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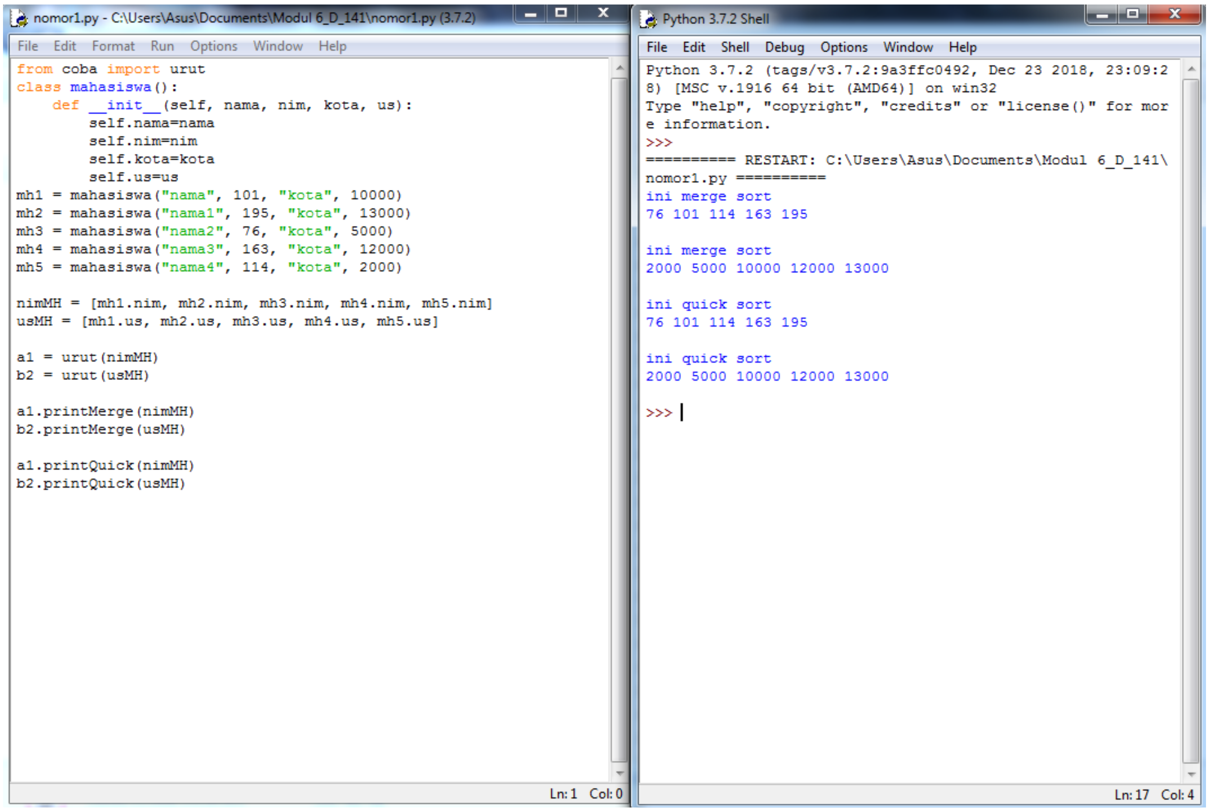
NIM : L200170141

