

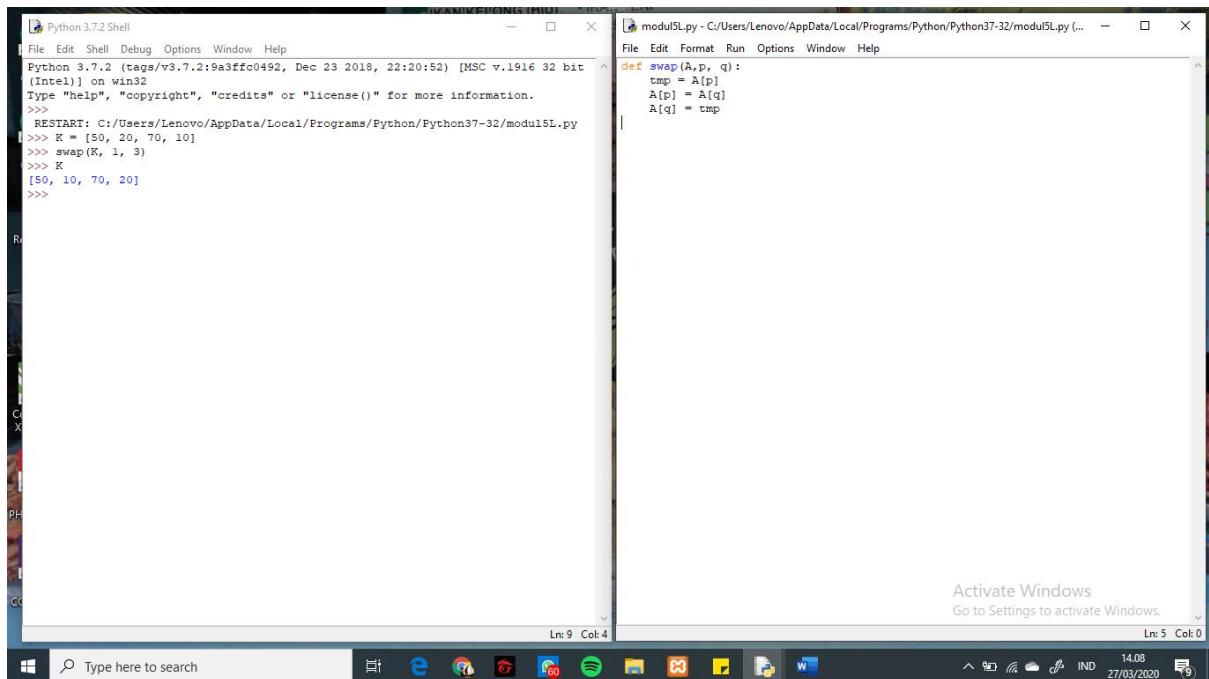
Nama : Abid Muhammad Taufiq

NIM : L200180059

Kelas : C

## MODUL 5

### 1. Routine swap untuk menukar A[p] dan A[q]



The screenshot shows two windows. The left window is a Python 3.7.2 Shell with the following code and output:

