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Kelas :A

PRAKTIKUM MODUL 6 ALGORITMA STRUKTUR DATA

Latihan

Latihan 6.1

```
latihanmodul6.py - C:/Users/kevin/Music/latihanr Python 3.8.1 Shell
File Edit Format Run Options Window Help File Edit Shell Debug Options Window Help

#Latihan 6.1
def gabungkanDuaListUrut(A, B):
    la = len(A)
    lb = len(B)
    C = []
    i = 0
    j = 0

    while i < la and j < lb:
        if A[i] < B[j]:
            C.append(A[i])
            i += 1
        else:
            C.append(B[j])
            j += 1
    while i < la:
        C.append(A[i])
        i += 1
    while j < lb:
        C.append(B[j])
        j += 1
    return C

daftar1 = [4, 7, 9, 12, 19]
daftar2 = [2, 5, 8, 15]

Python 3.8.1 (tags/v3.8.1:1b293b6, Dec 18 2019,
tel) on win32
Type "help", "copyright", "credits" or "license
>>>
===== RESTART: C:/Users/kevin/Music/
>>> gabungkanDuaListUrut(daftar1, daftar2)
[2, 4, 5, 7, 8, 9, 12, 15, 19]
>>> |
```

Latihan 6.2

```
latihanmodul6.py - C:/Users/kevin/Music/latihanmodul6.py (3.8.1)
File Edit Format Run Options Window Help

#Latihan 6.2
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) #

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

Python 3.8.1 Shell
File Edit Shell Debug Options Window Help

Python 3.8.1 (tags/v3.8.1:1b293b6, Dec 18 2019, 22:39:24) [MS
tel]) on win32
Type "help", "copyright", "credits" or "license()" for more i
>>>
===== RESTART: C:/Users/kevin/Music/latihanmodul6.
>>> mergeSort(alist)
Membelah [54, 26, 93, 17, 77, 31, 44, 55, 20]
Membelah [54, 26, 93, 17]
Membelah [54, 26]
Membelah [54]
Membelah [26]
Menggabungkan [26, 54]
Membelah [93, 17]
Membelah [93]
Membelah [17]
Menggabungkan [17, 93]
Menggabungkan [17, 26, 54, 93]
Membelah [77, 31, 44, 55, 20]
Membelah [77, 31]
Membelah [77]
Membelah [31]
Menggabungkan [31, 77]
Membelah [44, 55, 20]
Membelah [44]
Membelah [55, 20]
Membelah [55]
Membelah [20]
Menggabungkan [20, 55]
Menggabungkan [20, 44, 55]
Menggabungkan [20, 31, 44, 55, 77]
Menggabungkan [17, 20, 26, 31, 44, 54, 55, 77, 93]
>>> print(alist)
[17, 20, 26, 31, 44, 54, 55, 77, 93]
>>> |
```

Latihan 6.3

```
latihanmodul6.py - C:/Users/kevin/Music/latihanmodul6.py (3.8.1)
File Edit Format Run Options Window Help

#Latihan 6.3
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=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

x = [54, 26, 93, 17, 77, 31, 44, 55, 20]
quickSort(x)
print(x)

Python 3.8.1 Shell
File Edit Shell Debug Options Window Help

Python 3.8.1 (tags/v3.8.1:1b293b6, Dec 18 2019, 22:39:24) [MS
tel]) on win32
Type "help", "copyright", "credits" or
>>>
===== RESTART: C:/Users/kevi
[17, 20, 26, 31, 44, 54, 55, 77, 93]
>>> |
```