Kelas : D

Modul 6

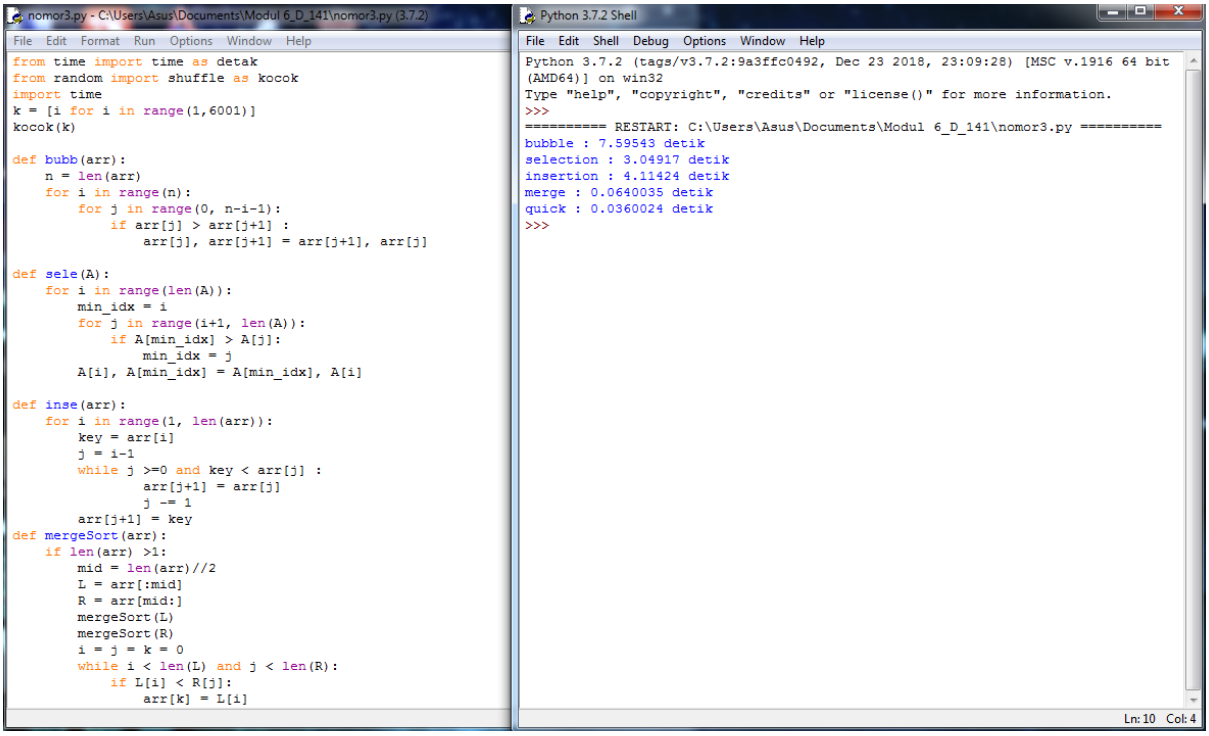
Nomer 1


nomor1.py - C:\Users\Asus\Documents\Modul 6_D_141\nomor1.py (3.7.2)
File Edit Format Run Options Window Help
Ln: 1 Col: 0
Python 3.7.2 Shell
File Edit Shell Debug Options Window Help
Ln: 17 Col: 4

```
from coba import urut
class mahasiswa():
    def __init__(self, nama, nim, kota, us):
        self.nama=nama
        self.nim=nim
        self.kota=kota
        self.us=us
mh1 = mahasiswa("nama", 101, "kota", 10000)
mh2 = mahasiswa("nama1", 195, "kota", 13000)
mh3 = mahasiswa("nama2", 76, "kota", 5000)
mh4 = mahasiswa("nama3", 163, "kota", 12000)
mh5 = mahasiswa("nama4", 114, "kota", 2000)

nimMH = [mh1.nim, mh2.nim, mh3.nim, mh4.nim, mh5.nim]
usMH = [mh1.us, mh2.us, mh3.us, mh4.us, mh5.us]

a1 = urut(nimMH)
b2 = urut(usMH)

a1.printMerge(nimMH)
b2.printMerge(usMH)

a1.printQuick(nimMH)
b2.printQuick(usMH)
```

```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 23:09:2
8) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for mor
e information.
>>>
========== RESTART: C:\Users\Asus\Documents\Modul 6_D_141\
nomor1.py ==========
ini merge sort
76 101 114 163 195

ini merge sort
2000 5000 10000 12000 13000

ini quick sort
76 101 114 163 195

ini quick sort
2000 5000 10000 12000 13000

>>> |
```

