Laporan Praktikum Algoritma dan Struktur Data

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Modul : 6

Latihan

6.1 Gabung Dua List Urut

```python
# 6.1
def gabungDuaListUrut(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]
```

```
/usr/bin/python3.8 /usr/share/pycharm/helpers/p
import sys; print('Python %s on %s' % (sys.vers
sys.path.extend(['/home/dikawfa/Documents/Kulia
Python 3.8.1 (default, Jan 22 2020, 06:38:00)
In[2]: runfile('/home/dikawfa/Documents/Kuliah/
In[3]: gabungDuaListUrut(daftar1, daftar2)
Out[3]: [2, 4, 5, 7, 8, 9, 12, 15, 19]

In[4]:
```

6.2 Merge Sort

```python
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 += 1
            else:
                A[k] = separuhkanan[j]
                j += 1
            k += 1

        while i < len(separuhkiri):
            A[k] = separuhkiri[i]
            i += 1
            k += 1
        while j < len(separuhkanan):
            A[k] = separuhkanan[j]
            j += 1
            k += 1
    print("Menggabungkan", A)  #

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

```
Membelah [54]
Menggabungkan [54]
Membelah [26]
Menggabungkan [26]
Menggabungkan [26, 54]
Membelah [93, 17]
Membelah [93]
Menggabungkan [93]
Membelah [17]
Menggabungkan [17]
Menggabungkan [17, 93]
Menggabungkan [17, 26, 54, 93]
Membelah [77, 31, 44, 55, 20]
Membelah [77, 31]
Membelah [77]
Menggabungkan [77]
Membelah [31]
Menggabungkan [31]
Menggabungkan [31, 77]
Membelah [44, 55, 20]
Membelah [44]
Menggabungkan [44]
Membelah [55, 20]
Membelah [55]
Menggabungkan [55]
Membelah [20]
Menggabungkan [20]
Menggabungkan [20, 55]
Menggabungkan [20, 44, 55]
Menggabungkan [20, 31, 44, 55, 77]
Menggabungkan [17, 20, 26, 31, 44, 54, 55, 77, 93]
[17, 20, 26, 31, 44, 54, 55, 77, 93]

