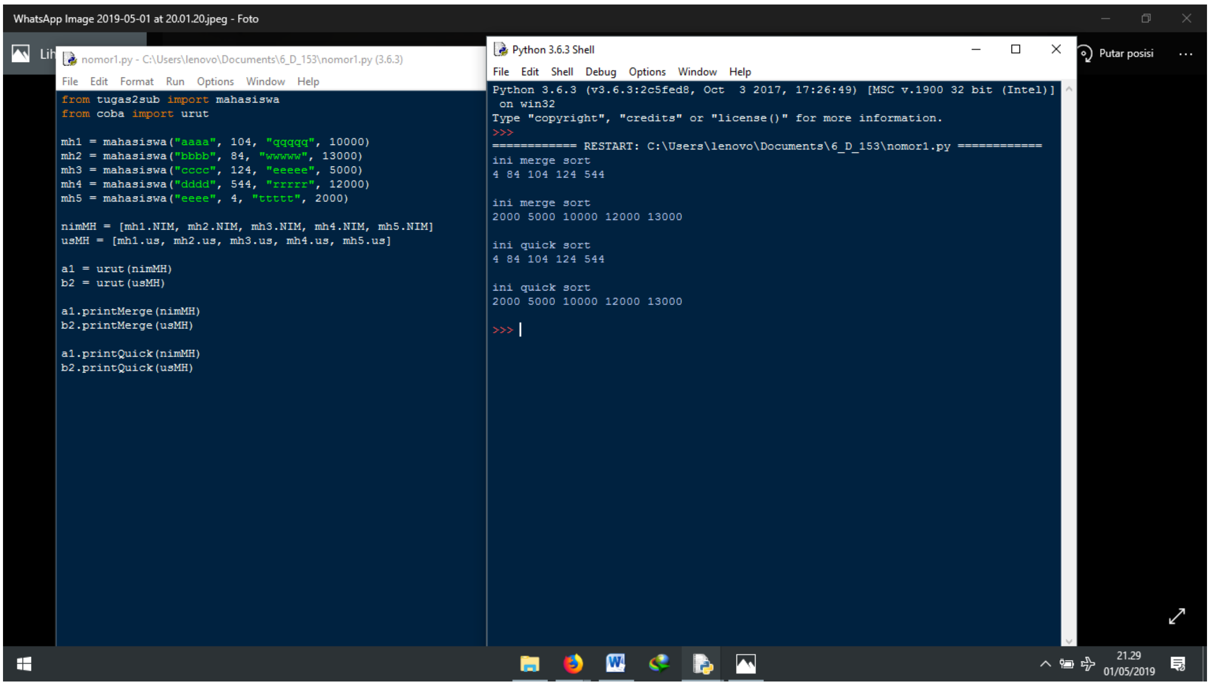
Ivanovitcz A.A.R
L200170153
Kelas D
Modul 6

Nomor 1


WhatsApp Image 2019-05-01 at 20.01.20.jpeg - Foto
nomor1.py - C:\Users\lenovo\Documents\6_D_153\nomor1.py (3.6.3)
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Python 3.6.3 Shell
File Edit Shell Debug Options Window Help
Putar posisi
21.29
01/05/2019

