LAPORAN

PRAKTIKUM ALGORITMA DAN STRUKTUR DATA

(MODUL 5)

“ PENGURUTAN”

Disusun oleh :

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KELAS : E

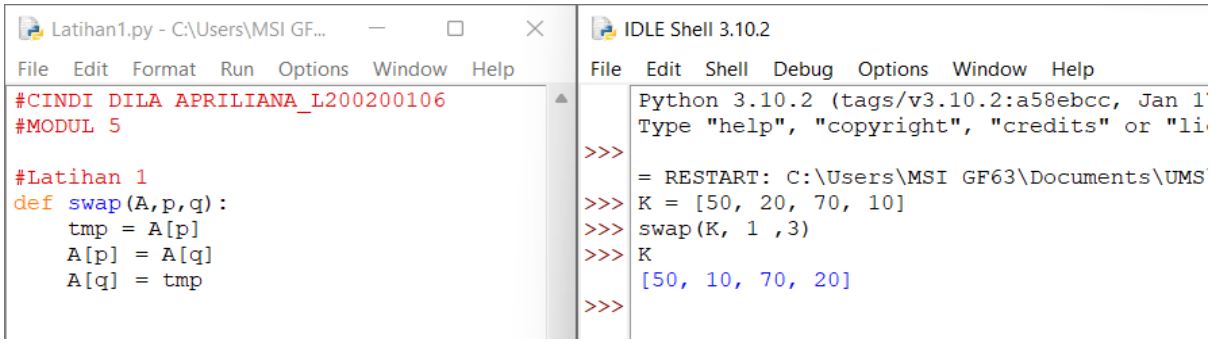
INFORMATIKA

FAKULTAS KOMUNIKASI DAN INFORMATIKA

UNIVERSITAS MUHAMMADIYAH SURAKARTA

TAHUN 2021/2022

Latihan 1



Latihan1.py - C:\Users\MSI GF...

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```
#CINDI DILA APRILIANA_L200200106
#MODUL 5

#Latihan 1
def swap(A,p,q):
    tmp = A[p]
    A[p] = A[q]
    A[q] = tmp
```

IDLE Shell 3.10.2

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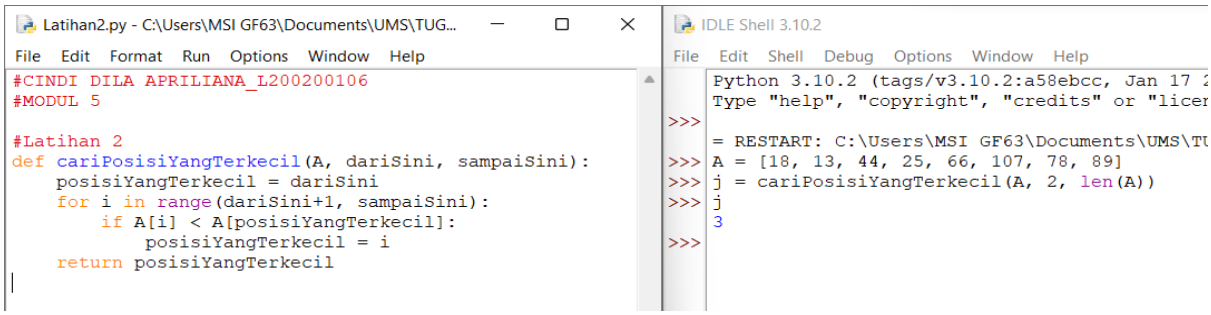
```
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 1
Type "help", "copyright", "credits" or "li
>>>
= RESTART: C:\Users\MSI GF63\Documents\UMS
>>> K = [50, 20, 70, 10]
>>> swap(K, 1 ,3)
>>> K
[50, 10, 70, 20]
>>>
```

Latihan 2



Latihan2.py - C:\Users\MSI GF63\Documents\UMS\TUG...

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```
#CINDI DILA APRILIANA_L200200106
#MODUL 5

#Latihan 2
def cariPosisiYangTerkecil(A, dariSini, sampaiSini):
    posisiYangTerkecil = dariSini
    for i in range(dariSini+1, sampaiSini):
        if A[i] < A[posisiYangTerkecil]:
            posisiYangTerkecil = i
    return posisiYangTerkecil
```