In[3]:
```

6.3 Quick Sort

latihan.py × | 01.py × | soal2.py × | soal3.py × | soal4.py × | soal5.py ×

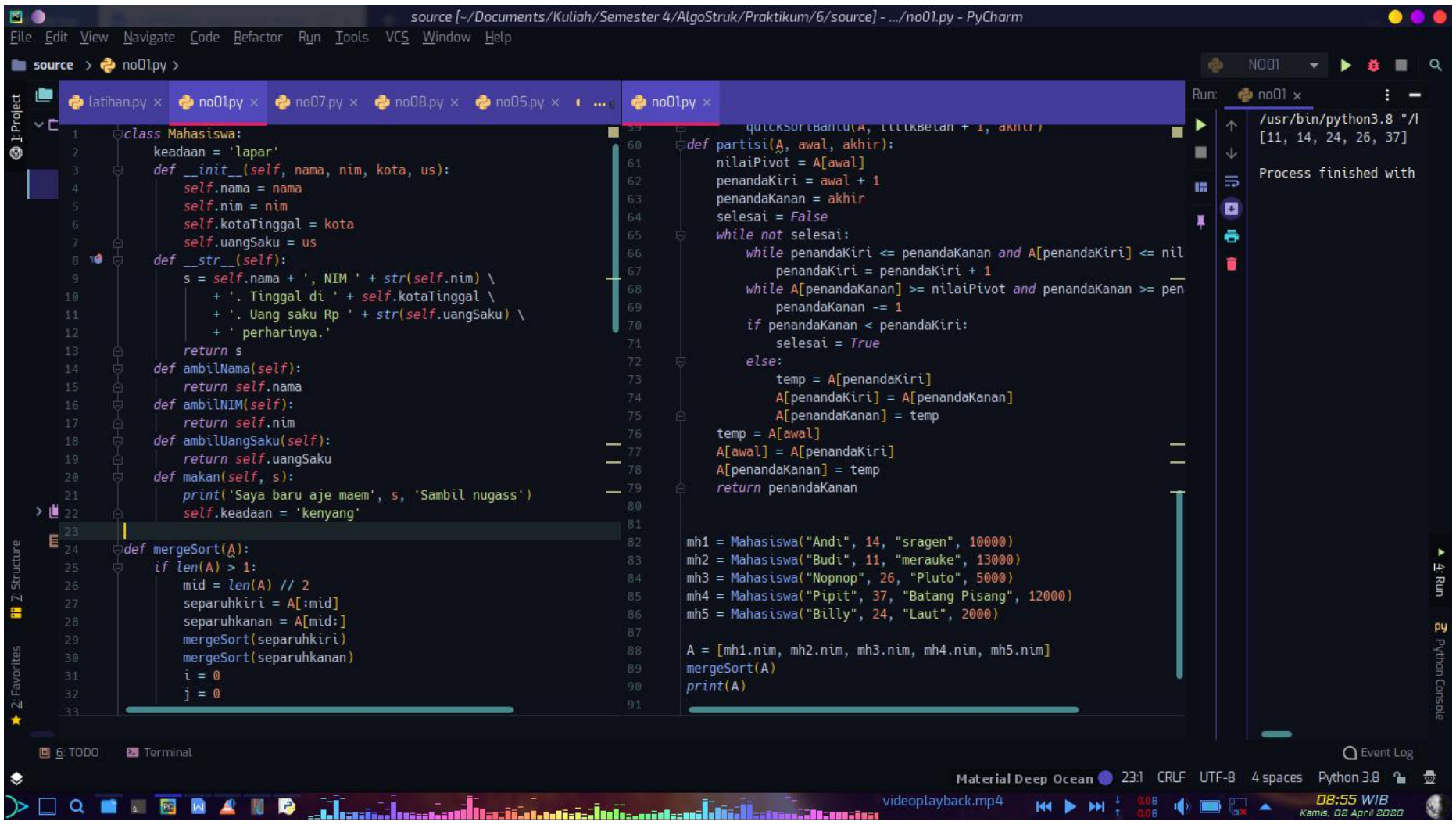
```python
# 6.3 Quick Sort
def quickSort(A):
    quickSortBantu(A, 0, len(A) - 1)

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)

```

latihan ×

```
/usr/bin/python3.8 /usr/share/pycharm/helpers/pydev/pyde
import sys; print('Python %s on %s' % (sys.version, sys.
sys.path.extend(['/home/dikawfa/Documents/Kuliah/Semeste
Python 3.8.1 (default, Jan 22 2020, 06:38:00)
In[2]: runfile('/home/dikawfa/Documents/Kuliah/Semester
In[3]: daftar = [54, 26, 93, 17, 77, 31, 44, 55, 20]
In[4]: quickSort(daftar)
In[5]: print(daftar)
[77, 54, 77, 54, 77, 54, 93, 77, 93]