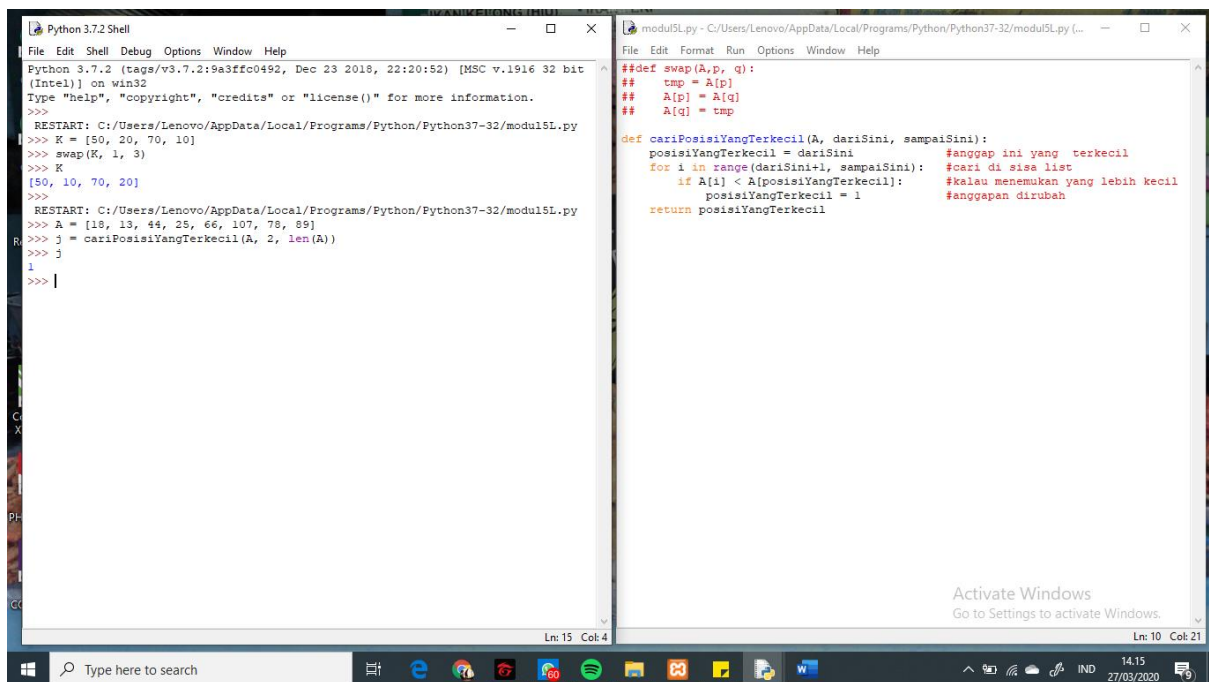
```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 22:20:52) [MSC v.1916 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> K = [50, 20, 70, 10]
>>> swap(K, 1, 3)
>>> K
[50, 10, 70, 20]
>>>
```

The right window is a text editor showing the definition of the `swap` function:

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

The Windows taskbar at the bottom shows the date and time as 14:08 on 27/03/2020.

### 2. Routine untuk mencari index dari elemen yang terkecil



The screenshot shows two windows. The left window is a Python 3.7.2 Shell with the following code and output:

```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 22:20:52) [MSC v.1916 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> K = [50, 20, 70, 10]
>>> swap(K, 1, 3)
>>> K
[50, 10, 70, 20]
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> A = [18, 13, 44, 25, 66, 107, 78, 89]
>>> j = cariPosisiYangTerkecil(A, 2, len(A))
>>> j
1
>>>
```

