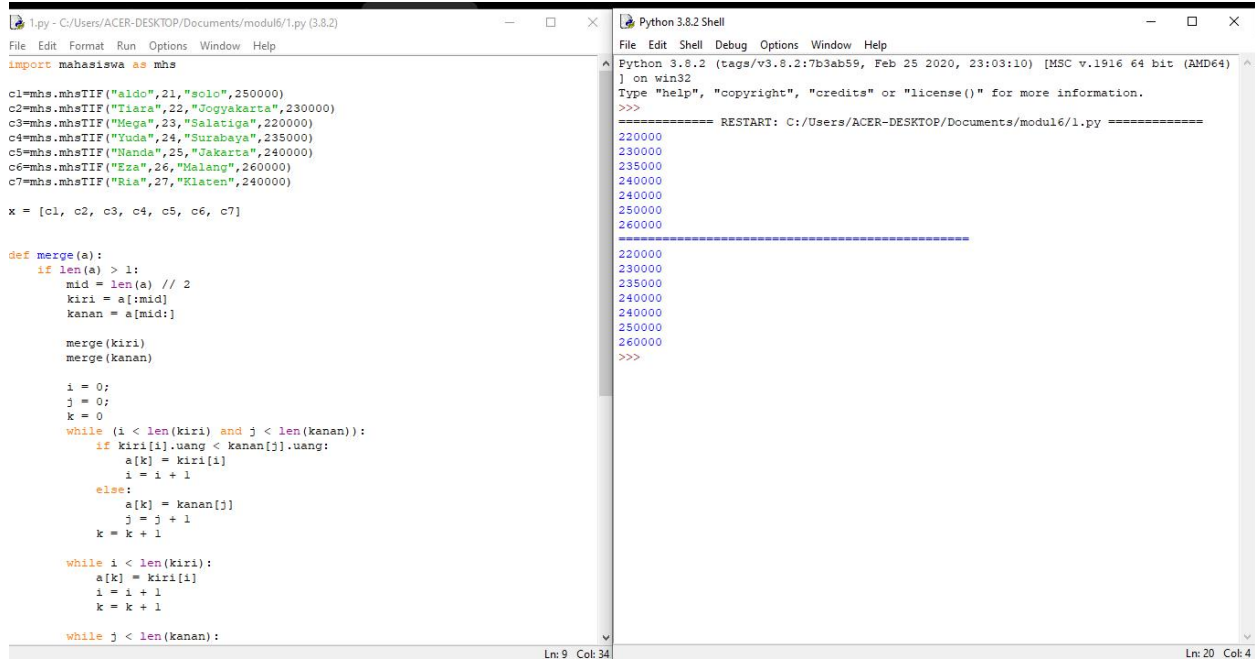


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1.