In[6]:
```

Soal-soal

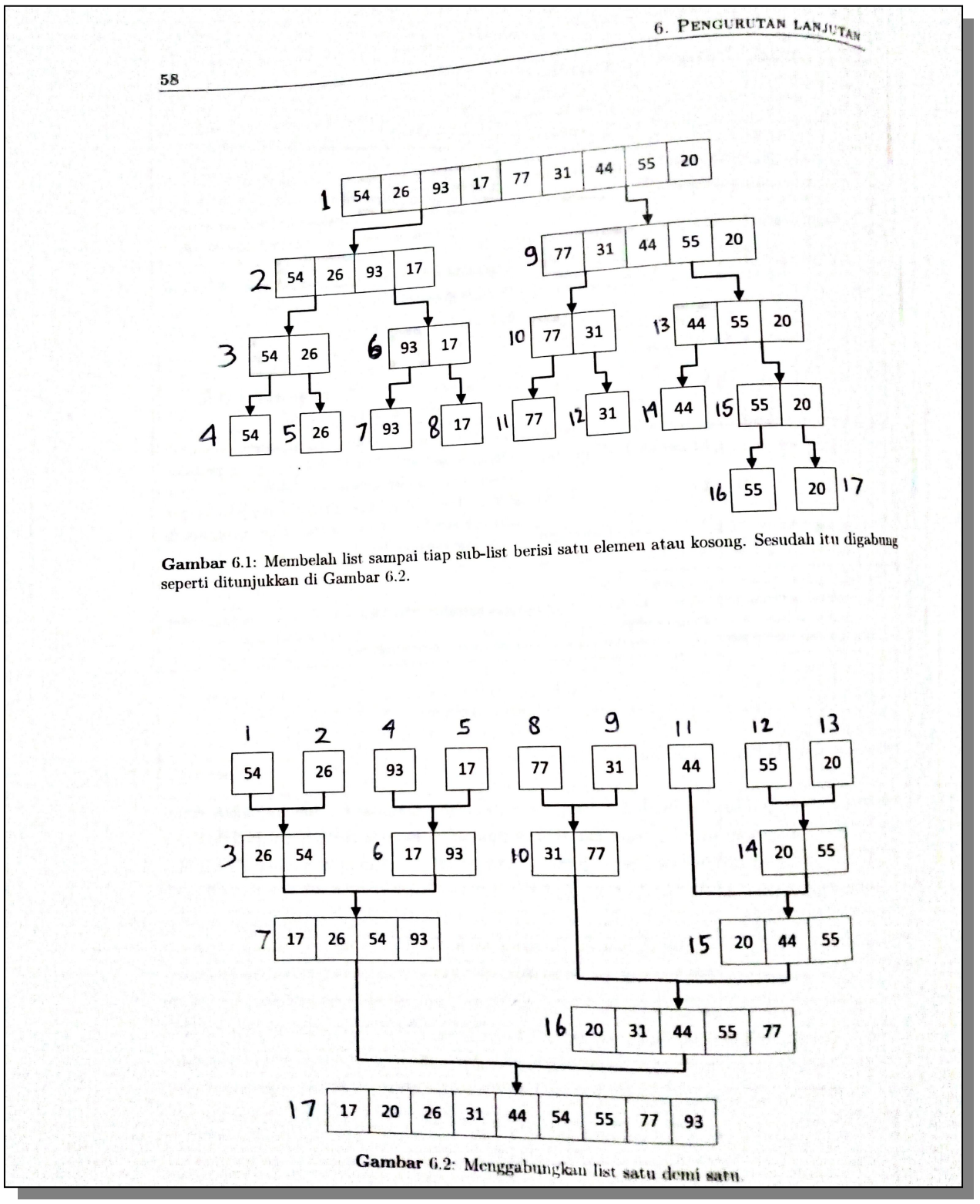
1.




```python
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 aje maem', s, 'Sambil nugass')
        self.keadaan = 'kenyang'

def mergeSort(A):
    if len(A) > 1:
        mid = len(A) // 2
        separuhkiri = A[:mid]
        separuhkanan = A[mid:]
        mergeSort(separuhkiri)
        mergeSort(separuhkanan)
        i = 0
        j = 0
```

```python
def partisi(A, awal, akhir):
    nilaiPivot = A[awal]
    penandaKiri = awal + 1
    penandaKanan = akhir
    selesai = False
    while not selesai:
        while penandaKiri <= penandaKanan and A[penandaKiri] <= nil
            penandaKiri = penandaKiri + 1
        while A[penandaKanan] >= nilaiPivot and penandaKanan >= pen
            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("Andi", 14, "sragen", 10000)
mh2 = Mahasiswa("Budi", 11, "merauke", 13000)
mh3 = Mahasiswa("Nopnop", 26, "Pluto", 5000)
mh4 = Mahasiswa("Pipit", 37, "Batang Pisang", 12000)
mh5 = Mahasiswa("Billy", 24, "Laut", 2000)

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

2.



6. PENGURUTAN LANJUTAN

58

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.