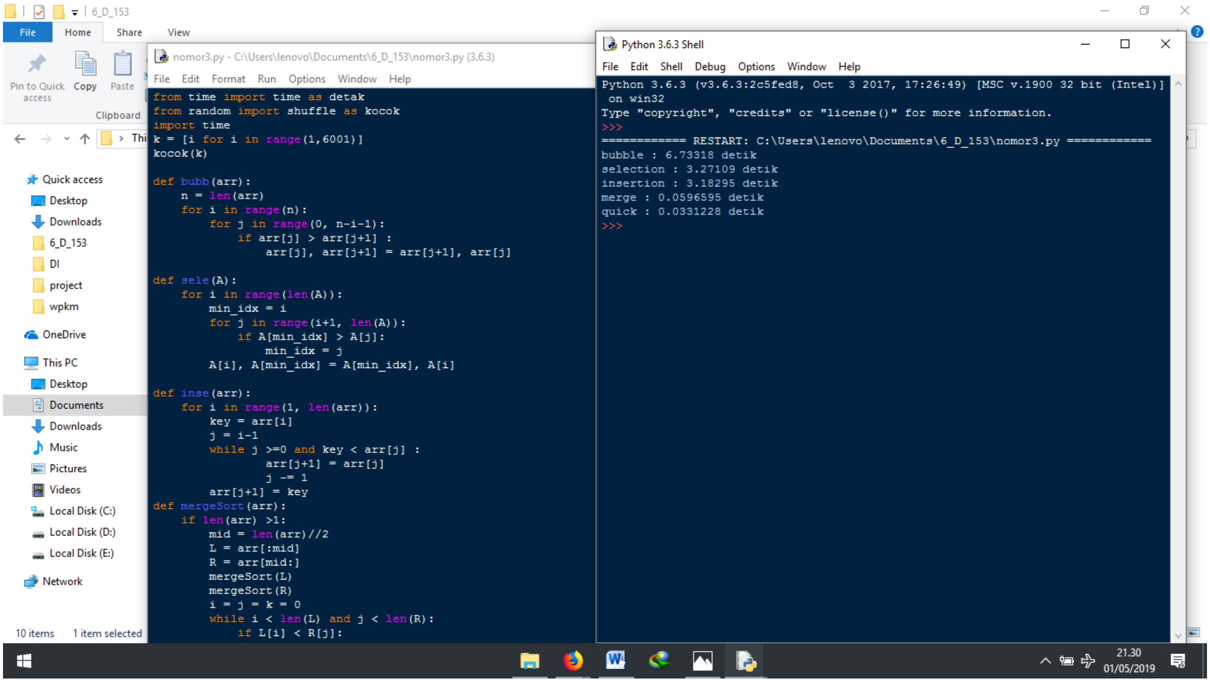
```python
from tugas2sub import mahasiswa
from coba import urut

mh1 = mahasiswa("aaaa", 104, "qqqqq", 10000)
mh2 = mahasiswa("bbbb", 84, "wwwww", 13000)
mh3 = mahasiswa("cccc", 124, "eeeee", 5000)
mh4 = mahasiswa("dddd", 544, "rrrrr", 12000)
mh5 = mahasiswa("eeee", 4, "ttttt", 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 3.6.3 (v3.6.3:2c5fed8, Oct  3 2017, 17:26:49) [MSC v.1900 32 bit (Intel)]
 on win32
Type "copyright", "credits" or "license()" for more information.
>>> 
============ RESTART: C:\Users\lenovo\Documents\6_D_153\nomor1.py ============
ini merge sort
4 84 104 124 544

ini merge sort
2000 5000 10000 12000 13000

ini quick sort
4 84 104 124 544

ini quick sort
2000 5000 10000 12000 13000

>>> 
```