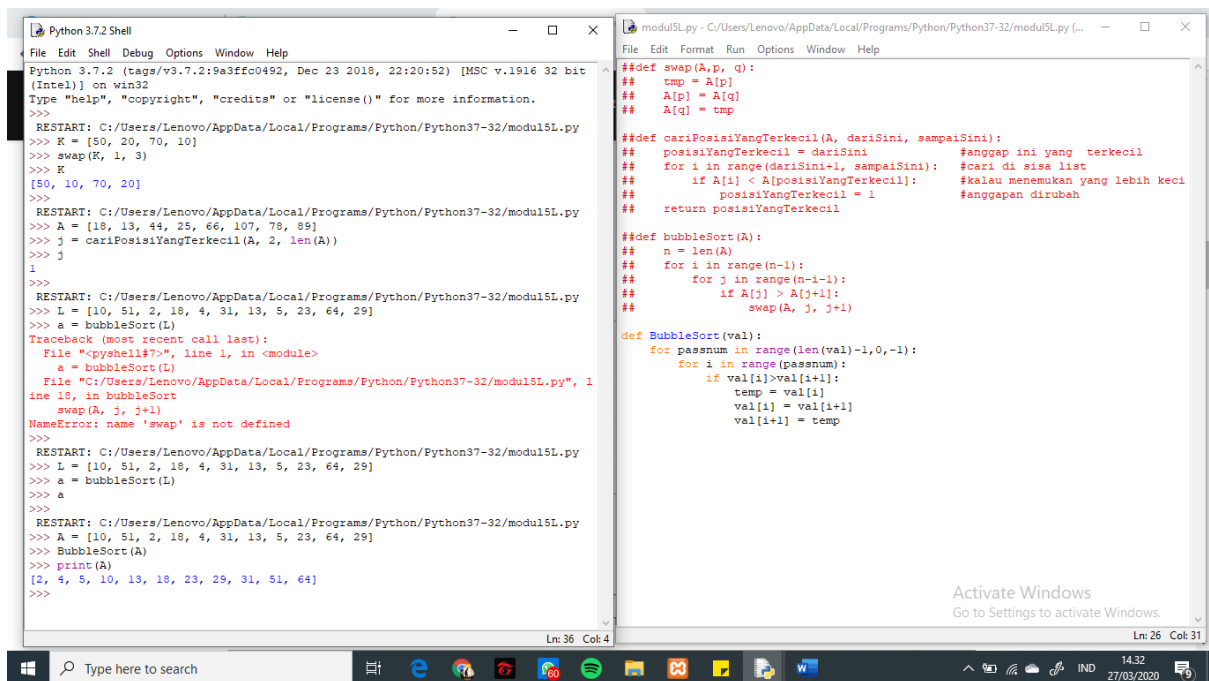
The right window is a text editor showing the definition of the `cariPosisiYangTerkecil` function:

```
##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
```

The Windows taskbar at the bottom shows the date and time as 14:15 on 27/03/2020.

### 3. Bubble sort



The image shows a Windows desktop with two open windows. The left window is a Python 3.7.2 Shell, and the right window is a Python file editor showing the code for the bubble sort algorithm.

**Python 3.7.2 Shell:**

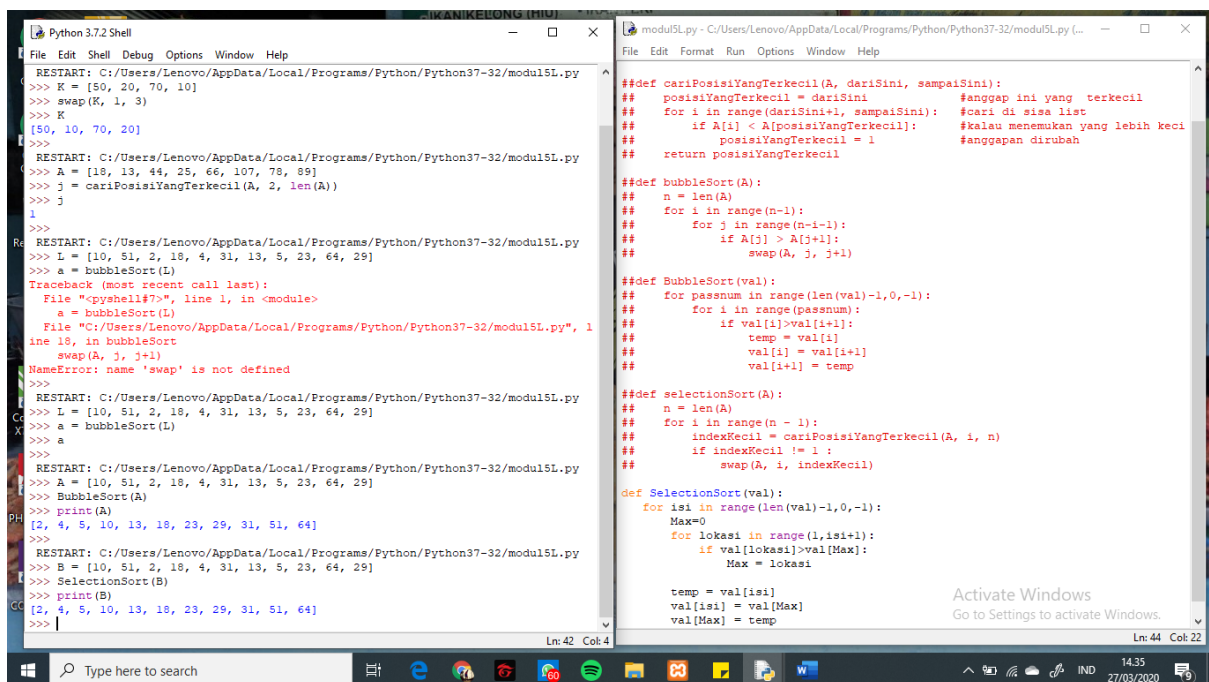
```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 22:20:52) [MSC v.1916 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> K = [50, 20, 70, 10]
>>> swap(K, 1, 3)
>>> K
[50, 10, 70, 20]
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> A = [18, 13, 44, 25, 66, 107, 78, 89]
>>> j = cariPosisiYangTerkecil(A, 2, len(A))
>>> j
1
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> a = bubbleSort(L)
Traceback (most recent call last):
  File "<pyshell#7>", line 1, in <module>
    a = bubbleSort(L)
  File "C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py", line 18, in bubbleSort
    swap(A, j, j+1)
NameError: name 'swap' is not defined
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> a = bubbleSort(L)
>>> a
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> A = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> BubbleSort(A)
>>> print(A)
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
```