3.

```
latihan.py × | no07.py × | no08.py × | no05.py × | no06.py × | no03.py ×
            k += 1

def partition(A, low, high):
    i = (low - 1)
    pivot = A[high]
    for j in range(low, high):
        if A[j] <= pivot:
            i = i + 1
            A[i], A[j] = A[j], A[i]
    A[i + 1], A[high] = A[high], A[i + 1]
    return i + 1
def quickSortBantu(A, low, high):
    if low < high:
        pi = partition(A, low, high)
        quickSortBantu(A, low, pi - 1)
        quickSortBantu(A, pi + 1, high)
def quickSort(A):
    quickSortBantu(A, 0, len(A)-1)


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' % (ak-aw))
aw = detak(); insertionSort(ins); ak = detak(); print('insertion : %g detik' % (ak-aw))
aw = detak(); mergeSort(mer); ak = detak(); print('merge : %g detik' % (ak-aw))
aw = detak(); quickSort(qui); ak = detak(); print('quick : %g detik' % (ak-aw))

Run: 03 ×
/usr/bin/python3.8 "/home/dikawfa/
bubble : 4.51196 detik
selection : 1.66321 detik
insertion : 2.01827 detik
merge : 0.0277326 detik
quick : 0.016572 detik

Process finished with exit code 0
```