Nomor 2

-

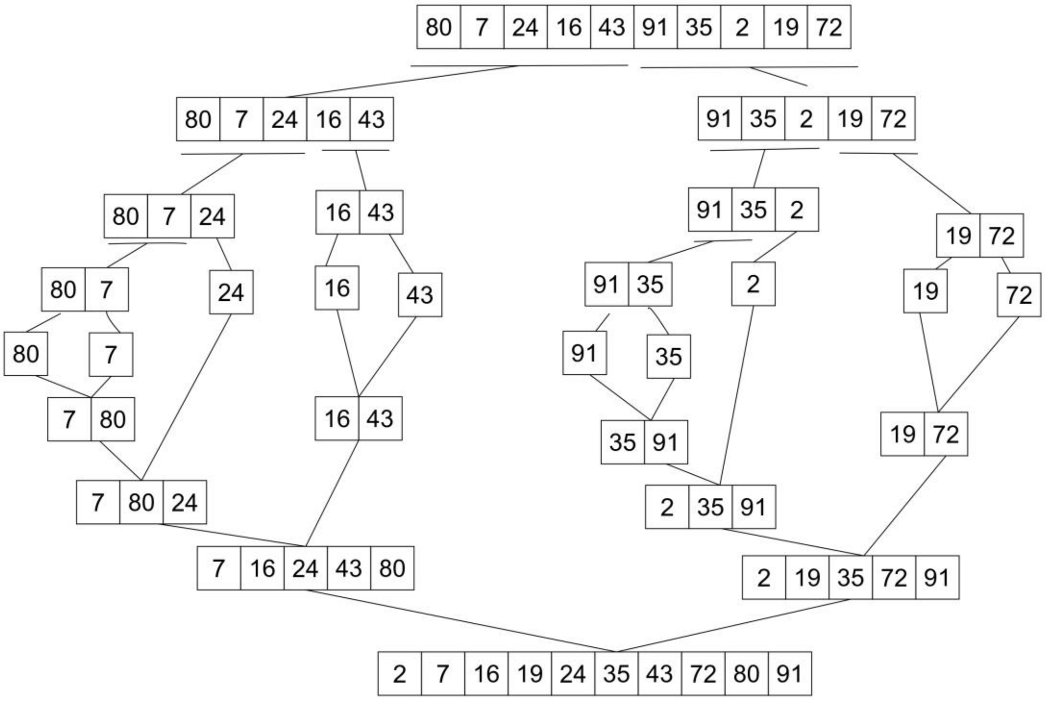
Nomor 3



```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]:
```

```
Python 3.6.3 (v3.6.3:2c5fed8, Oct  3 2017, 17:26:49) [MSC v.1900 32 bit (Intel)]
 on win32
Type "copyright", "credits" or "license()" for more information.
>>> 
============ RESTART: C:\Users\lenovo\Documents\6_D_153\nomor3.py ============
bubble : 6.73318 detik
selection : 3.27109 detik
insertion : 3.18295 detik
merge : 0.0596595 detik
quick : 0.0331228 detik
>>> 
```

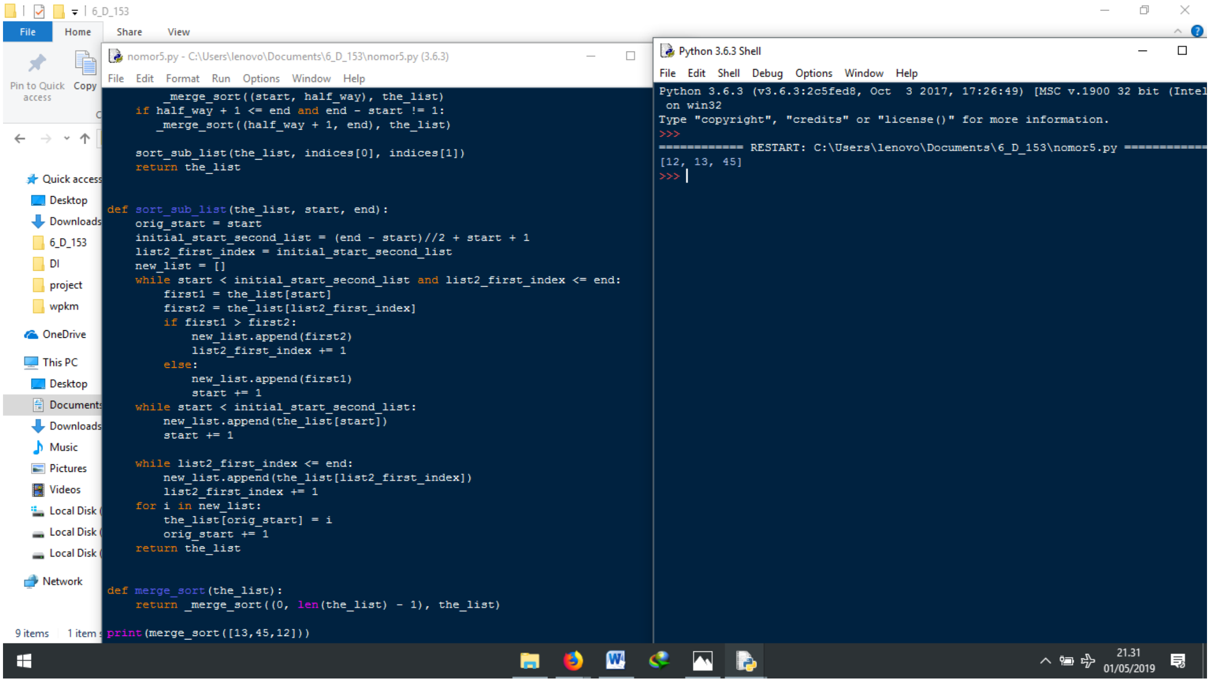
Nomor 4 A (Tracing Algorithm Merge Sort)