Nomer 3

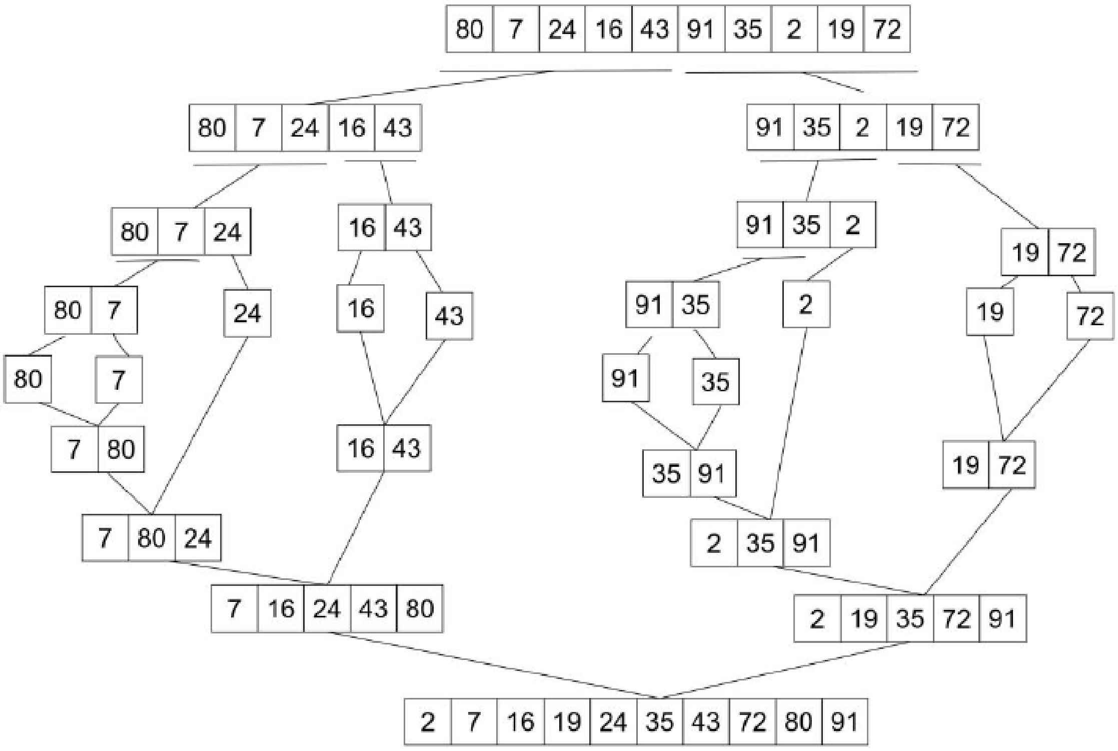


nomor3.py - C:\Users\Asus\Documents\Modul 6_D_141\nomor3.py (3.7.2)
File Edit Format Run Options Window Help
Python 3.7.2 Shell
File Edit Shell Debug Options Window Help
Ln: 10 Col: 4