4a) 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

4b) 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

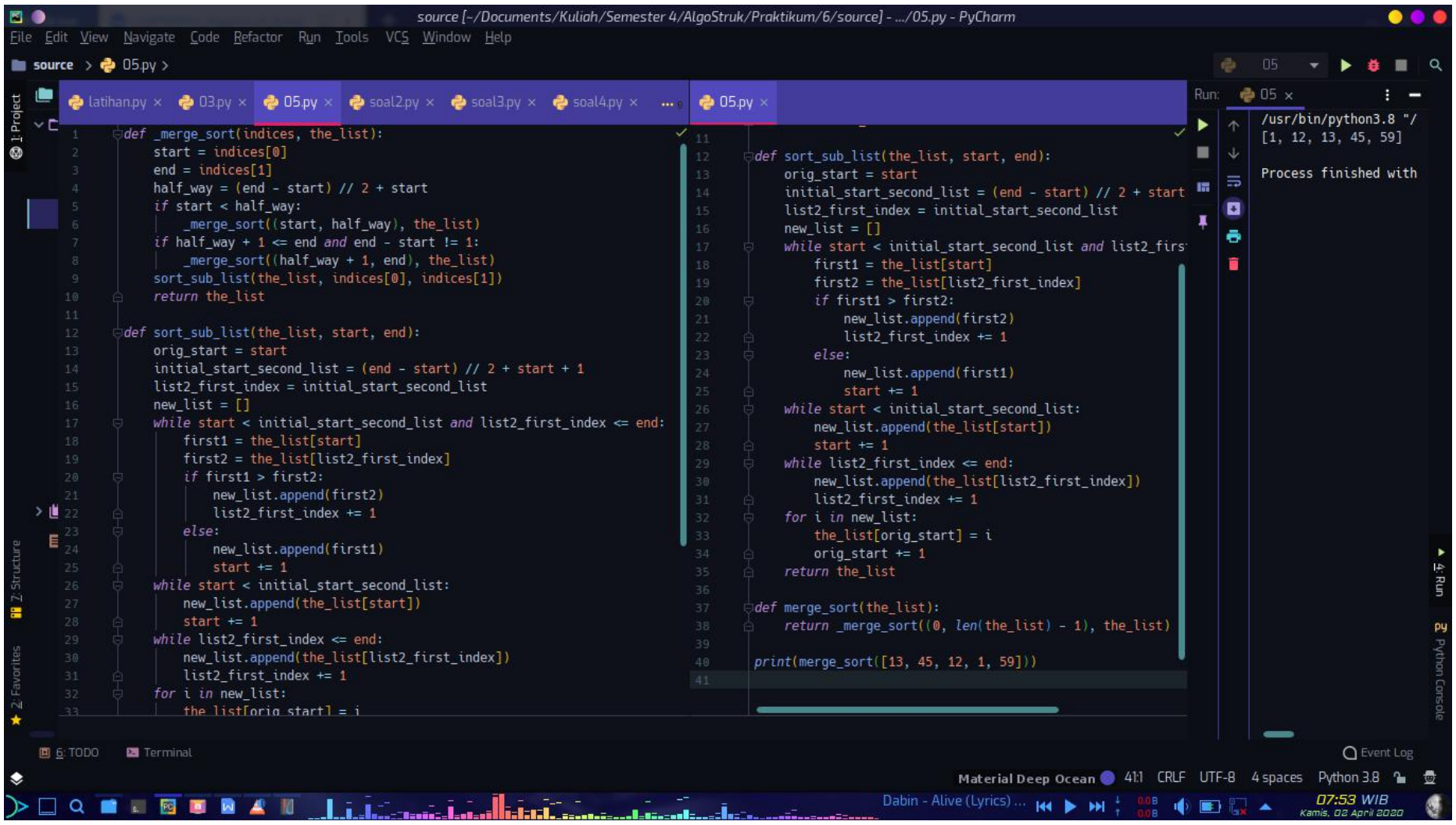
