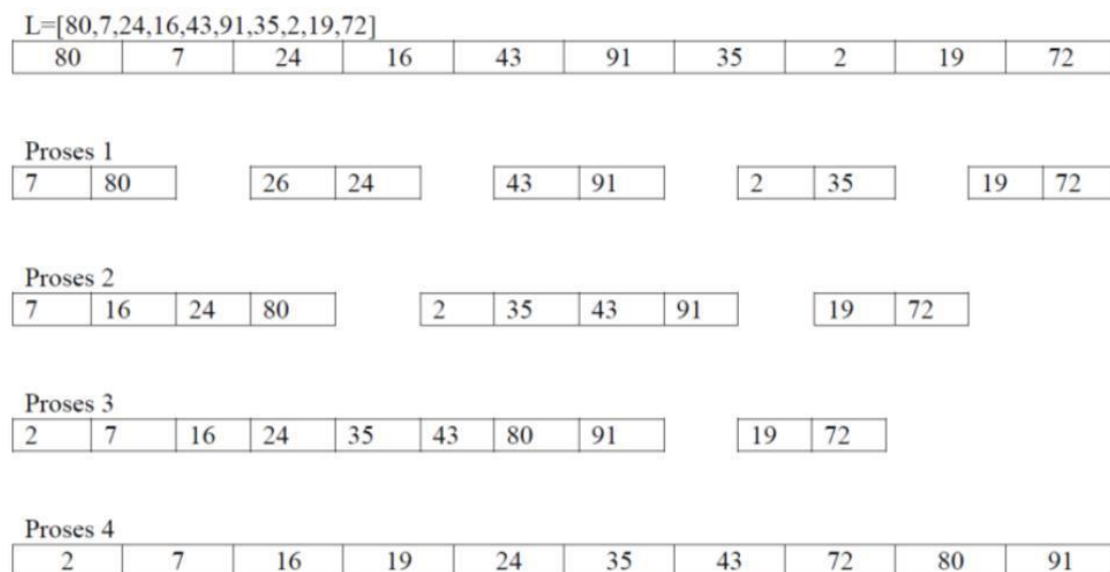
def quickSort(A):
    quickSortBantu (A, 0, len(A)-1)

k = [[i] for i in range(1, 6001)]
kocok(k)
u_bub = k[:]
u_sel = k[:]
u_ins = k[:]
u_mrg = k[:]
u_qok = k[:]

aw=detak();bubbleSort(u_bub);ak=detak();print("bubble: %g detik" %(ak-aw));
aw=detak();selectionSort(u_sel);ak=detak();print("selection: %g detik" %(ak-aw));
aw=detak();insertionSort(u_ins);ak=detak();print("insertion: %g detik" %(ak-aw));
aw=detak();mergeSort(u_mrg);ak=detak();print("merge: %g detik" %(ak-aw));
aw=detak();quickSort(u_qok);ak=detak();print("quick: %g detik" %(ak-aw));
  
```

### No 4

Merge Sort:



## 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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2	7	16	19	24	35	43	72	80	91
---	---	----	----	----	----	----	----	----	----

No 5

```

Python 3.8.2 Shell
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD 64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: E:\kuliah\semester 4 alhamdulillah\praktikum\prak algostruktura\Modul_6 \No 5.py
MERGE SORT v2 BY NIM
[ Tomi L200180056 Lampung 430000 ]
[ annisa L200180066 Sragen 500000 ]
[ Defa L200180068 Sragen 235000 ]
[ taufik L200180069 Surakarta 450000 ]
[ Dilliah L200180074 Klaten 300000 ]
[ ayudhia L200180096 Palembang 20500 ]
[ dika L200180097 Bekasi 350000 ]
[ rohmah L200180101 Riau 430000 ]
[ berlian L200180107 Sragen 125000 ]
[ dhim L200180148 Sragen 350000 ]
>>>

No 5.py - E:\kuliah\semester 4 alhamdulillah\praktikum\prak algostruktura\Modul_6\No 5.py (3...
File Edit Format Run Options Window Help
class MhsTIF(object):
    def __init__(self, nama, nim, tinggal, us):
        self.nama = nama
        self.nim = nim
        self.tinggal = tinggal
        self.us = us

c0 = MhsTIF('Dilliah', "L200180074", 'Klaten', 300000)
c1 = MhsTIF('berlian', "L200180107", 'Sragen', 125000)
c2 = MhsTIF('ayudhia', "L200180096", 'Palembang', 20500)
c3 = MhsTIF('dika', "L200180097", 'Bekasi', 350000)
c4 = MhsTIF('annisa', "L200180066", 'Sragen', 500000)
c5 = MhsTIF('Tomi', "L200180056", 'Lampung', 430000)
c6 = MhsTIF('taufik', "L200180069", 'Surakarta', 450000)
c7 = MhsTIF('rohmah', "L200180101", 'Riau', 430000)
c8 = MhsTIF('Defa', "L200180068", 'Sragen', 235000)
c9 = MhsTIF('dhim', "L200180148", 'Sragen', 350000)