IDLE Shell 3.10.2

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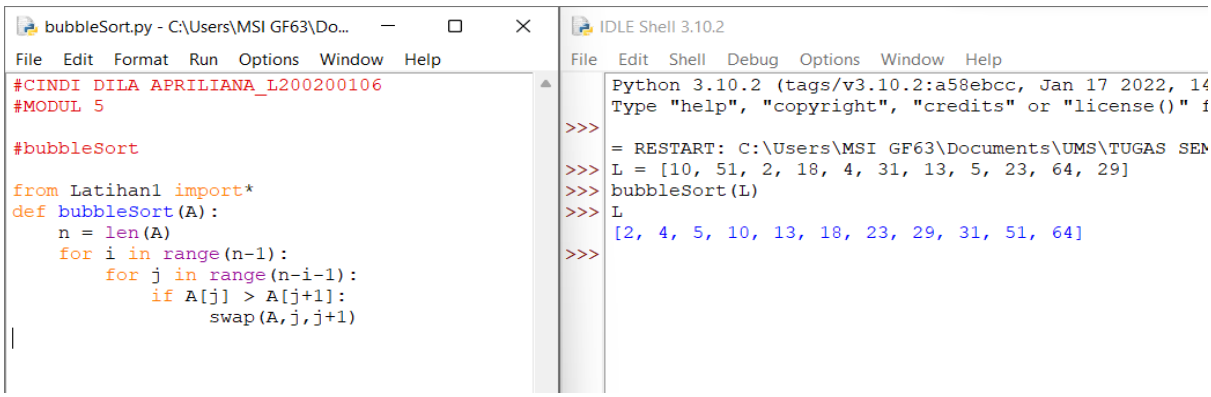
```
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 17 2
Type "help", "copyright", "credits" or "licer
>>>
= RESTART: C:\Users\MSI GF63\Documents\UMS\TU
>>> A = [18, 13, 44, 25, 66, 107, 78, 89]
>>> j = cariPosisiYangTerkecil(A, 2, len(A))
>>> j
3
>>>
```

BubbleSort



bubbleSort.py - C:\Users\MSI GF63\Do...

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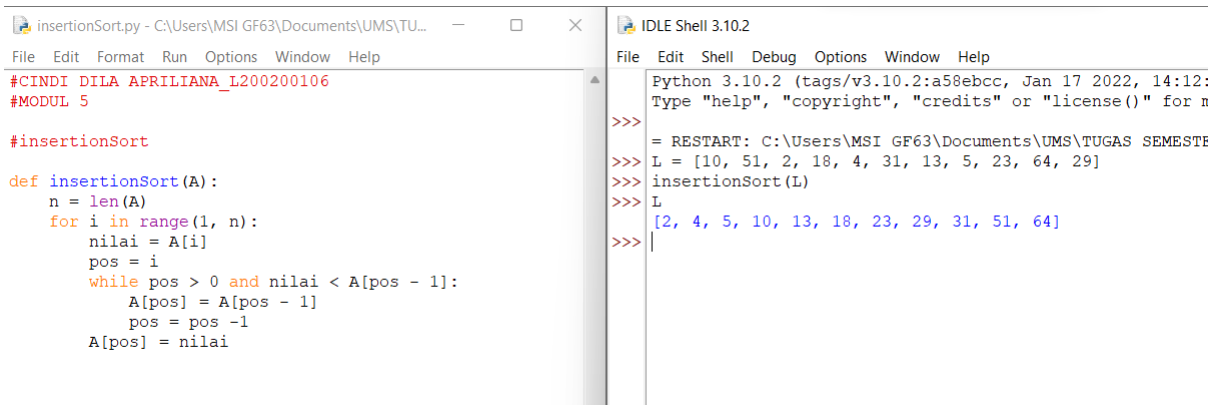
```
#CINDI DILA APRILIANA_L200200106
#MODUL 5

#bubbleSort

from Latihan1 import*
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)
```

IDLE Shell 3.10.2

File Edit Shell Debug Options Window Help

```
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 17 2022, 14
Type "help", "copyright", "credits" or "license()" f
>>>
= RESTART: C:\Users\MSI GF63\Documents\UMS\TUGAS SEM
>>> L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> bubbleSort(L)
>>> L
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
```

insertionSort



insertionSort.py - C:\Users\MSI GF63\Documents\UMS\TU...