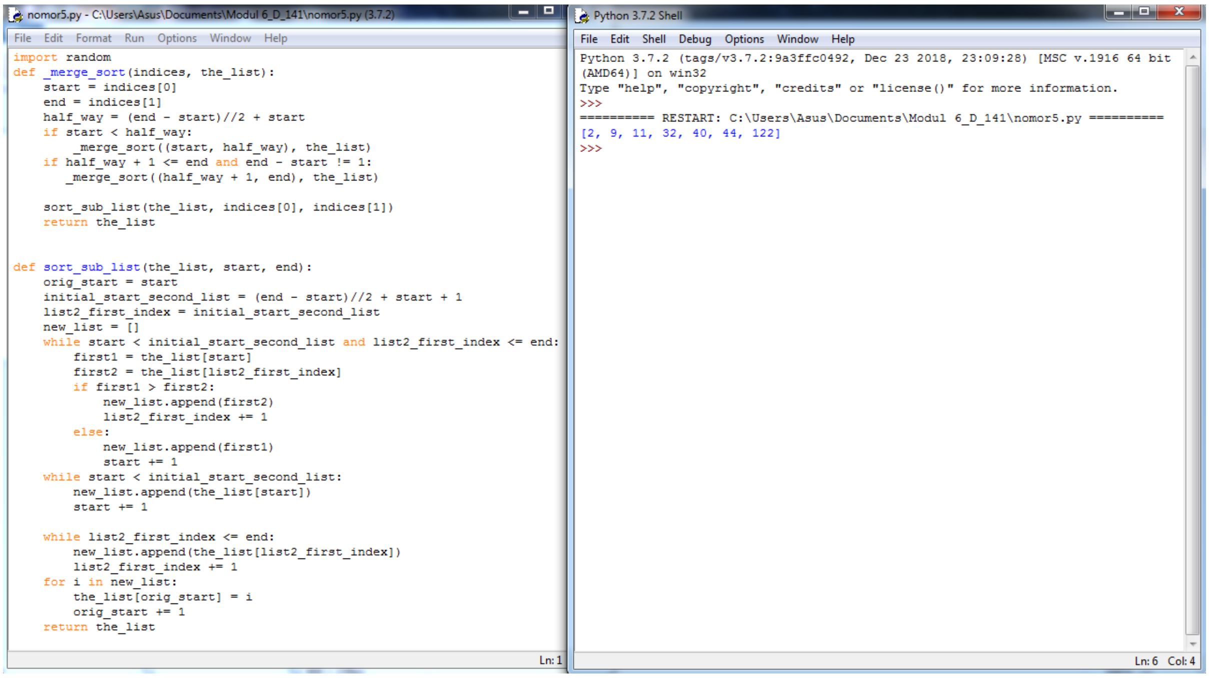
```python
from time import time as detak
from random import shuffle as kocok
import time
k = [i for i in range(1,6001)]
kocok(k)

def bubb(arr):
    n = len(arr)
    for i in range(n):
        for j in range(0, n-i-1):
            if arr[j] > arr[j+1] :
                arr[j], arr[j+1] = arr[j+1], arr[j]

def sele(A):
    for i in range(len(A)):
        min_idx = i
        for j in range(i+1, len(A)):
            if A[min_idx] > A[j]:
                min_idx = j
        A[i], A[min_idx] = A[min_idx], A[i]

def inse(arr):
    for i in range(1, len(arr)):
        key = arr[i]
        j = i-1
        while j >=0 and key < arr[j] :
                arr[j+1] = arr[j]
                j -= 1
        arr[j+1] = key
def mergeSort(arr):
    if len(arr) >1:
        mid = len(arr)//2
        L = arr[:mid]
        R = arr[mid:]
        mergeSort(L)
        mergeSort(R)
        i = j = k = 0
        while i < len(L) and j < len(R):
            if L[i] < R[j]:
                arr[k] = L[i]
```

```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 23:09:28) [MSC v.1916 64 bit
(AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Asus\Documents\Modul 6_D_141\nomor3.py ==========
bubble : 7.59543 detik
selection : 3.04917 detik
insertion : 4.11424 detik
merge : 0.0640035 detik
quick : 0.0360024 detik
>>>
```

Nomer 4A(Tracing Algoritma Merge Sort)



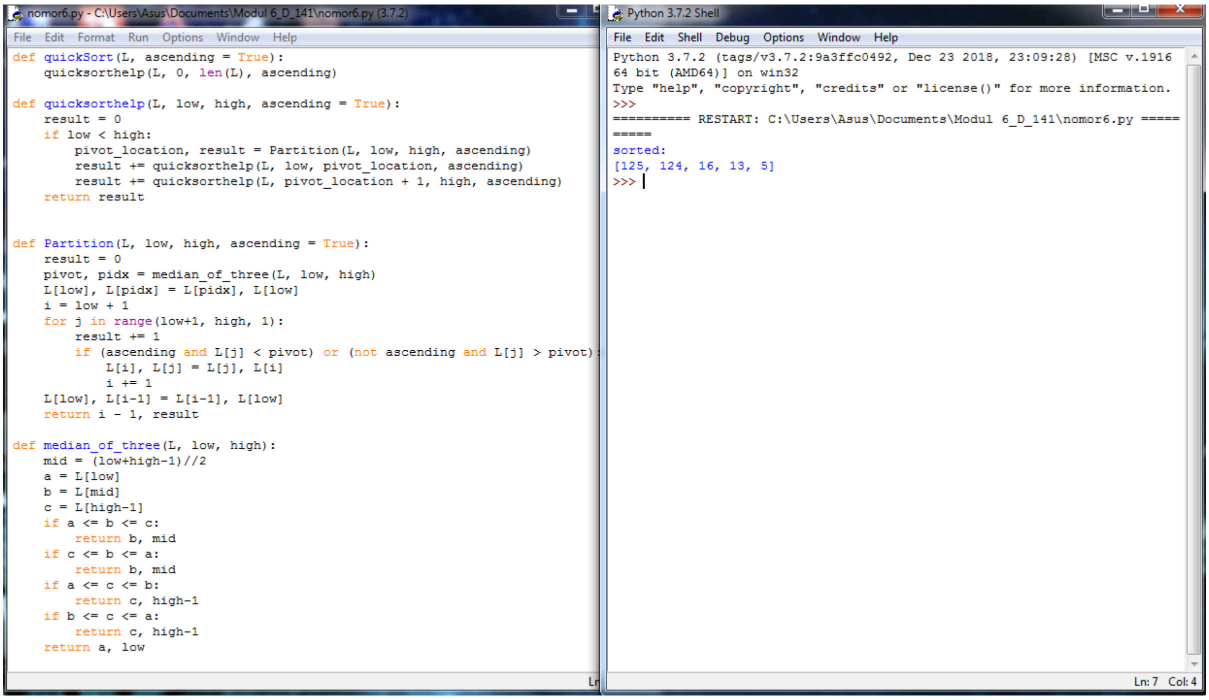
Nomor 5 (Merge Sort tanpa Slicing, menggunakan recursive)