Daftar = [c0, c1, c2, c3, c4, c5, c6, c7, c8, c9]

def mergeSort2(A, awal, akhir):
    mid = (awal+akhir)//2
    if awal < akhir:
        mergeSort2(A, awal, mid)
        mergeSort2(A, mid+1, akhir)

    a, f, l = 0, awal, mid+1
    tmp = [None] * (akhir - awal + 1)
    while f <= mid and l <= akhir:
        if A[f] < A[l]:
            tmp[a] = A[f]
            f += 1
        else:
            tmp[a] = A[l]
            l += 1
        a += 1

    if f <= mid:
        tmp[a:] = A[f:mid+1]
    if l <= akhir:
        tmp[a:] = A[l:akhir+1]
  
```

## No 6

```
Python 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD
64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: E:\kuliah\semester 4 alhamdulillah\praktikum\prak allgostrukda\Modul_6
\No 6.py
QUICK SORT v2 BY NIM
[ Tomi L200180056 Lampung 430000 ]
[ annisa L200180066 Sragen 500000 ]
[ Defa L200180068 Sragen 235000 ]
[ taufik L200180069 Surakarta 450000 ]
[ Dillah L200180074 Klaten 300000 ]
[ ayudhia L200180096 Palembang 20500 ]
[ dika L200180097 Bekasi 350000 ]
[ rohmah L200180101 Riau 430000 ]
[ berlian L200180107 Sragen 125000 ]
[ dhim L200180148 Sragen 350000 ]
>>>

No 6.py - E:\kuliah\semester 4 alhamdulillah\praktikum\prak allgostrukda\Modul_6\No 6.py (3.8...
File Edit Format Run Options Window Help
def partisi(A, awal, akhir):
    hasil = 0
    pivot, idx = median_dari_tiga(A, awal, akhir)
    A[awal], A[idx] = A[idx], A[awal]
    i = awal + 1
    for j in range(awal+1, akhir, 1):
        hasil += 1
        if A[j] < pivot:
            A[i], A[j] = A[j], A[i]
            i += 1
    A[awal], A[i-1] = A[i-1], A[awal]
    return i - 1, hasil

def median_dari_tiga(A, awal, akhir):
    tengah = (awal+akhir-1)//2
    a = A[awal]
    b = A[tengah]
    c = A[akhir-1]
    if a <= b <= c:
        return b, tengah
    if c <= b <= a:
        return b, tengah
    if a <= c <= b:
        return c, akhir-1
    if b <= c <= a:
        return c, akhir-1
    return a, awal

def quickSortBantu(A, awal, akhir):
    hasil = 0
    if awal < akhir:
        titikBelah, hasil = partisi(A, awal, akhir)
        hasil += quickSortBantu(A, awal, titikBelah)
        hasil += quickSortBantu(A, titikBelah + 1, akhir)
    return hasil

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

def convert(arr, obj):
    hasil = []
    for i in range(len(arr)):
        hasil.append(obj[arr[i]])
```

## No 7

```
Python 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD
64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: E:\kuliah\semester 4 alhamdulillah\praktikum\prak allgostrukda\Modul_6
\No 7.py
merge: 0.0852995 detik
quick: 0.0588431 detik
merge v2: 0.109249 detik
quick v2: 0.0563591 detik
>>>

No 7.py - E:\kuliah\semester 4 alhamdulillah\praktikum\prak allgostrukda\Modul_6\No 7.py (3.8...
File Edit Format Run Options Window Help
from time import time as detik
from random import shuffle as kocok
import time

## Merge Sort 1
def mergeSort(A):
    ##print("Membelah", A)
    if len(A) > 1:
        mid = len(A) // 2
        separuhkiri = A[:mid]
        separuhkanan = A[mid:]

        mergeSort(separuhkiri)
        mergeSort(separuhkanan)

        i = 0; j = 0; k = 0
        while i < len(separuhkiri) and j < len(separuhkanan):
            if separuhkiri[i] < separuhkanan[j]:
                A[k] = separuhkiri[i]
                i = i + 1
            else:
                A[k] = separuhkanan[j]
                j = j + 1
            k = k + 1