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```
#CINDI DILA APRILIANA_L200200106
#MODUL 5

#insertionSort

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
```

IDLE Shell 3.10.2

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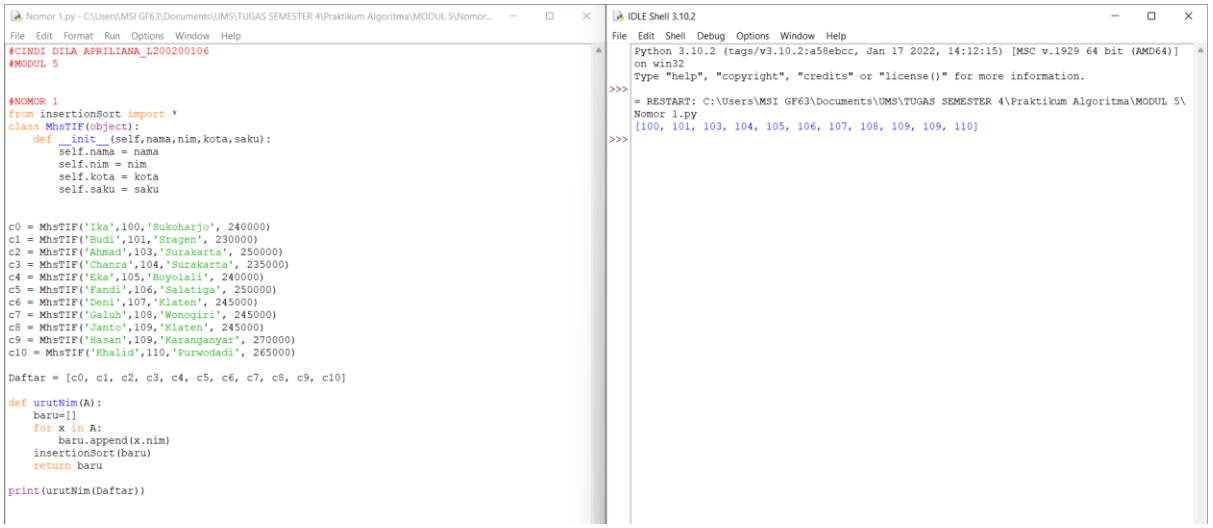
```
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 17 2022, 14:12:
Type "help", "copyright", "credits" or "license()" for m
>>>
= RESTART: C:\Users\MSI GF63\Documents\UMS\TUGAS SEMESTE
>>> L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> insertionSort(L)
>>> L
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
```

Soal-soal untuk Mahasiswa

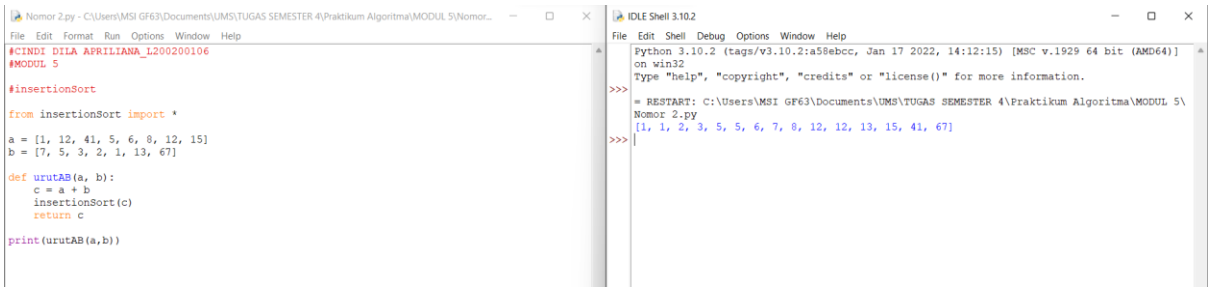
1. Buatlah suatu program untuk mengurutkan array mahasiswa berdasarkan NIM, yang elemennya terbuat dari class MhsTIF, yang telah kamu buat sebelumnya.



```
#CINDI DILA APRILIANA_L200200106
#MODUL 5


#NOMOR 1
from insertionSort import *
class MhsTIF(object):
    def __init__(self,nama,nim,kota,saku):
        self.nama = nama
        self.nim = nim
        self.kota = kota
        self.saku = saku


c0 = MhsTIF('Ika',100,'Sukoharjo', 240000)
c1 = MhsTIF('Budi',101,'Sragen', 230000)
c2 = MhsTIF('Ahmad',103,'Surakarta', 250000)
c3 = MhsTIF('Chanra',104,'Surakarta', 235000)
c4 = MhsTIF('Eka',105,'Boyolali', 240000)
c5 = MhsTIF('Fandi',106,'Salatiga', 250000)
c6 = MhsTIF('Deni',107,'Klaten', 245000)
c7 = MhsTIF('Galuh',108,'Wonogiri', 245000)
c8 = MhsTIF('Janto',109,'Klaten', 245000)
c9 = MhsTIF('Hasan',109,'Karanganyar', 270000)
c10 = MhsTIF('Khalid',110,'Purwodadi', 265000)