nomor5.py - C:\Users\Asus\Documents\Modul 6_D_141\nomor5.py (3.7.2)
File Edit Format Run Options Window Help
Ln: 1
Python 3.7.2 Shell
File Edit Shell Debug Options Window Help
Ln: 6 Col: 4

```python
import random
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
```

```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 23:09:28) [MSC v.1916 64 bit
(AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Asus\Documents\Modul 6_D_141\nomor5.py ==========
[2, 9, 11, 32, 40, 44, 122]
>>>
```

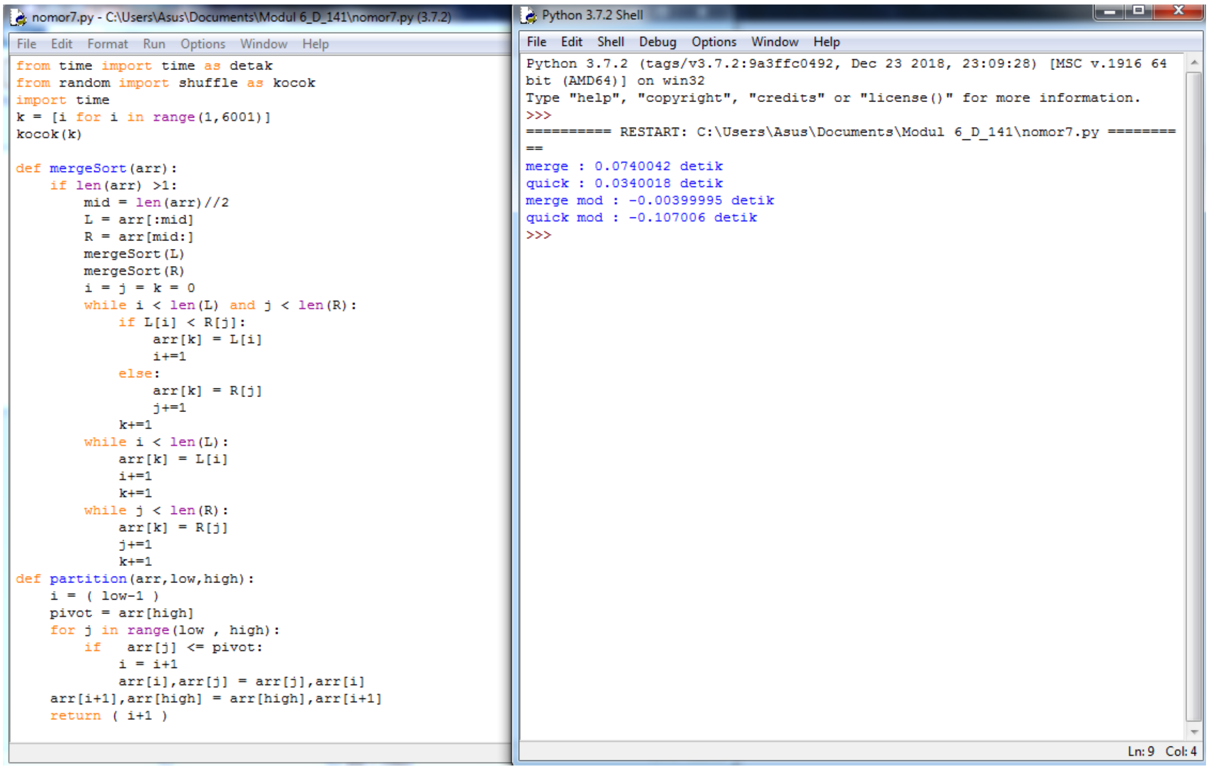
Nomor 6 (Quick Sort dengan Median of Three)