Low High

pivot

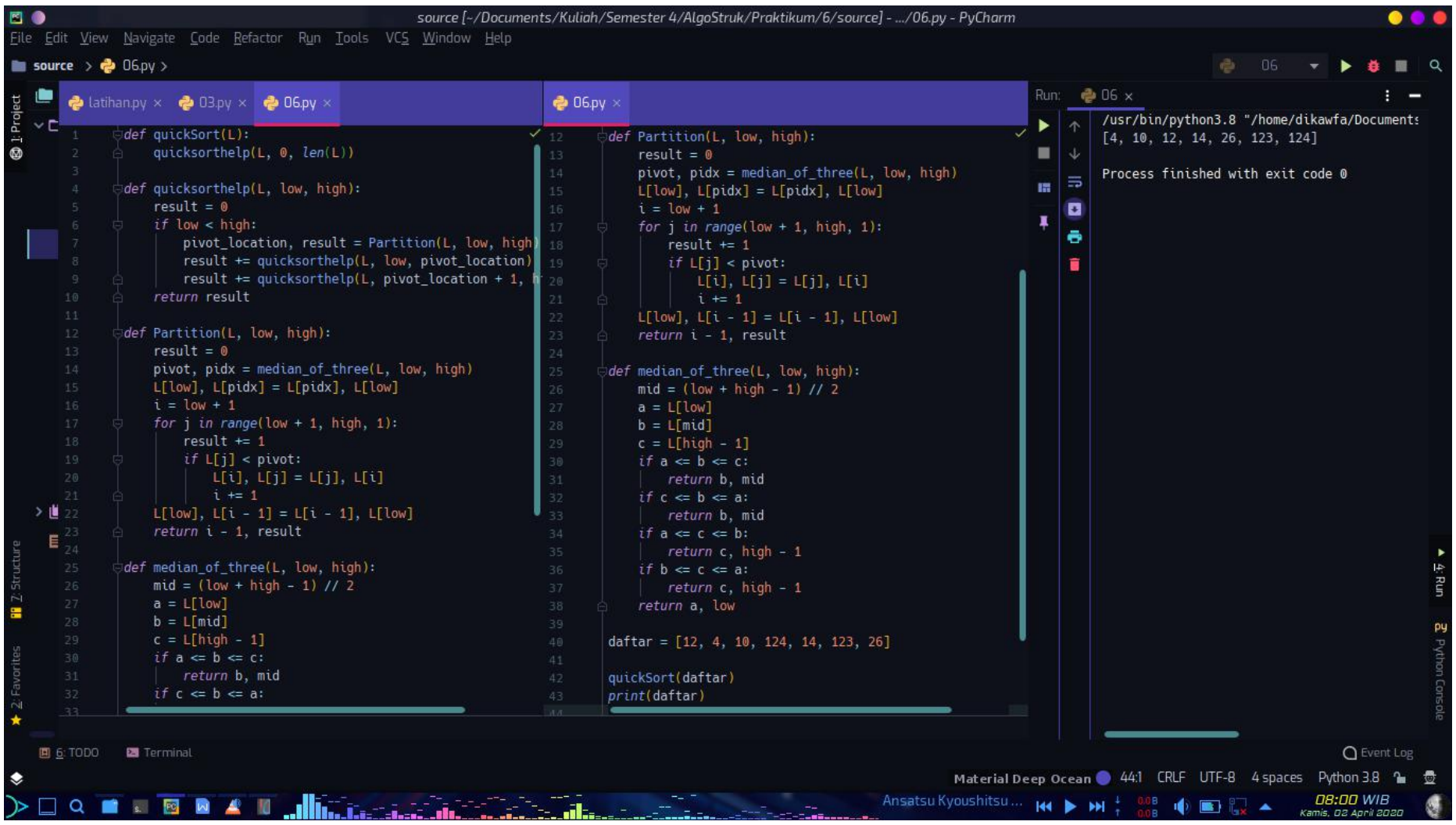
72	7	24	16	43	19	35	2	80	91

Low High

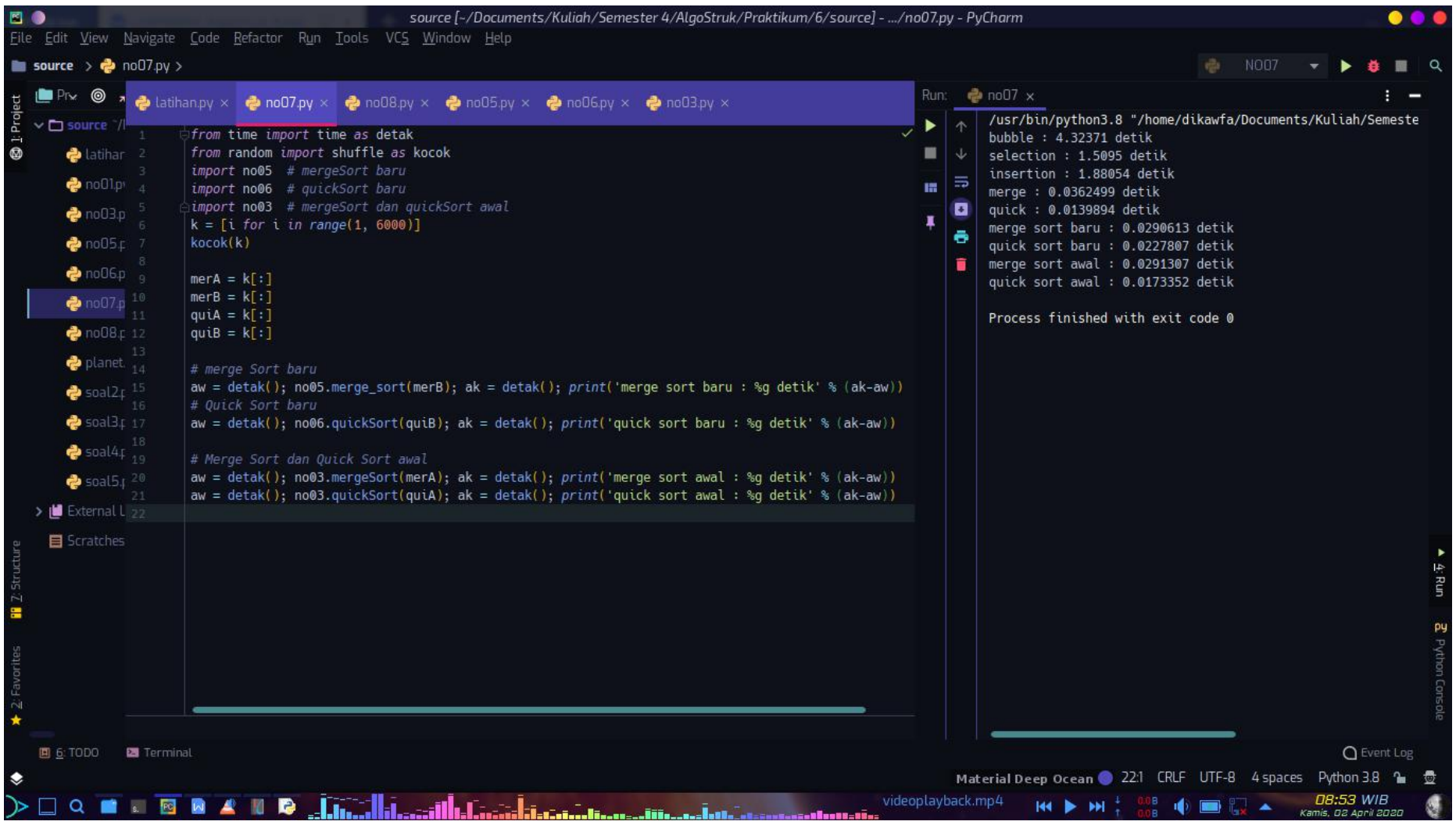
5.