**modul5L.py - C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py (...):**

```
File Edit Format Run Options Window Help
##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 BubbleSort(val):
    for passnum in range(len(val)-1, 0, -1):
        for i in range(passnum):
            if val[i]>val[i+1]:
                temp = val[i]
                val[i] = val[i+1]
                val[i+1] = temp

```

### 4. Selection Sort



The image shows a Windows desktop with two open windows. The left window is a Python 3.7.2 Shell, and the right window is a Python file editor showing the code for the selection sort algorithm.

**Python 3.7.2 Shell:**

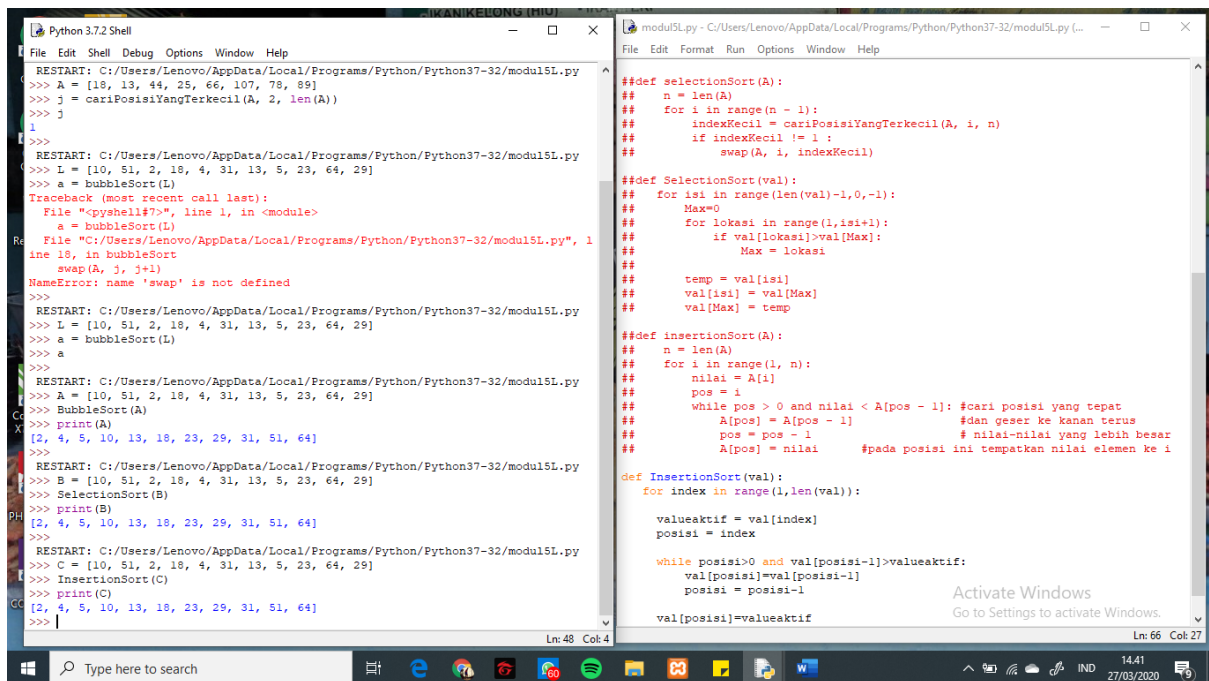
```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 22:20:52) [MSC v.1916 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> K = [50, 20, 70, 10]
>>> swap(K, 1, 3)
>>> K
[50, 10, 70, 20]
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> A = [18, 13, 44, 25, 66, 107, 78, 89]
>>> j = cariPosisiYangTerkecil(A, 2, len(A))
>>> j
1
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> a = bubbleSort(L)
Traceback (most recent call last):
  File "<pyshell#7>", line 1, in <module>
    a = bubbleSort(L)
  File "C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py", line 18, in bubbleSort
    swap(A, j, j+1)
NameError: name 'swap' is not defined
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> a = bubbleSort(L)
>>> a
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> A = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> BubbleSort(A)
>>> print(A)
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> B = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> SelectionSort(B)
>>> print(B)
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
```