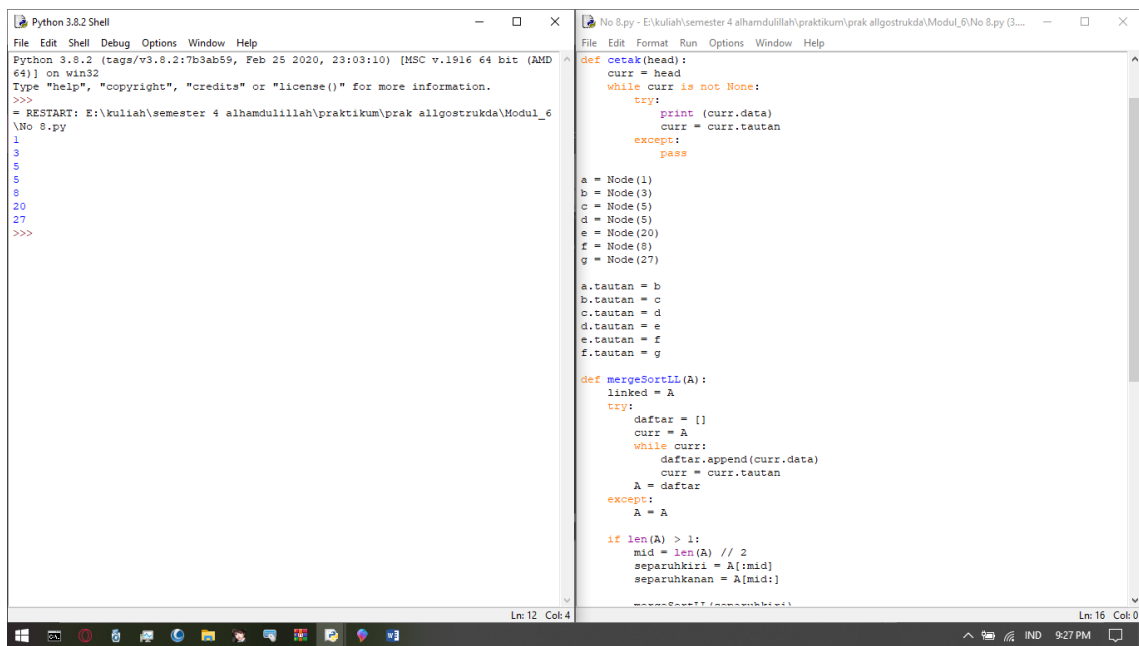
        while i < len(separuhkiri):
            A[k] = separuhkiri[i]
            i = i + 1
            k = k + 1

        while j < len(separuhkanan):
            A[k] = separuhkanan[j]
            j = j + 1
            k = k + 1

        ##print("Menggabungkan", A)

## Quick Sort 1
def partisi(A, awal, akhir):
    nilaiPivot = A[awal]
    penandaKiri = awal + 1
    penandaKanan = akhir
```

## No 8



The image shows a screenshot of a Windows desktop with two open applications. On the left is a 'Python 3.8.2 Shell' window, and on the right is a text editor window titled 'No 8.py'.

The Python Shell window displays the following text:

```
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: E:\kuliah\semester 4 alhamdulillah\praktikum\prak allgostrukda\Modul_6\No 8.py
1
3
5
5
8
20
27
>>>
```

The text editor window shows the following Python code:

```
def cetak(head):
    curr = head
    while curr is not None:
        try:
            print (curr.data)
            curr = curr.tautan
        except:
            pass

a = Node(1)
b = Node(3)
c = Node(5)
d = Node(5)
e = Node(20)
f = Node(8)
g = Node(27)

a.tautan = b
b.tautan = c
c.tautan = d
d.tautan = e
e.tautan = f
f.tautan = g

def mergeSortLL(A):
    linked = A
    try:
        daftar = []
        curr = A
        while curr:
            daftar.append(curr.data)
            curr = curr.tautan
        A = daftar
    except:
        A = A

    if len(A) > 1:
        mid = len(A) // 2
        separuhkiri = A[:mid]
        separuhkanan = A[mid:]

    mergeSortLL(separuhkiri)
```

The taskbar at the bottom shows the Windows Start button, task view, and several pinned applications. The system tray on the right indicates the date and time as 'IND 9:27 PM'.