LAPORAN

PRAKTIKUM ALGORITMA DAN STRUKTUR DATA

(MODUL 3)

“ COLLECTIONS, ARRAYS, AND LINKED STRUCTURES ”

Disusun oleh :

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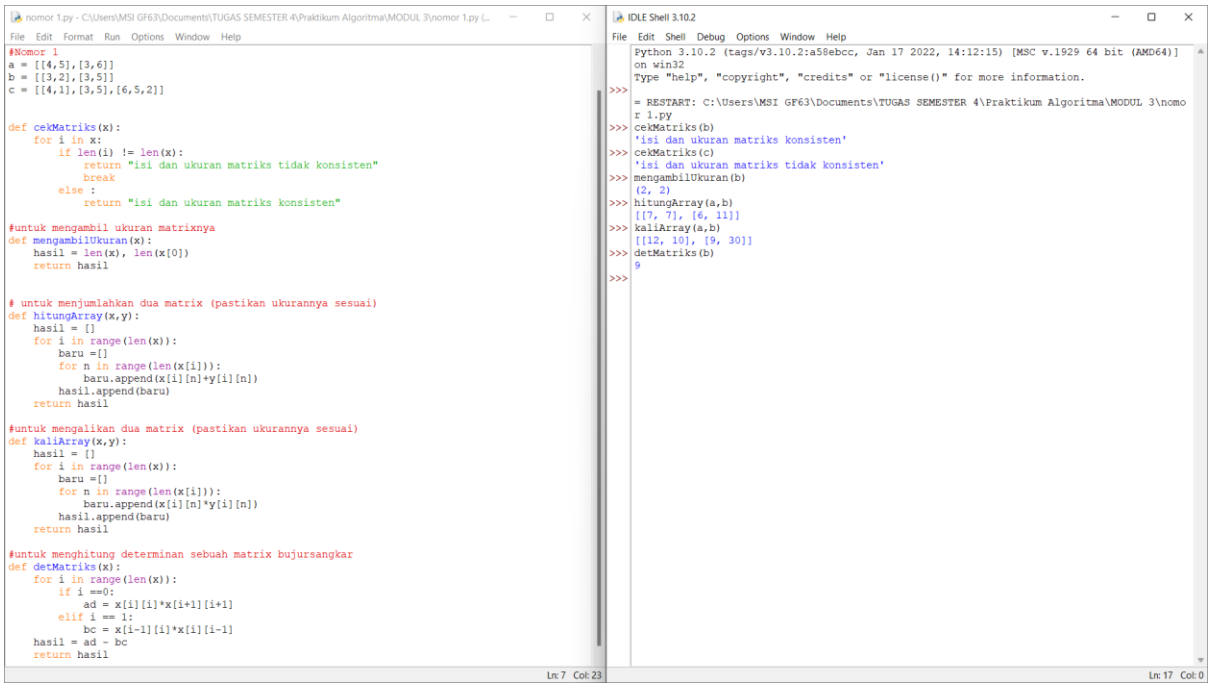
TAHUN 2021/2022