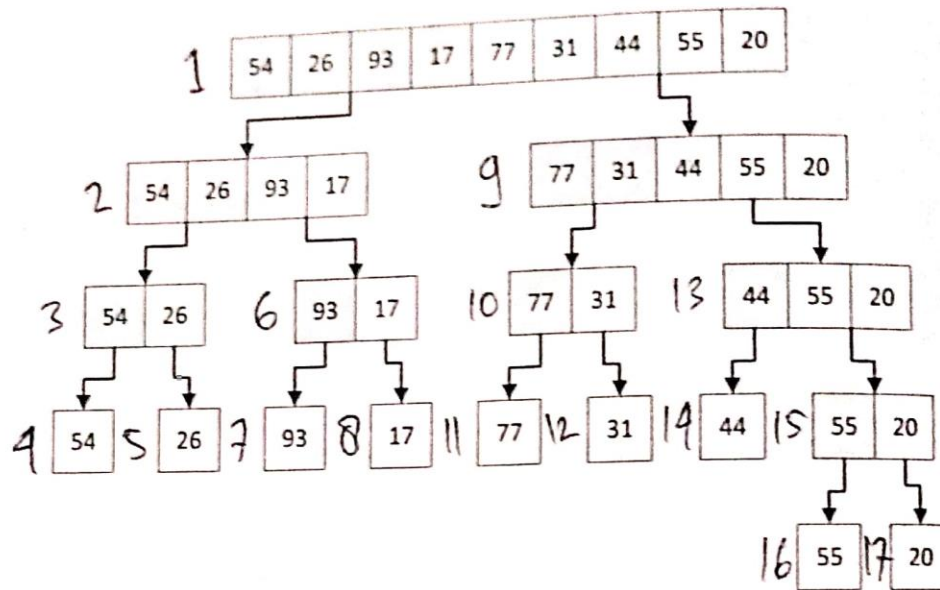
Activate
Go to Sett

Tugas

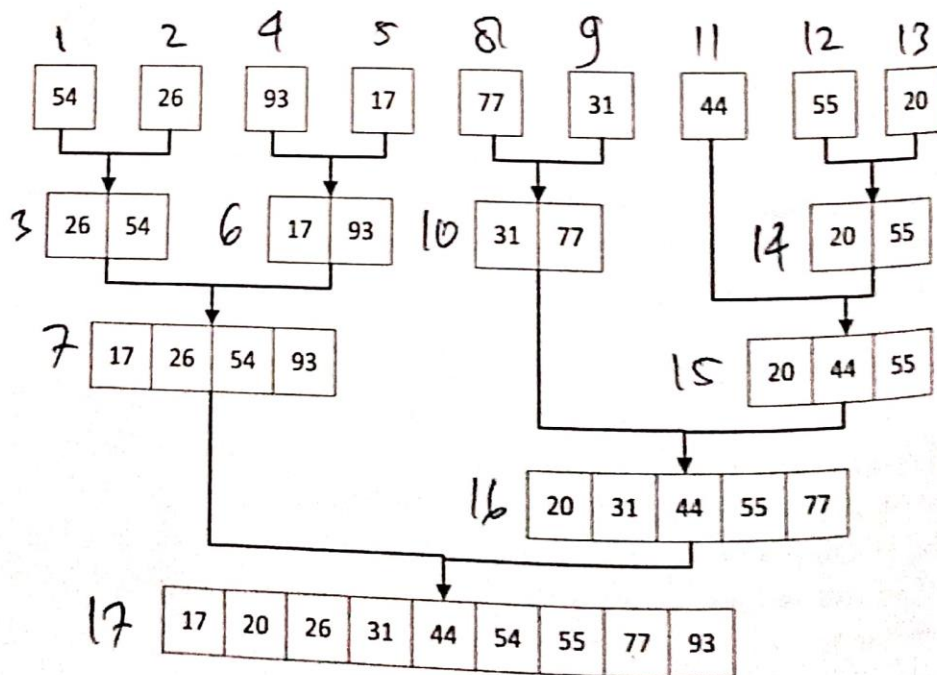
No. 1

<p>tugas1.py - C:/Users/kevin/Pictures/MODUL_6/tugas1.py (3.8.1)</p> <p>File Edit Format Run Options Window Help</p> <pre>from latihanmodul6 import mergeSort from latihanmodul6 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 saja makan', s, 'sambil belajar') self.keadaan = 'kenyang' class mhsTIF(mahasiswa): def katakanPy(self): print('Python is cool') c1=mhsTIF('ana',55,'Boyolali',250000) c2=mhsTIF('Ahmad',22,'Salatiga',250000) c3=mhsTIF('Budi',15,'Surakarta',235000) c4=mhsTIF('Dika',4,'Sragen',240000) c5=mhsTIF('aji',38,'Surakarta',230000) A = [c1.nim, c2.nim, c3.nim, c4.nim, c5.nim] mergeSort(A) print(A)</pre>	<p>Python 3.8.1 Shell</p> <p>File Edit Shell Debug Options Window Help</p> <p>Python 3.8.1 (tags/v3.8.1:1b293b6, Dec tel)] on win32 Type "help", "copyright", "credits" or >>> ===== RESTART: C:/Users/kevin/ [4, 15, 22, 38, 55] >>> </p>
--	---