Nomor 4 B (Tracing Algorithm Quick Sort)

-

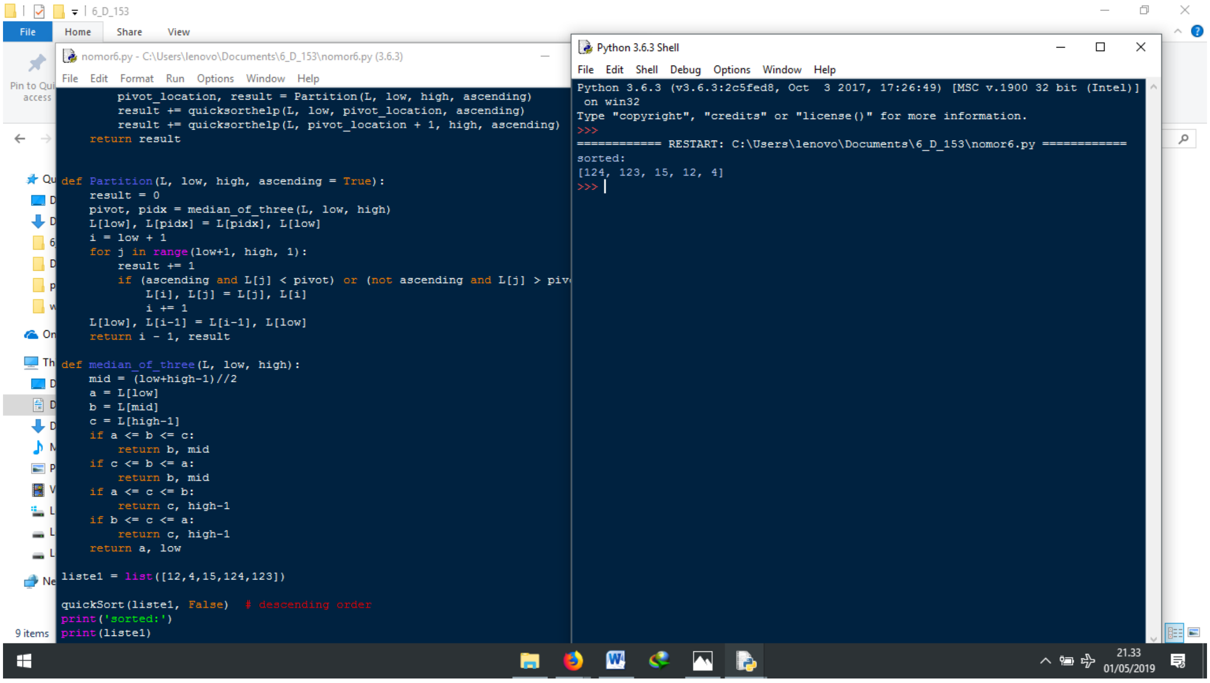
Nomor 5 (Merge Sort tanpa Slicing, menggunakan recursive)



```
        _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


def merge_sort(the_list):
    return _merge_sort((0, len(the_list) - 1), the_list)

print(merge_sort([13,45,12]))
```

```
Python 3.6.3 (v3.6.3:2c5fed8, Oct  3 2017, 17:26:49) [MSC v.1900 32 bit (Intel
 on win32
Type "copyright", "credits" or "license()" for more information.
>>> 
============ RESTART: C:\Users\lenovo\Documents\6_D_153\nomor5.py ============
[12, 13, 45]
>>> 
```

