VIRLIANA AR
L200180017
A

MODUL 6
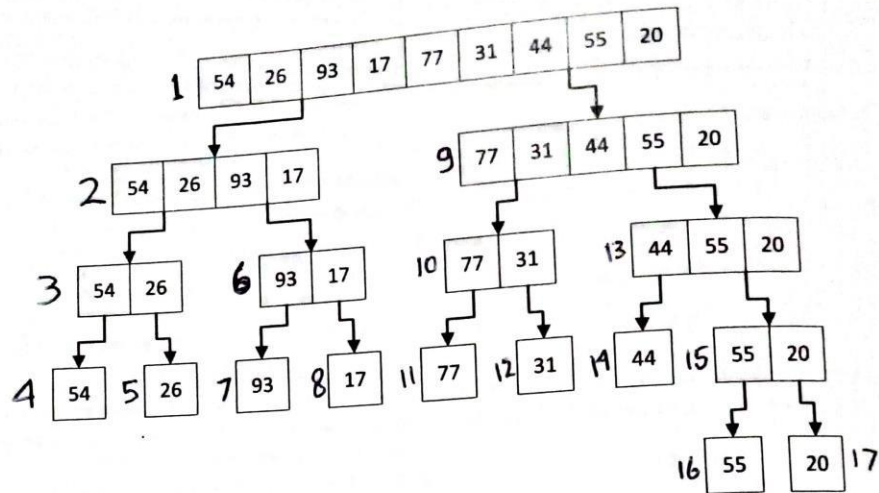
PENGURUTAN LANJUTAN

SOAL-SOAL UNTUK MAHASISWA

no1

```
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
D64)] on win32
Type "help", "copyright", "credits" or "license()"
>>>
======== RESTART: C:/Users/Vian/Documents/prakalgo
[11, 14, 24, 26, 37]
>>>
```
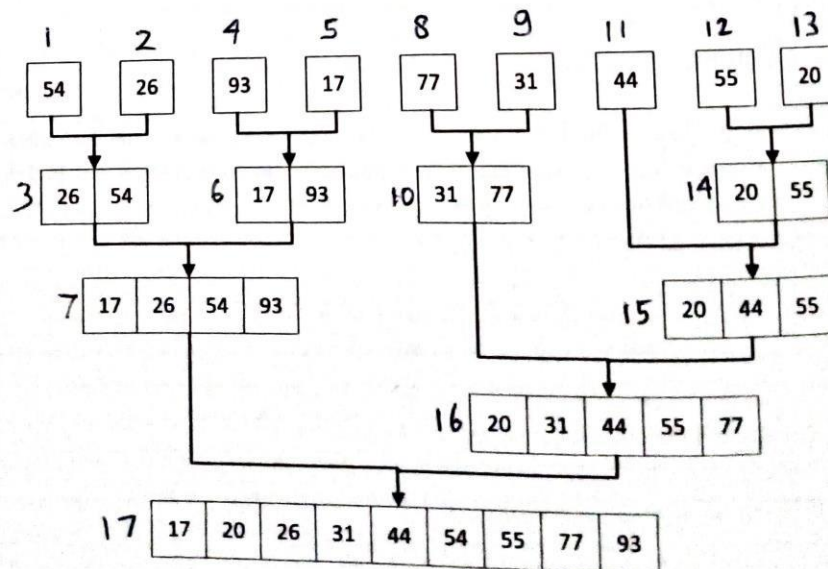
```python
from lat2 import mergeSort
from lat3 import quickSort
class Mahasiswa:
    keadaan = 'lapar'
    def __init__(self, nama, nim, kota, us):
        self.nama = nama
        self.nim = nim
        self.kotaTinggal = kota
        self.uangSaku = us
    def __str__(self):
        s = self.nama + ', NIM ' + str(self.nim) \
            + '. Tinggal di ' + self.kotaTinggal \
            + '. Uang saku Rp ' + str(self.uangSaku) \
            + ' perharinya.'
        return s
    def ambilNama(self):
        return self.nama
    def ambilNIM(self):
        return self.nim
    def ambilUangSaku(self):
        return self.uangSaku
    def makan(self, s):
        print('Saya baru aja makan', s, 'sambil nugas')
        self.keadaan = 'kenyang'

mh1 = Mahasiswa("Andi", 14, "Sragen", 10000)
mh2 = Mahasiswa("Budi", 11, "Klaten", 13000)
mh3 = Mahasiswa("Rozaq", 26, "Boyolali", 12000)
mh4 = Mahasiswa("Putri", 37, "pekalongan", 12000)
mh5 = Mahasiswa("Billy", 24, "Bandung", 2000)

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

No2

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.

No3

NO 3

Python 3.8.2 Shell

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```
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23
D64)] on win32
Type "help", "copyright", "credits" or "license()"
>>>
======== RESTART: C:/Users/Vian/Documents/prakalgo
[11, 14, 24, 26, 37]
>>>
======== RESTART: C:/Users/Vian/Documents/prakalgo
bubble : 6.24212 detik
selection : 2.81241 detik
insertion : 4.85469 detik
merge : 0.0557878 detik
quick : 0.0642307 detik
>>>
```