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 3.8.1 Shell
File Edit Shell Debug Options Window Help
Python 3.8.1 (tags/v3.8.1:1b293b6, Dec 18 2019, 22:03:25) on win32
Type "help", "copyright", "credits" or "license()"
>>>
===== RESTART: C:/Users/kevin/Pictures/MODUL_6/tugas3.py (3.8.1)
bubble : 9.45247 detik
selection : 3.62471 detik
insertion : 4.49969 detik
merge : 0.0468698 detik
quick : 0.046854 detik
>>>

tugas3.py - C:/Users/kevin/Pictures/MODUL_6/tugas3.py (3.8.1)
File Edit Format Run Options Window Help
from time import time as detik
from random import shuffle as kocok
import time
from latihanmodul6 import mergeSort
from latihanmodul6 import *

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

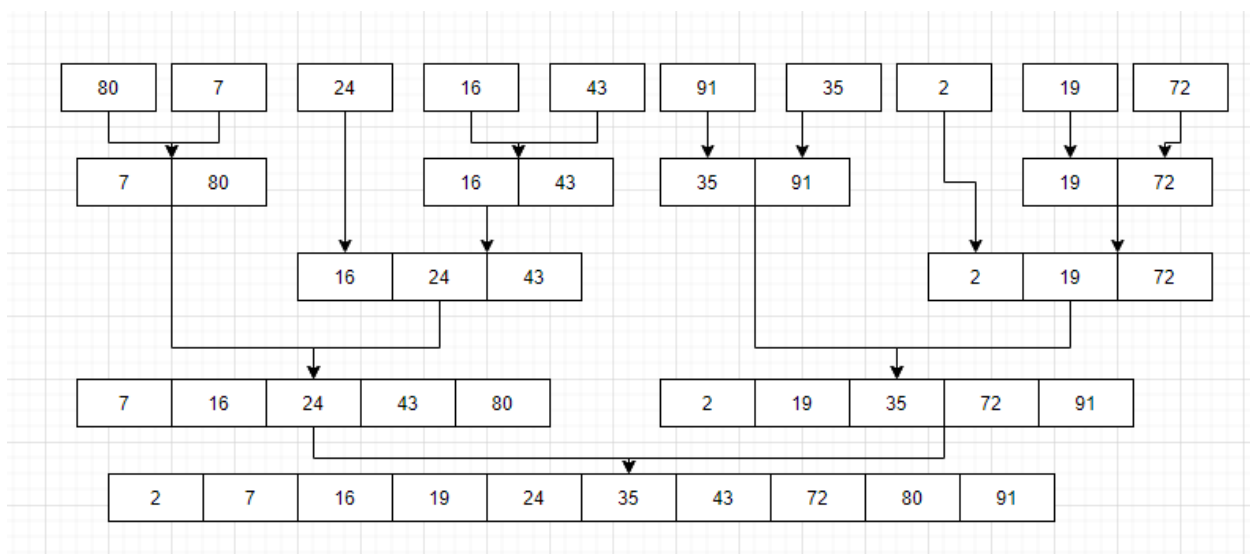
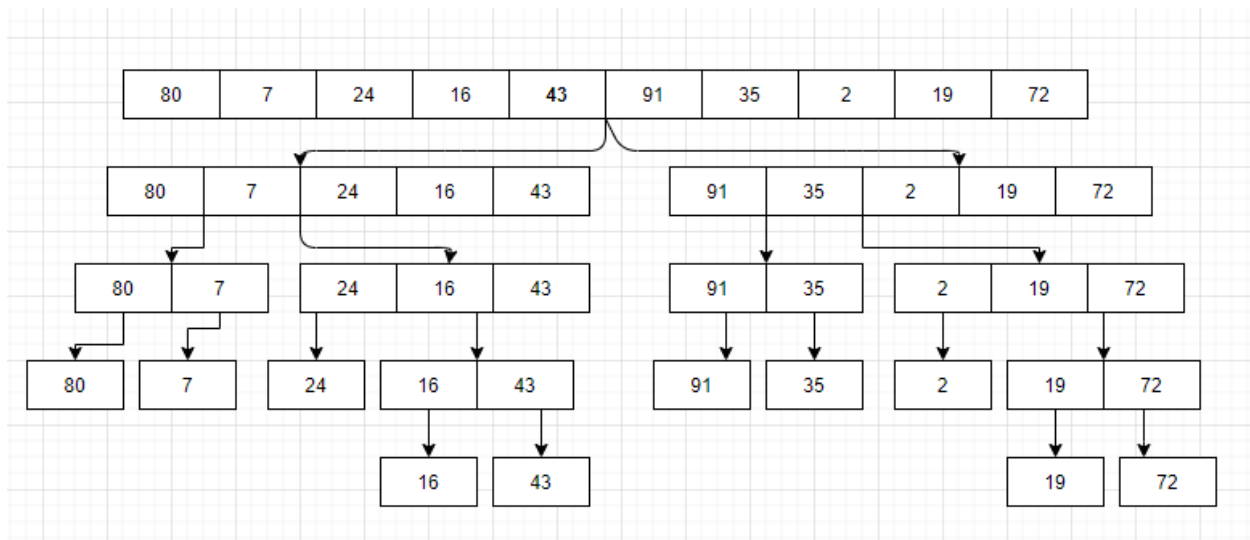
def bubbleSort(A):
    n = len(A)
    for i in range(n - 1):
        for j in range(n - i - 1):
            if A[j] > A[j + 1]:
                swap(A, j, j + 1)