**modul5L.py - C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py (...):**

```
File Edit Format Run Options Window Help
##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 BubbleSort(val):
##    for passnum in range(len(val)-1, 0, -1):
##        for i in range(passnum):
##            if val[i]>val[i+1]:
##                temp = val[i]
##                val[i] = val[i+1]
##                val[i+1] = temp
##
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 SelectionSort(val):
    for isi in range(len(val)-1, 0, -1):
        Max=0
        for lokasi in range(1, isi+1):
            if val[lokasi]>val[Max]:
                Max = lokasi
        temp = val[isi]
        val[isi] = val[Max]
        val[Max] = temp

```

## 5. Insertion Sort



The image shows a screenshot of a Windows desktop with two windows open. The left window is a Python 3.7.2 Shell, and the right window is a text editor showing the code for the sorting algorithms.

**Python 3.7.2 Shell:**

```
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> A = [18, 13, 44, 25, 66, 107, 78, 89]
>>> j = cariPosisiYangTerkecil(A, 2, len(A))
>>> j
1
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> a = bubbleSort(L)
Traceback (most recent call last):
  File "<pyshell#7>", line 1, in <module>
    a = bubbleSort(L)
  File "C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py", line 19, in bubbleSort
    swap(A, j, j+1)
NameError: name 'swap' is not defined
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> L = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> a = bubbleSort(L)
>>> a
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> A = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> BubbleSort(A)
>>> print(A)
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> B = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> SelectionSort(B)
>>> print(B)
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
RESTART: C:/Users/Lenovo/AppData/Local/Programs/Python/Python37-32/modul5L.py
>>> C = [10, 51, 2, 18, 4, 31, 13, 5, 23, 64, 29]
>>> InsertionSort(C)
>>> print(C)
[2, 4, 5, 10, 13, 18, 23, 29, 31, 51, 64]
>>>
```

**modul5L.py:**

```
##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 SelectionSort(val):
##    for isi in range(len(val)-1,0,-1):
##        Max=0
##        for lokasi in range(1,isi+1):
##            if val[lokasi]>val[Max]:
##                Max = lokasi
##
##        temp = val[isi]
##        val[isi] = val[Max]
##        val[Max] = temp
##
##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]: #cari posisi yang tepat
##            A[pos] = A[pos - 1]             #dan geser ke kanan terus
##            pos = pos - 1                   # nilai-nilai yang lebih besar
##            A[pos] = nilai                 #pada posisi ini tempatkan nilai elemen ke i
##
def InsertionSort(val):
    for index in range(1,len(val)):
        valueaktif = val[index]
        posisi = index
        while posisi>0 and val[posisi-1]>valueaktif:
            val[posisi]=val[posisi-1]
            posisi = posisi-1
        val[posisi]=valueaktif
```