SOAL

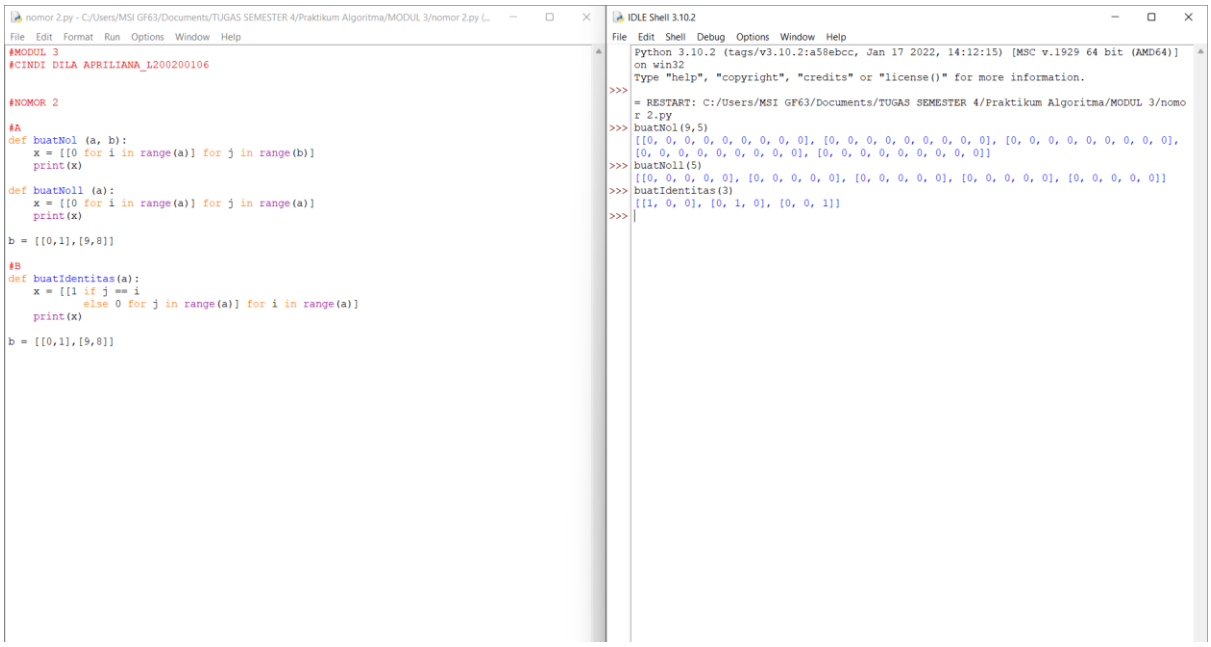
1. Terkait array dua dimensi, kita akan membuat tipe data sebuah matrix berisi angka-angka. Untuk itu buatlah fungsi-fungsi.



```
#Nomor 1
a = [[4,5],[3,6]]
b = [[3,2],[3,5]]
c = [[4,1],[3,5],[6,5,2]]


def cekMatriks(x):
    for i in x:
        if len(i) != len(x):
            return "isi dan ukuran matriks tidak konsisten"
            break
        else :
            return "isi dan ukuran matriks konsisten"

#untuk mengambil ukuran matrixnya
def mengambilUkuran(x):
    hasil = len(x), len(x[0])
    return hasil


# untuk menjumlahkan dua matrix (pastikan ukurannya sesuai)
def hitungArray(x,y):
    hasil = []
    for i in range(len(x)):
        baru =[]
        for n in range(len(x[i])):
            baru.append(x[i][n]+y[i][n])
        hasil.append(baru)
    return hasil

#untuk mengalikan dua matrix (pastikan ukurannya sesuai)
def kaliArray(x,y):
    hasil = []
    for i in range(len(x)):
        baru =[]
        for n in range(len(x[i])):
            baru.append(x[i][n]*y[i][n])
        hasil.append(baru)
    return hasil

#untuk menghitung determinan sebuah matrix bujursangkar
def detMatriks(x):
    for i in range(len(x)):
        if i ==0:
            ad = x[i][i]*x[i+1][i+1]
        elif i == 1:
            bc = x[i-1][i]*x[i][i-1]
    hasil = ad - bc
    return hasil
```

```
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 17 2022, 14:12:15) [MSC v.1929 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:\Users\MSI GF63\Documents\TUGAS SEMESTER 4\Praktikum Algoritma\MODUL 3\nomo
r 1.py
>>> cekMatriks(b)
'isi dan ukuran matriks konsisten'
>>> cekMatriks(c)
'isi dan ukuran matriks tidak konsisten'
>>> mengambilUkuran(b)
(2, 2)
>>> hitungArray(a,b)
[[7, 7], [6, 11]]
>>> kaliArray(a,b)
[[12, 10], [9, 30]]
>>> detMatriks(b)
9
>>>
```