The screenshot shows a Python 3.8.2 IDE with two windows. The left window, titled '1.py - C:\Users\ACER-DESKTOP\Documents\modul6\1.py (3.8.2)', contains a merge sort implementation. The right window, titled 'Python 3.8.2 Shell', shows the execution output. The code in the left window defines a list 'x' with 7 elements and a 'merge' function that recursively sorts the list. The output in the right window shows the list being sorted in place, with the final sorted list being [220000, 230000, 235000, 240000, 240000, 250000, 260000].

```
1.py - C:\Users\ACER-DESKTOP\Documents\modul6\1.py (3.8.2)
File Edit Format Run Options Window Help
import mahasiswa as mhs

c1=mhs.mhsTIF("aldo",21,"solo",250000)
c2=mhs.mhsTIF("Tiara",22,"Jogysakarta",230000)
c3=mhs.mhsTIF("Mega",23,"Salatiga",220000)
c4=mhs.mhsTIF("Yuda",24,"Surabaya",235000)
c5=mhs.mhsTIF("Nanda",25,"Jakarta",240000)
c6=mhs.mhsTIF("Eza",26,"Malang",260000)
c7=mhs.mhsTIF("Ria",27,"Klaten",240000)

x = [c1, c2, c3, c4, c5, c6, c7]

def merge(a):
    if len(a) > 1:
        mid = len(a) // 2
        kiri = a[:mid]
        kanan = a[mid:]

        merge(kiri)
        merge(kanan)

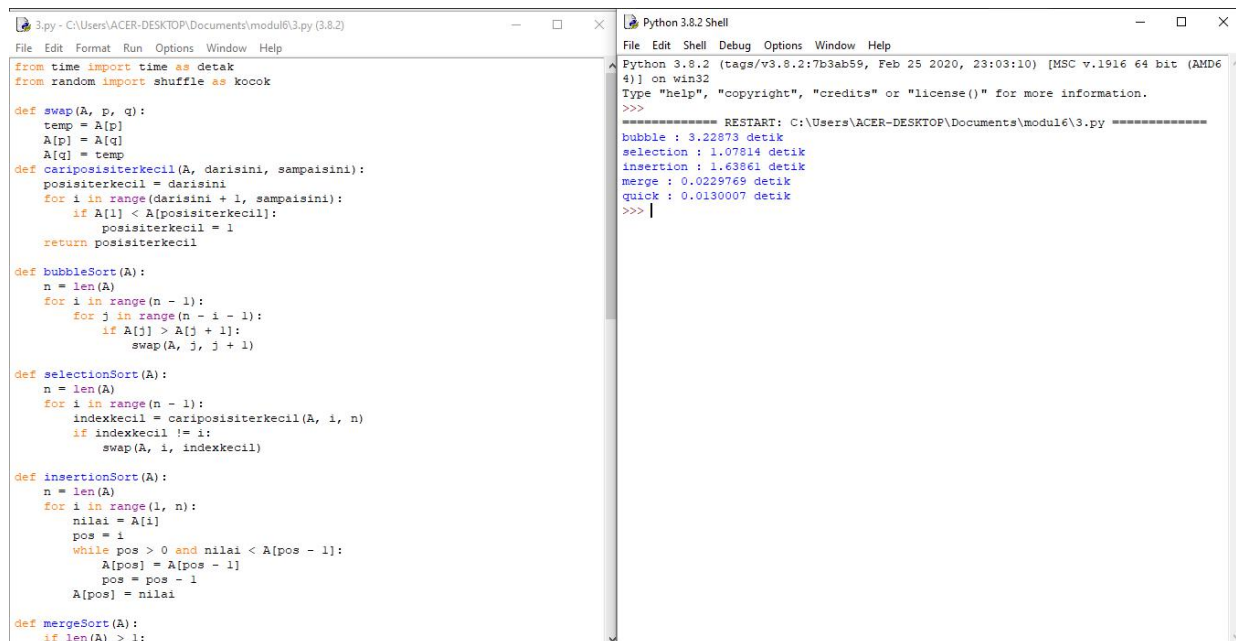
        i = 0;
        j = 0;
        k = 0
        while (i < len(kiri) and j < len(kanan)):
            if kiri[i].uang < kanan[j].uang:
                a[k] = kiri[i]
                i = i + 1
            else:
                a[k] = kanan[j]
                j = j + 1
            k = k + 1

        while i < len(kiri):
            a[k] = kiri[i]
            i = i + 1
            k = k + 1

        while j < len(kanan):
```

```
Python 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Users\ACER-DESKTOP\Documents\modul6\1.py =====
220000
230000
235000
240000
240000
250000
260000
=====
220000
230000
235000
240000
240000
250000
260000
>>>
```

3.