Nomor 6 (Quick Sort dengan Median of Three)


6_D_153
File
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View
nomor6.py - C:\Users\lenovo\Documents\6_D_153\nomor6.py (3.6.3)
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Python 3.6.3 Shell
File Edit Shell Debug Options Window Help
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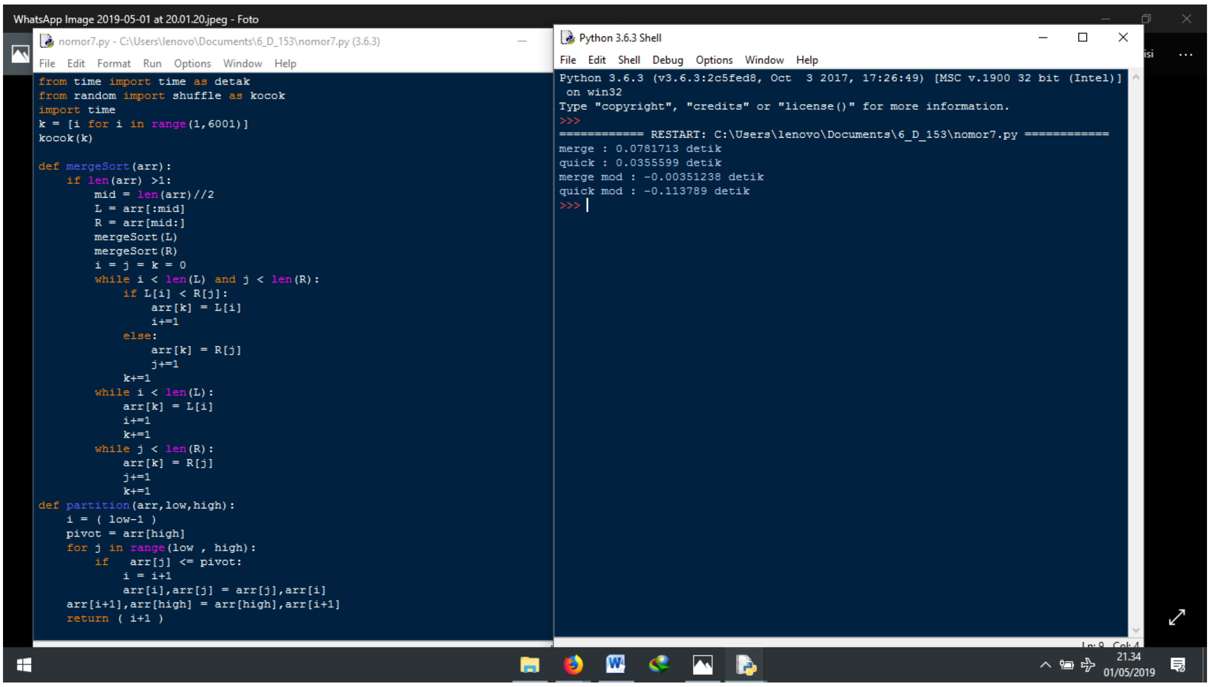
```
        pivot_location, result = Partition(L, low, high, ascending)
        result += quicksorthelp(L, low, pivot_location, ascending)
        result += quicksorthelp(L, pivot_location + 1, high, ascending)
    return result


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] > piv
            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

liste1 = list([12,4,15,124,123])

quickSort(liste1, False)  # descending order
print('sorted:')
print(liste1)
```

```
Python 3.6.3 (v3.6.3:2c5fed8, Oct  3 2017, 17:26:49) [MSC v.1900 32 bit (Intel)]
 on win32
Type "copyright", "credits" or "license()" for more information.
>>> 
============ RESTART: C:\Users\lenovo\Documents\6_D_153\nomor6.py ============
sorted:
[124, 123, 15, 12, 4]
>>> 
```