source [~/Documents/Kuliah/Semester 4/AlgoStruk/Praktikum/6/source] - .../05.py - PyCharm
File Edit View Navigate Code Refactor Run Tools VCS Window Help
source > 05.py >
latihan.py × 03.py × 05.py × soal2.py × soal3.py × soal4.py ×
05.py ×
Run: 05 ×
/usr/bin/python3.8 "/
[1, 12, 13, 45, 59]
Process finished with
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([13, 45, 12, 1, 59]))
1: Project
2: Favorites
7: Structure
4: Run
Python Console
6: TODO
Terminal
Event Log
Material Deep Ocean
41:1
CRLF
UTF-8
4 spaces
Python 3.8
Dabin - Alive (Lyrics) ...
07:53 WIB
Kamis, 02 April 2020

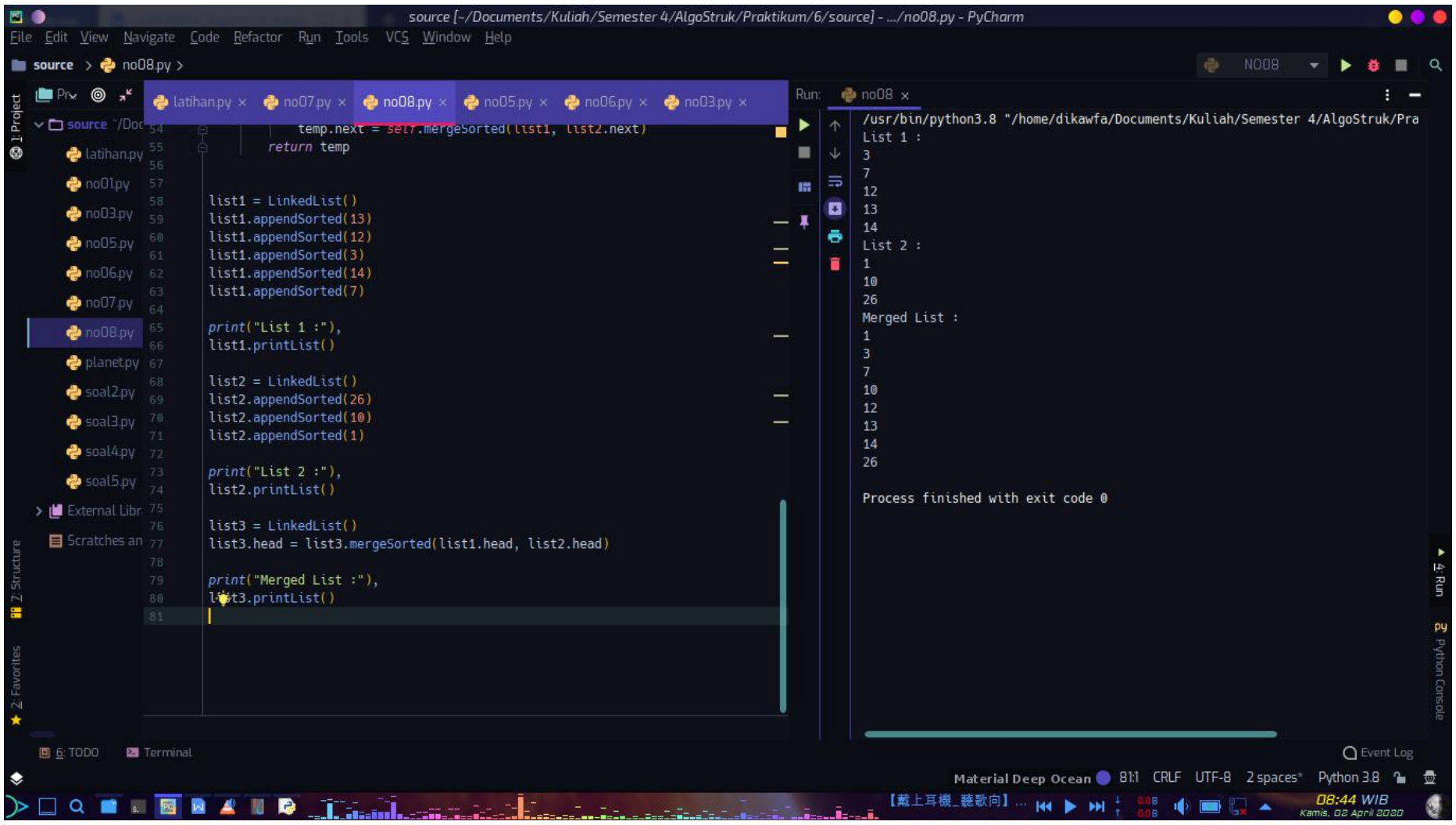
6.