Daftar = [c0, c1, c2, c3, c4, c5, c6, c7, c8, c9, c10]

def urutNim(A):
    baru=[]
    for x in A:
        baru.append(x.nim)
    insertionSort(baru)
    return baru

print(urutNim(Daftar))
```

```
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 17 2022, 14:12:15) [MSC v.1929 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\MSI GF63\Documents\UMS\TUGAS SEMESTER 4\Praktikum Algoritma\MODUL 5\
Nomor 1.py
[100, 101, 103, 104, 105, 106, 107, 108, 109, 109, 110]
>>>
```

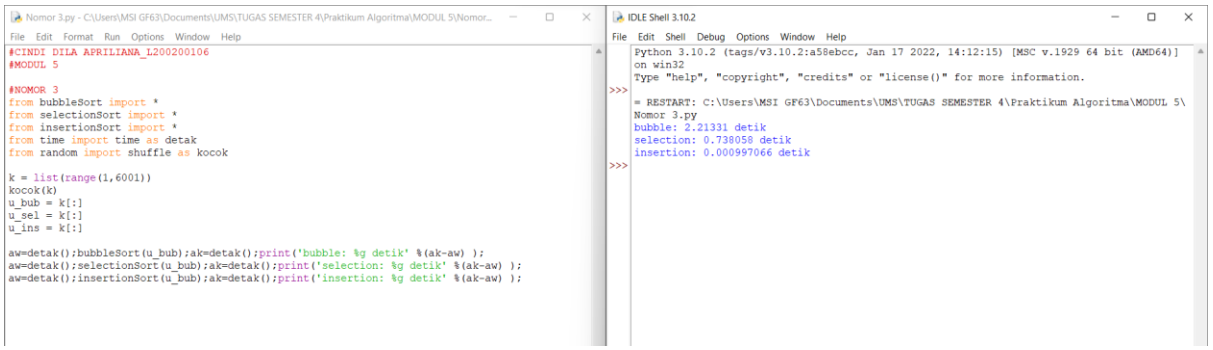
2. Misal terdapat dua buah array yang sudah urut A dan B. Buatlah suatu program untuk menggabungkan, secara efisien, kedua array itu menjadi suatu array C yang urut.



```
#CINDI DILA APRILIANA_L200200106
#MODUL 5

#insertionSort

from insertionSort import *

a = [1, 12, 41, 5, 6, 8, 12, 15]
b = [7, 5, 3, 2, 1, 13, 67]

def urutAB(a, b):
    c = a + b
    insertionSort(c)
    return c

print(urutAB(a,b))
```

```
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 17 2022, 14:12:15) [MSC v.1929 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\MSI GF63\Documents\UMS\TUGAS SEMESTER 4\Praktikum Algoritma\MODUL 5\
Nomor 2.py
[1, 1, 2, 3, 5, 5, 6, 7, 8, 12, 12, 13, 15, 41, 67]
>>>
```

3. Kamu mungkin sudah menduga, bubble sort lebih lambat dari selection sort dan juga insertion sort. Tapi manakah yang lebih cepat antara selection sort dan insertion sort?7 Untuk memulai menyelidikinya, kamu bisa membandingkan waktu yang diperlukan untuk mengurutkan sebuah array yang besar, misal sepanjang 6000 (enam ribu) elemen



```
#CINDI DILA APRILIANA_L200200106
#MODUL 5

#NOMOR 3
from bubbleSort import *
from selectionSort import *
from insertionSort import *
from time import time as detak
from random import shuffle as kocok

k = list(range(1,6001))
kocok(k)
u_bub = k[:]
u_sel = k[:]
u_ins = k[:]

aw=detak();bubbleSort(u_bub);ak=detak();print('bubble: %g detik' %(ak-aw) );
aw=detak();selectionSort(u_bub);ak=detak();print('selection: %g detik' %(ak-aw) );
aw=detak();insertionSort(u_bub);ak=detak();print('insertion: %g detik' %(ak-aw) );
```

```
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 17 2022, 14:12:15) [MSC v.1929 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\MSI GF63\Documents\UMS\TUGAS SEMESTER 4\Praktikum Algoritma\MODUL 5\
Nomor 3.py
bubble: 2.21331 detik
selection: 0.738058 detik
insertion: 0.000997066 detik
>>>
```