ALGORITHM AND DATA STRUCTURE PRACTICUM

MODULE 5

SORTING

CREATED BY :

KURNIAWAN BAGASKARA

L200214253

INFORMATICS STUDY PROGRAM

FACULTY OF COMMUNICATION AND INFORMATION SCIENCE

MUHAMMADIYAH SURAKARTA UNIVERSITY

1.

```
class MhsTIF(object):
    listKuliah = []
    def __init__(self, nama, NIM, kota, us):
        self.nama = nama
        self.NIM = NIM
        self.kotaTinggal = kota
        self.uangSaku = us

c0 = MhsTIF('Ika',153,'Sukoharjo', 240000)
c1 = MhsTIF('Budi',120,'Sragen', 230000)
c2 = MhsTIF('Ali',22,'Surakarta', 250000)
c3 = MhsTIF('Caca',180,'Surakarta', 235000)
c4 = MhsTIF('Eka',47,'Boyolali', 240000)
c5 = MhsTIF('Kamidi',131,'Salatiga', 250000)
c6 = MhsTIF('Deni',132,'Klaten', 245000)
c7 = MhsTIF('Ngatiyem',50,'Wonogiri', 245000)
c8 = MhsTIF('Sumanto',23,'Klaten', 245000)
c9 = MhsTIF('Hamid',64,'Karanganyar', 270000)
c10 = MhsTIF('Yetno',70,'Purwodadi', 265000)

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

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

def sortNIM(daftar):
    n = len(daftar)
    for i in range(n-1):
```

```
        for j in range(n-i-1):
            if daftar[j].NIM > daftar[j+1].NIM:
                swap(daftar, j, j+1)


def checkNIM(a):
    n = len(a)
    for i in a :
        print('NIM : {} \nNama : {} \nKota Tinggal : {}\n'.format(i.NIM, i.nama,
i.kotaTinggal))


print ('Kurniawan Bagaskara')
print ('L200214253')
```

```
Shell ×
 Kurniawan Bagaskara
 L200214253
>>> sortNIM(Daftar)
>>> checkNIM(Daftar)
 NIM : 22
 Nama : Ali
 Kota Tinggal : Surakarta

 NIM : 23
 Nama : Sumanto
 Kota Tinggal : Klaten

 NIM : 47
 Nama : Eka
 Kota Tinggal : Boyolali

 NIM : 50
 Nama : Ngatiyem
 Kota Tinggal : Wonogiri

 NIM : 64
 Nama : Hamid
 Kota Tinggal : Karanganyar

 NIM : 70
 Nama : Yetno
 Kota Tinggal : Purwodadi

 NIM : 120
 Nama : Budi
 Kota Tinggal : Sragen
```

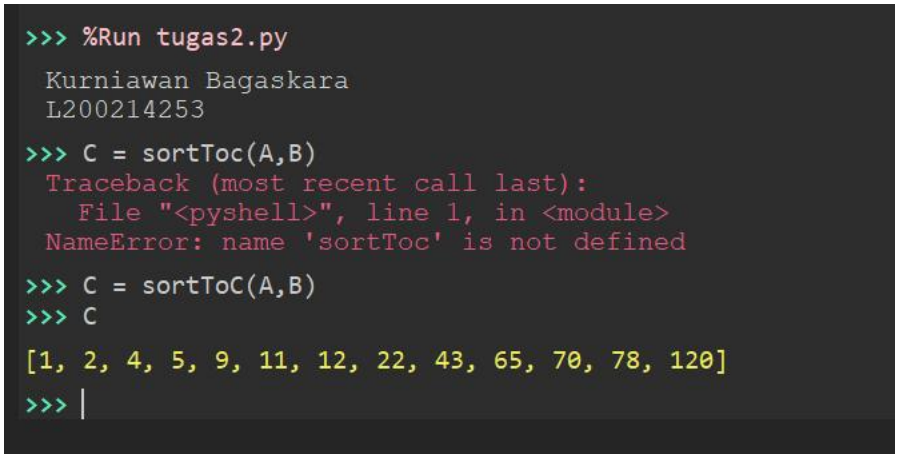
```
NIM : 120
Nama : Budi
Kota Tinggal : Sragen

NIM : 131
Nama : Kamidi
Kota Tinggal : Salatiga

NIM : 132
Nama : Deni
Kota Tinggal : Klaten

NIM : 153
Nama : Ika
Kota Tinggal : Sukoharjo

NIM : 180
Nama : Caca
Kota Tinggal : Surakarta
```

2.

A = [2,9,78,65,5,70]

B = [1,4,12,43,22,11,120]

```
def sortToC(a, b):
    c = a+b
    for i in range(1, len(c)):
        nilai = c[i]
        pos = i
        while pos > 0 and nilai < c[pos - 1]:
            c[pos] = c[pos-1]
            pos -=1
        c[pos] = nilai
    return c
print ('Kurniawan Bagaskara')
print ('L200214253')
```



3.

```
from time import time as detak
from random import shuffle as acak

def swap(A, p , q):
    tmp = A[p]
    A[p] = A[q]
    A[q] = tmp

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

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 = cariPosisiYangTerkecil(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

x = [i for i in range(1, 6001)]
acak(x)
u_bub = x[:]
u_sel = x[:]
u_ins = x[:]

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));
print ('Kurniawan Bagaskara')
print ('L200214253')
```

```
Python 3.7.9 (bundled)
>>> %Run tugas3.py
  bubble: 4.74961 detik
  selection: 1.50144 detik
  insertion: 2.21093 detik
  Kurniawan Bagaskara
  L200214253
```