source [~/Documents/Kuliah/Semester 4/AlgoStruk/Praktikum/6/source] - .../06.py - PyCharm
File Edit View Navigate Code Refactor Run Tools VCS Window Help
source > 06.py >
latihan.py × 03.py × 06.py ×
06.py ×
Run: 06 ×
/usr/bin/python3.8 "/home/dikawfa/Document
[4, 10, 12, 14, 26, 123, 124]
Process finished with exit code 0
6: TODO
Terminal
Event Log
Material Deep Ocean 44:1 CRLF UTF-8 4 spaces Python 3.8
Ansatsu Kyoushitsu ...
08:00 WIB
Kamis, 02 April 2020

7.


source [~/Documents/Kuliah/Semester 4/AlgoStruk/Praktikum/6/source] - .../no07.py - PyCharm
File Edit View Navigate Code Refactor Run Tools VCS Window Help
source > no07.py >
latihan.py × no07.py × no08.py × no05.py × no06.py × no03.py ×
Run: no07 ×
/usr/bin/python3.8 "/home/dikawfa/Documents/Kuliah/Semeste
bubble : 4.32371 detik
selection : 1.5095 detik
insertion : 1.88054 detik
merge : 0.0362499 detik
quick : 0.0139894 detik
merge sort baru : 0.0290613 detik
quick sort baru : 0.0227807 detik
merge sort awal : 0.0291307 detik
quick sort awal : 0.0173352 detik
Process finished with exit code 0
6: TODO
Terminal
Event Log
Material Deep Ocean 22:1 CRLF UTF-8 4 spaces Python 3.8
videoplayback.mp4
08:53 WIB
Kamis, 02 April 2020

8.


source [~/Documents/Kuliah/Semester 4/AlgoStruk/Praktikum/6/source] - .../no08.py - PyCharm
File Edit View Navigate Code Refactor Run Tools VCS Window Help
source > no08.py >
NO08
latihan.py × no07.py × no08.py × no05.py × no06.py × no03.py ×
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)
print("Merged List :"),
list3.printList()
Run: no08 ×
/usr/bin/python3.8 "/home/dikawfa/Documents/Kuliah/Semester 4/AlgoStruk/Pra
List 1 :
3
7
12
13
14
List 2 :
1
10
26
Merged List :
1
3
7
10
12
13
14
26
Process finished with exit code 0
6: TODO
Terminal
Event Log
Material Deep Ocean
81:1 CRLF UTF-8 2 spaces* Python 3.8
08:44 WIB
Kamis, 02 April 2020