Nomor 7


WhatsApp Image 2019-05-01 at 20.01.20.jpeg - Foto
nomor7.py - C:\Users\lenovo\Documents\6_D_153\nomor7.py (3.6.3)
File Edit Format Run Options Window Help
Python 3.6.3 Shell
File Edit Shell Debug Options Window Help
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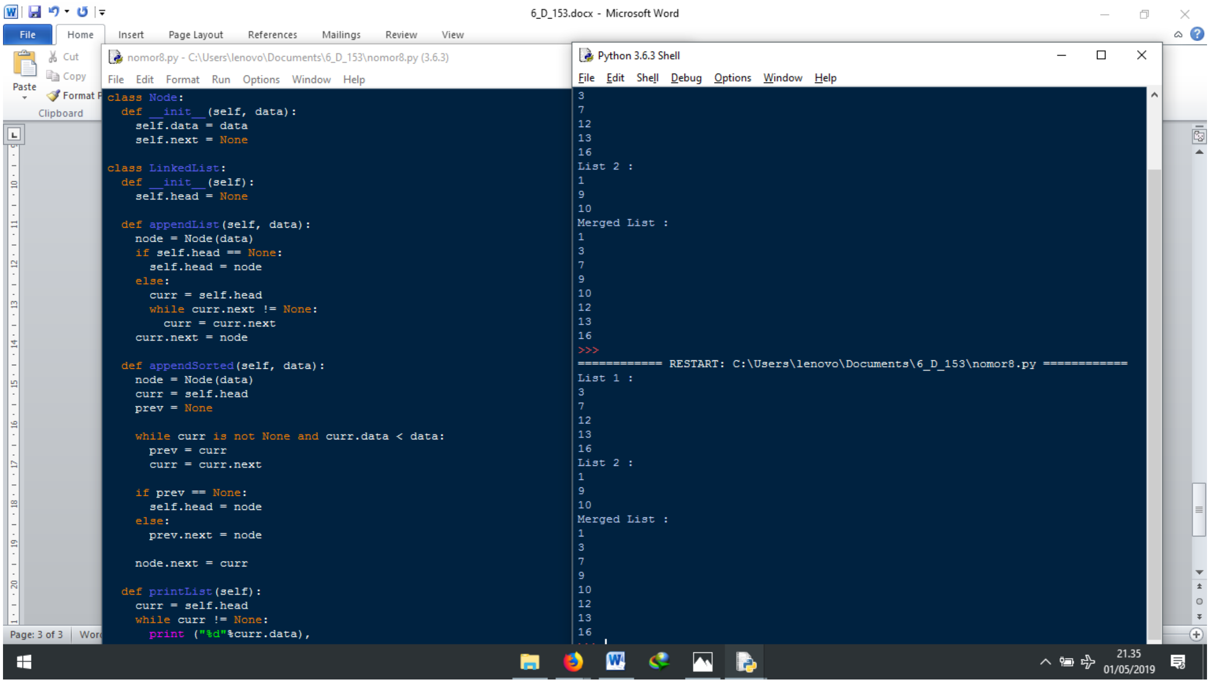
```
from time import time as detak
from random import shuffle as kocok
import time
k = [i for i in range(1,6001)]
kocok(k)

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 3.6.3 (v3.6.3:2c5fed8, Oct  3 2017, 17:26:49) [MSC v.1900 32 bit (Intel)]
 on win32
Type "copyright", "credits" or "license()" for more information.
>>> 
============ RESTART: C:\Users\lenovo\Documents\6_D_153\nomor7.py ============
merge : 0.0781713 detik
quick : 0.0355599 detik
merge mod : -0.00351238 detik
quick mod : -0.113789 detik
>>> 
```

Nomor 8 (Merge Sort dengan Linked List)



```
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),
```

```
3
7
12
13
16
List 2 :
1
9
10
Merged List :
1
3
7
9
10
12
13
16
>>>
============ RESTART: C:\Users\lenovo\Documents\6_D_153\nomor8.py ============
List 1 :
3
7
12
13
16
List 2 :
1
9
10
Merged List :
1
3
7
9
10
12
13
16
```