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
```

No. 4

a.



b.

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

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				

No. 5

tugas5.py - C:/Users/kevin/Pictures/MODUL_6/tugas5.py (3.8.1)

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)

print(merge_sort([78, 54, 12, 2, 35, 41, 67]))
```

Python 3.8.1 Shell

File Edit Shell Debug Options Window Help

```
Python 3.8.1 (tags/v3.8.1:1b293b6, Dec
tel)] on win32
Type "help", "copyright", "credits" or
>>>
===== RESTART: C:/Users/kevin/
[2, 12, 35, 41, 54, 67, 78]
>>> |
```

No. 6


```
tugas6.py - C:/Users/kevin/Pictures/MODUL_6/tugas6.py (3.8.1)
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 = [78, 54, 12, 2, 35, 41, 67]
```

```
Python 3.8.1 Shell
File Edit Shell Debug Options Window Help

Python 3.8.1 (tags/v3.8.1:1b293b6, Dec 18 2019) on win32
Type "help", "copyright", "credits" or "quit()"
>>>
===== RESTART: C:/Users/kevin/Python381/Python381 Shell =====
[2, 12, 35, 41, 54, 67, 78]
>>> |
```

No. 7

tugas7.py - C:/Users/kevin/Pictures/MODUL_6/tugas7.py (3.8.1)

File Edit Format Run Options Window Help

```
from time import time as detak
from random import shuffle as kocok
import tugas5 # mergeSort baru
import tugas6 # quickSort baru
import tugas3 # 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(); tugas5.merge_sort(merB); ak = detak(); print('merge s
# Quick Sort baru
aw = detak(); tugas6.quickSort(quiB); ak = detak(); print('quick s

# Merge Sort dan Quick Sort awal
aw = detak(); tugas3.mergeSort(merA); ak = detak(); print('merge s
aw = detak(); tugas3.quickSort(quiA); ak = detak(); print('quick s
```

Python 3.8.1 Shell

File Edit Shell Debug Options Window Help

```
Python 3.8.1 (tags/v3.8.1:1b293b6, Dec
tel)] on win32
Type "help", "copyright", "credits" or
>>>
===== RESTART: C:/Users/kevin/
bubble : 9.67123 detik
selection : 3.71846 detik
insertion : 4.57779 detik
merge : 0.1406 detik
quick : 0.0312486 detik
merge sort baru : 0.062495 detik
quick sort baru : 0.124972 detik
merge sort awal : 0.0781238 detik
quick sort awal : 0.0780842 detik
```

```
>>> |
```

No. 8

tugas8.py - C:/Users/kevin/Pictures/MODUL_6/tugas8.py (3.8.1)

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 3.8.1 Shell

File Edit Shell Debug Options Window Help

Python 3.8.1 (tags/v3.8.1:1b293b6, Dec 18 2019) on win32

Type "help", "copyright", "credits" or "quit()"

>>>

===== RESTART: C:/Users/kevin/Python38/Python38-Shell =====

List 1 :

3

12

23

34

44

List 2 :

1

11

25

Merged List :

1

3

11

12

23

25

34

44

>>> |