6.py - C:/Users/Vian/Documents/prakalgostruk/New folder/6.py (3.8.2)

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```
            if A[1] < A[posisiterkecil]:
                posisiterkecil = 1
    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

bub = k[:]
sel = k[:]
ins = k[:]
mer = k[:]
qui = k[:]

aw = detak(); bubbleSort(bub); ak = detak(); print('bubble : %g detik' % (ak-aw)
aw = detak(); selectionSort(sel); ak = detak(); print('selection : %g detik' % (
aw = detak(); insertionSort(ins); ak = detak(); print('insertion : %g detik' % (
aw = detak(); mergeSort(mer); ak = detak(); print('merge : %g detik' % (ak-aw))
aw = detak(); quickSort(qui); ak = detak(); print('quick : %g detik' % (ak-aw))
```

No4

4a

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 |

4b

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

No5

```
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 202
D64)] on win32
Type "help", "copyright", "credits" or "licen
>>>
======== RESTART: C:/Users/Vian/Documents/pra
>>> print(merge_sort([13,45,12,1,59]))
```

```python
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)
```

Ln: 93 Col: 0

No6

```
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb
D64)] on win32
Type "help", "copyright", "credits" or
>>>
======== RESTART: C:/Users/Vian/Documen
>>>
======== RESTART: C:/Users/Vian/Documen
>>> quickSort(daftar)
>>> print(daftar)
[4, 10, 12, 14, 26, 123, 124]
>>>
```

6.py - C:/Users/Vian/Documents/prakalgostruk/New folder/6.py (3.8.2)

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```python
    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 = [12, 4, 10, 124, 14, 123, 26]
```

Ln: 173 Col: 0

No7

```
Python 3.8.2 (tags/v3.8.2:7b3ab5
D64)] on win32
Type "help", "copyright", "credit
>>>
======== RESTART: C:/Users/Vian/I
>>>
======== RESTART: C:/Users/Vian/I
>>> quickSort(daftar)
>>> print(daftar)
[4, 10, 12, 14, 26, 123, 124]
>>>
======== RESTART: C:/Users/Vian/I
Traceback (most recent call last)
  File "C:/Users/Vian/Documents/p
dule>
    import no5  # mergeSort baru
ModuleNotFoundError: No module na
>>>
======== RESTART: C:/Users/Vian/I
Traceback (most recent call last)
  File "C:/Users/Vian/Documents/p
dule>
    import no6  # quickSort baru
ModuleNotFoundError: No module na
>>>
======== RESTART: C:/Users/Vian/I
bubble : 7.30006 detik
selection : 2.19997 detik
insertion : 3.22076 detik
merge : 0.039669 detik
quick : 0.038677 detik
merge sort baru : 0.0665653 detik
quick sort baru : 0.0555651 detik
merge sort awal : 0.0606952 detik
quick sort awal : 0.0214872 detik
>>>
```

6.py - C:/Users/Vian/Documents/prakalgostruk/New folder/6.py (3.8.2)

```python
##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 = [12, 4, 10, 124, 14, 123, 26]

from time import time as detak
from random import shuffle as kocok
import no5  # mergeSort baru
import no6  # quickSort baru
import no3  # mergeSort dan quickSort awal
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 de
# Quick Sort baru
aw = detak(); no6.quickSort(quiB); ak = detak(); print('quick sort baru : %g det

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

Ln: 73 Col: 0

No8

File Edit Shell Debug Options Window

```
>>>
======== RESTART: C:/Users/Via
Traceback (most recent call la
  File "C:/Users/Vian/Document
dule>
    import no6  # quickSort ba
ModuleNotFoundError: No module
>>>
======== RESTART: C:/Users/Via
bubble : 7.30006 detik
selection : 2.19997 detik
insertion : 3.22076 detik
merge : 0.039669 detik
quick : 0.038677 detik
merge sort baru : 0.0665653 de
quick sort baru : 0.0555651 de
merge sort awal : 0.0606952 de
quick sort awal : 0.0214872 de
>>>
======== RESTART: C:/Users/Via
List 1 :
3
7
12
13
14
List 2 :
1
10
26
Merged List :
1
3
7
10
12
13
14
26
>>>
```

6.py - C:/Users/Vian/Documents/prakalgostruk/New folder/6.py (3.8.2)

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

    def mergeSorted(self, list1, list2):
        if list1 is None:
            return list2
        if list2 is None:
            return list1

        if list1.data < list2.data:
            temp = list1
            temp.next = self.mergeSorted(list1.next, list2)
        else:
            temp = list2
            temp.next = self.mergeSorted(list1, list2.next)
        return temp

list1 = LinkedList()
list1.appendSorted(13)
list1.appendSorted(12)
list1.appendSorted(3)
list1.appendSorted(14)
list1.appendSorted(7)

print("List 1 :"),
list1.printList()

list2 = LinkedList()
list2.appendSorted(26)
list2.appendSorted(10)
list2.appendSorted(1)

print("List 2 :"),
list2.printList()

list3 = LinkedList()
list3.head = list3.mergeSorted(list1.head, list2.head)
```

Ln: 277 Col: 0