nomor6.py - C:\Users\Asus\Documents\Modul 6_D_141\nomor6.py (3.7.2)
File Edit Format Run Options Window Help
Python 3.7.2 Shell
File Edit Shell Debug Options Window Help
Ln: 7 Col: 4

```python
def quickSort(L, ascending = True):
    quicksorthelp(L, 0, len(L), ascending)

def quicksorthelp(L, low, high, ascending = True):
    result = 0
    if low < high:
        pivot_location, result = Partition(L, low, high, ascending)
        result += quicksorthelp(L, low, pivot_location, ascending)
        result += quicksorthelp(L, pivot_location + 1, high, ascending)
    return result


def Partition(L, low, high, ascending = True):
    result = 0
    pivot, pidx = median_of_three(L, low, high)
    L[low], L[pidx] = L[pidx], L[low]
    i = low + 1
    for j in range(low+1, high, 1):
        result += 1
        if (ascending and L[j] < pivot) or (not ascending and L[j] > pivot):
            L[i], L[j] = L[j], L[i]
            i += 1
    L[low], L[i-1] = L[i-1], L[low]
    return i - 1, result

def median_of_three(L, low, high):
    mid = (low+high-1)//2
    a = L[low]
    b = L[mid]
    c = L[high-1]
    if a <= b <= c:
        return b, mid
    if c <= b <= a:
        return b, mid
    if a <= c <= b:
        return c, high-1
    if b <= c <= a:
        return c, high-1
    return a, low
```

```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 23:09:28) [MSC v.1916
64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
========== RESTART: C:\Users\Asus\Documents\Modul 6_D_141\nomor6.py =====
=====
sorted:
[125, 124, 16, 13, 5]
>>> 
```

