

# LAPORAN PRAKTIKUM ALGORITMA DAN STRUKTUR DATA

## MODUL 5



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```
##=====Latihan=====
```

```
##Latihan 1
```

```
def swap(a,b,c):  
    tmp=a[b]  
    a[b]=a[c]  
    a[c]=tmp
```

```
K = [50,20,70,10]
```

```
swap(K,1,3)
```

**Output:**

```
>>> print(K)  
[50, 10, 70, 20]
```

```
##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
```

```
A = [18, 13, 44, 25, 66, 107, 78, 89]
```

```
j = cariPosisiYangTerkecil(A, 2, len(A))
```

```
L = [10,51,2,18,4,31,13,5,23,64,29]
```

**Output:**

```
>>> print(j)  
3
```

### ##Latihan 3

```
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)  
    return A
```

#### Output:

```
>>> bubbleSort(A)  
[13, 18, 25, 44, 66, 78, 89, 107]  
>>> bubbleSort(L)  
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
```

### ##Latihan 4

```
def selectionSort(A):  
    n = len(A)  
    for i in range(n - 1):  
        indexKecil = cariPosisiYangTerkecil(A,i,n)  
        if indexKecil != i:  
            swap(A,i,indexKecil)  
    return A
```

#### Output:

```
>>> selectionSort(A)  
[13, 18, 25, 44, 66, 78, 89, 107]  
>>> selectionSort(L)  
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
```

### ##Latihan 5

```
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  
    return A
```

#### Output:

```
>>> insertionSort(A)  
[13, 18, 25, 44, 66, 78, 89, 107]  
>>> insertionSort(L)  
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
```

# #=====Tugas Mahasiswa=====

```
class MhsTIF(object):
    def __init__(self,nama,nim,kotaTinggal,us):
        self.nama = nama
        self.nim = nim
        self.kotaTinggal = kotaTinggal
        self.uangSaku = us

c0 = MhsTIF('Ika', 'L20019001', 'Sukoharjo', 240000)
c1 = MhsTIF('Budi', 'L20019003', 'Sragen', 230000)
c2 = MhsTIF('Ahmad', 'L20019002', 'Surakarta', 250000)
c3 = MhsTIF('Chandra', 'L20019004', 'Surakarta', 235000)
c4 = MhsTIF('Eka', 'L20019006', 'Boyolali', 240000)
c5 = MhsTIF('Fandi', 'L20019005', 'Salatiga', 250000)
c6 = MhsTIF('Deni', 'L20019007', 'Klaten', 245000)
c7 = MhsTIF('Galuh', 'L20019009', 'Wonogiri', 245000)
c8 = MhsTIF('Janto', 'L20019008', 'Klaten', 245000)
c9 = MhsTIF('Hasan', 'L20019011', 'Karanganyar', 270000)
c10 = MhsTIF('Khalid', 'L20019010', 'Purwodadi', 265000)

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

## #Nomor 1

```
def swap(i,j,k):
    tmp=i[j]
    i[j]=i[k]
    i[k]=tmp

def urutNim(i):
    n = len(i)
    for x in range(n-1):
        for y in range(n-x-1):
            if i[y].nim > i[y+1].nim:
                swap(i,y,y+1)

def cekNim(x):
    for y in x:
        print(y.nama, y.nim, y.kotaTinggal)
```

### Output:

```
>>> cekNim(Daftar)
Ika L20019001 Sukoharjo
Budi L20019003 Sragen
Ahmad L20019002 Surakarta
Chandra L20019004 Surakarta
Eka L20019006 Boyolali
Fandi L20019005 Salatiga
Deni L20019007 Klaten
Galuh L20019009 Wonogiri
Janto L20019008 Klaten
Hasan L20019011 Karanganyar
Khalid L20019010 Purwodadi
>>> urutNim(Daftar)
>>> cekNim(Daftar)
Ika L20019001 Sukoharjo
Ahmad L20019002 Surakarta
Budi L20019003 Sragen
Chandra L20019004 Surakarta
Fandi L20019005 Salatiga
Eka L20019006 Boyolali
Deni L20019007 Klaten
Janto L20019008 Klaten
Galuh L20019009 Wonogiri
Khalid L20019010 Purwodadi
Hasan L20019011 Karanganyar
```

### # Nomer 2

```
a = [10,9,8,7,6,5,4,3,2,1]
b = [20,19,18,17,16,15,14,13,12,11]
```

```
def urut(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
    print©
```

### Output:

```
>>> urut(a,b)
[1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20]
```

### ## Nomer 3

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

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

```
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 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 insertionSort(A):
    n = len(A)
    for i in range(1, n):
        nilai = A[i]
        posisi = i
        while posisi > 0 and nilai < A[posisi-1]:
            A[posisi] = A[posisi-1]
            posisi = posisi-1
        A[posisi] = nilai
```

```
from time import time as detik
from random import shuffle as kocok
```

```
k = [i for i in range(1,6001)]
kocok(k)
u_bub = k[:]
u_sel = k[:]
u_ins = k[:]
```

```
aw = detik();bubbleSort(u_bub);ak=detak();print("Bubble: %g detik"%(ak-aw));
aw = detik();selectionSort(u_sel);ak=detak();print("Selection: %g detik"%(ak-aw));
aw = detik();insertionSort(u_ins);ak=detak();print("Insertion: %g detik"%(ak-aw));
```

### Output:

```
dul5.py
Bubble: 14.6788 detik
Selection: 3.68721 detik
Insertion: 6.9174 detik
```