The screenshot shows a Python 3.8.2 IDE with two windows. The left window, titled '3.py - C:\Users\ACER-DESKTOP\Documents\modul6\3.py (3.8.2)', contains several sorting algorithms: swap, cariposisiterkecil, bubbleSort, selectionSort, insertionSort, and mergeSort. The right window, titled 'Python 3.8.2 Shell', shows the execution output for the bubbleSort algorithm, displaying the time taken for each step: bubble (3.22873 detik), selection (1.07814 detik), insertion (1.63861 detik), merge (0.0229769 detik), and quick (0.0130007 detik).

```
3.py - C:\Users\ACER-DESKTOP\Documents\modul6\3.py (3.8.2)
File Edit Format Run Options Window Help
from time import time as detik
from random import shuffle as kocok

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

def cariposisiterkecil(A, darisini, sampaisini):
    posisiterkecil = darisini
    for i in range(darisini + 1, sampaisini):
        if A[i] < A[posisiterkecil]:
            posisiterkecil = i
    return posisiterkecil

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)

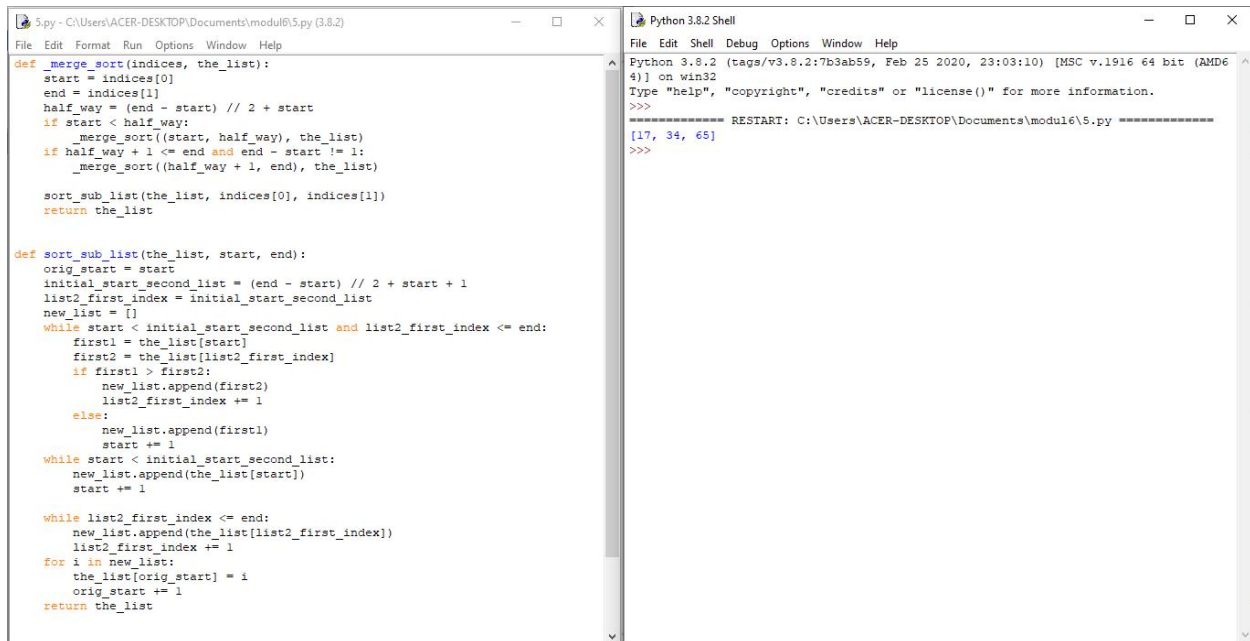
def selectionSort(A):
    n = len(A)
    for i in range(n - 1):
        indexkecil = cariposisiterkecil(A, i, n)
        if indexkecil != i:
            swap(A, i, indexkecil)

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

def mergeSort(A):
    if len(A) > 1:
```

```
Python 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Users\ACER-DESKTOP\Documents\modul6\3.py =====
bubble : 3.22873 detik
selection : 1.07814 detik
insertion : 1.63861 detik
merge : 0.0229769 detik
quick : 0.0130007 detik
>>>
```

5.



The screenshot shows a Python IDE with two windows. The left window, titled '5.py - C:\Users\ACER-DESKTOP\Documents\modul6\5.py (3.8.2)', contains the following code:

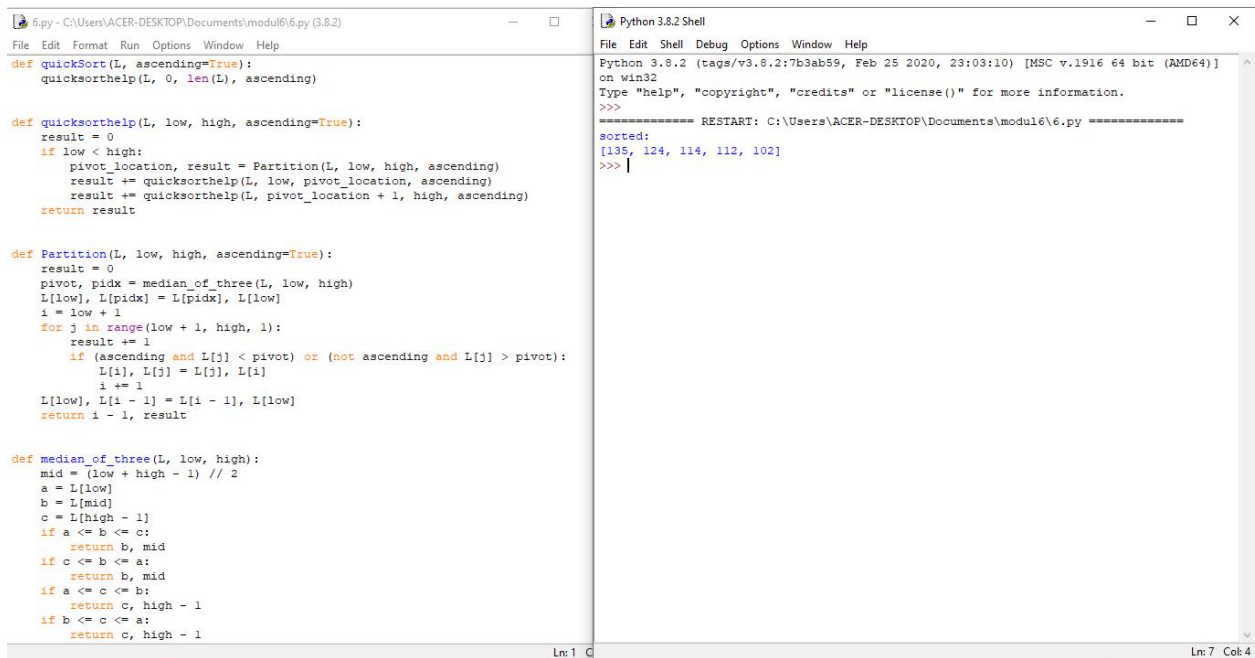
```
def _merge_sort(indices, the_list):
    start = indices[0]
    end = indices[1]
    half_way = (end - start) // 2 + start
    if start < half_way:
        _merge_sort((start, half_way), the_list)
    if half_way + 1 <= end and end - start != 1:
        _merge_sort((half_way + 1, end), the_list)

    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
```

The right window, titled 'Python 3.8.2 Shell', shows the execution of the code. It displays the prompt 'Type "help", "copyright", "credits" or "license()" for more information.' followed by the command 'RESTART: C:\Users\ACER-DESKTOP\Documents\modul6\5.py' and the output '[17, 34, 65]'.

6.



The screenshot shows a Python IDE with two windows. The left window, titled '6.py - C:\Users\ACER-DESKTOP\Documents\modul6\6.py (3.8.2)', contains the following code:

```
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
```

The right window, titled 'Python 3.8.2 Shell', shows the execution of the code. It displays the prompt 'Type "help", "copyright", "credits" or "license()" for more information.' followed by the command 'RESTART: C:\Users\ACER-DESKTOP\Documents\modul6\6.py' and the output 'sorted: [135, 124, 114, 112, 102]'.

7.

The screenshot shows a Python IDE with two windows. The left window displays a Python script for a sorting algorithm, and the right window shows the output of the script.

```

7.py - C:/Users/ACER-DESKTOP/Documents/module6/7.py (3.8.2)
File Edit Format Run Options Window Help

    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

mer = k[:]
qui = k[:]
mer2 = k[:]
qui2 = k[:]

aw = detak();
mergeSort(mer);
ak = detak();
print('merge : %g detik' % (ak - aw));
aw = detak();
quickSort(qui, 0, len(qui) - 1);
ak = detak();
print('quick : %g detik' % (ak - aw));
aw = detak();
merge_sort(mer2);
print('merge mod : %g detik' % (ak - aw));
aw = detak();
quickSortMOD(qui2, False);
print('quick mod : %g detik' % (ak - aw));

```

```

Python 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/Users/ACER-DESKTOP/Documents/module6/7.py =====
merge : 0.0498631 detik
quick : 0.0119672 detik
merge mod : -0.0019958 detik
quick mod : -0.0308867 detik
>>>

```

8.

The screenshot shows a Python IDE with two windows. The left window displays a Python script for a linked list implementation, and the right window shows the output of the script.

```

8.py - C:/Users/ACER-DESKTOP/Documents/module6/8.py (3.8.2)
File Edit Format Run Options Window Help

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 3.8.2 Shell
File Edit Shell Debug Options Window Help
Python 3.8.2 (tags/v3.8.2:7b3ab59, Feb 25 2020, 23:03:10) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:/Users/ACER-DESKTOP/Documents/module6/8.py =====
List 1 :
3
7
12
13
16
List 2 :
1
9
10
Merged List :
1
3
7
9
10
12
13
16
>>>

```