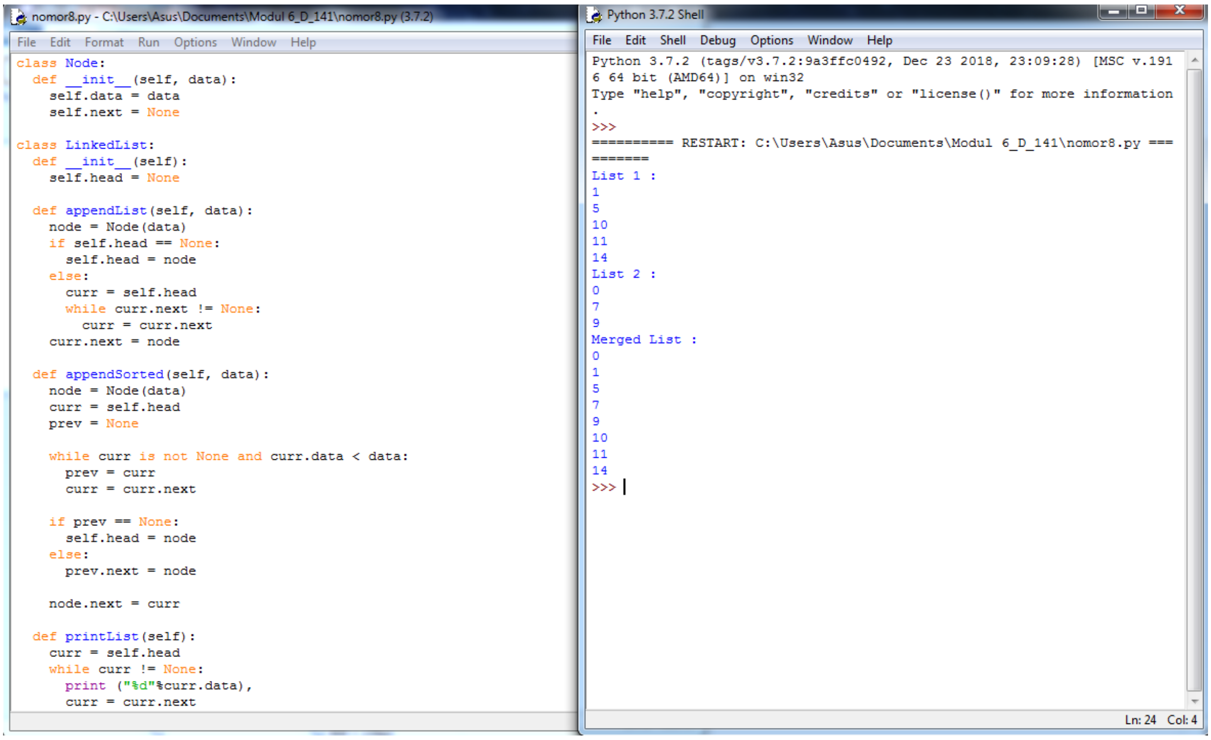
Nomer 7


nomor7.py - C:\Users\Asus\Documents\Modul 6_D_141\nomor7.py (3.7.2)
File Edit Format Run Options Window Help
Python 3.7.2 Shell
File Edit Shell Debug Options Window Help
Ln: 9 Col: 4

```python
from time import time as detak
from random import shuffle as kocok
import time
k = [i for i in range(1,6001)]
kocok(k)

def mergeSort(arr):
    if len(arr) >1:
        mid = len(arr)//2
        L = arr[:mid]
        R = arr[mid:]
        mergeSort(L)
        mergeSort(R)
        i = j = k = 0
        while i < len(L) and j < len(R):
            if L[i] < R[j]:
                arr[k] = L[i]
                i+=1
            else:
                arr[k] = R[j]
                j+=1
            k+=1
        while i < len(L):
            arr[k] = L[i]
            i+=1
            k+=1
        while j < len(R):
            arr[k] = R[j]
            j+=1
            k+=1
def partition(arr,low,high):
    i = ( low-1 )
    pivot = arr[high]
    for j in range(low , high):
        if   arr[j] <= pivot:
            i = i+1
            arr[i],arr[j] = arr[j],arr[i]
    arr[i+1],arr[high] = arr[high],arr[i+1]
    return ( i+1 )
```

```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 23:09:28) [MSC v.1916 64
bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 
========== RESTART: C:\Users\Asus\Documents\Modul 6_D_141\nomor7.py ========
==
merge : 0.0740042 detik
quick : 0.0340018 detik
merge mod : -0.00399995 detik
quick mod : -0.107006 detik
>>> 
```

Nomor 8 (Merge Sort dengan Linked List)


nomor8.py - C:\Users\Asus\Documents\Modul 6_D_141\nomor8.py (3.7.2)
File Edit Format Run Options Window Help
Python 3.7.2 Shell
File Edit Shell Debug Options Window Help
Ln: 24 Col: 4

```python
class Node:
  def __init__(self, data):
    self.data = data
    self.next = None

class LinkedList:
  def __init__(self):
    self.head = None

  def appendList(self, data):
    node = Node(data)
    if self.head == None:
      self.head = node
    else:
      curr = self.head
      while curr.next != None:
        curr = curr.next
    curr.next = node

  def appendSorted(self, data):
    node = Node(data)
    curr = self.head
    prev = None

    while curr is not None and curr.data < data:
      prev = curr
      curr = curr.next

    if prev == None:
      self.head = node
    else:
      prev.next = node

    node.next = curr

  def printList(self):
    curr = self.head
    while curr != None:
      print ("%d"%curr.data),
      curr = curr.next
```

```
Python 3.7.2 (tags/v3.7.2:9a3ffc0492, Dec 23 2018, 23:09:28) [MSC v.191
6 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information
.
>>> 
========== RESTART: C:\Users\Asus\Documents\Modul 6_D_141\nomor8.py ===
=======
List 1 :
1
5
10
11
14
List 2 :
0
7
9
Merged List :
0
1
5
7
9
10
11
14
>>> 
```