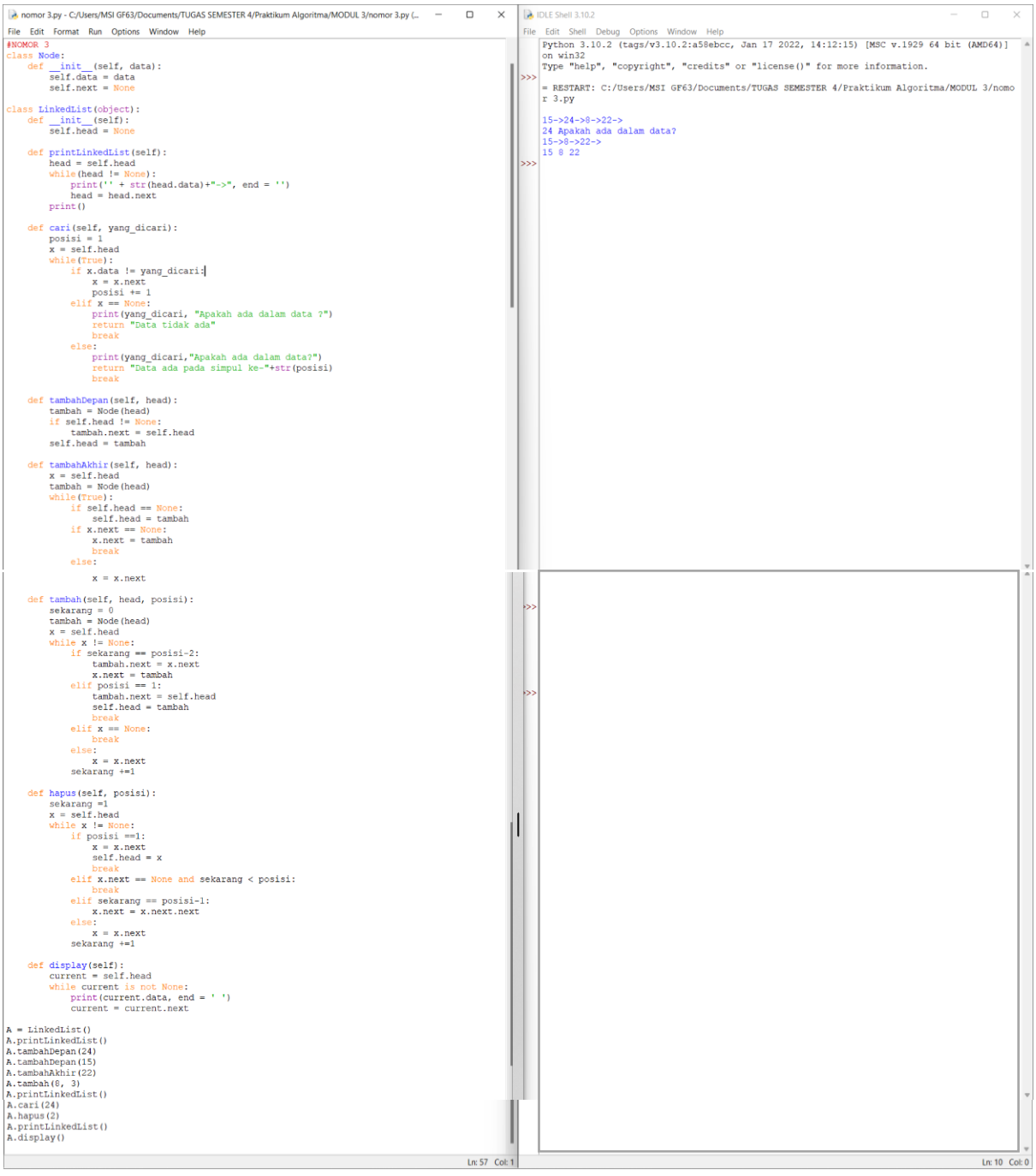
2. Terkait matrix dan list comprehension, buatlah (dengan memanfaatkan list comprehension). Fungsi-fungsi.



```
#MODUL 3
#CINDI DILA APRILIANA_L200200106


#NOMOR 2

#A
def buatNol (a, b):
    x = [[0 for i in range(a)] for j in range(b)]
    print(x)

def buatNoll (a):
    x = [[0 for i in range(a)] for j in range(a)]
    print(x)

b = [[0,1],[9,8]]

#B
def buatIdentitas(a):
    x = [[1 if j == i
          else 0 for j in range(a)] for i in range(a)]
    print(x)

b = [[0,1],[9,8]]
```

```
Python 3.10.2 (tags/v3.10.2:a58ebcc, Jan 17 2022, 14:12:15) [MSC v.1929 64 bit (AMD64)]
on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/MSI GF63/Documents/TUGAS SEMESTER 4/Praktikum Algoritma/MODUL 3/nomo
r 2.py
>>> buatNol(9,5)
[[0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0],
[0, 0, 0, 0, 0, 0, 0, 0, 0], [0, 0, 0, 0, 0, 0, 0, 0, 0]]
>>> buatNoll(5)
[[0, 0, 0, 0, 0], [0, 0, 0, 0, 0], [0, 0, 0, 0, 0], [0, 0, 0, 0, 0], [0, 0, 0, 0, 0]]
>>> buatIdentitas(3)
[[1, 0, 0], [0, 1, 0], [0, 0, 1]]
>>>
```

3. Terkait linked list, buatlah fungsi untuk



nomor 3.py - C:/Users/MSI GF63/Documents/TUGAS SEMESTER 4/Praktikum Algoritma/MODUL 3/nomor 3.py (...

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```
#NOMOR 3
class Node:
    def __init__(self, data):
        self.data = data
        self.next = None

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

    def printLinkedList(self):
        head = self.head
        while(head != None):
            print('' + str(head.data)+"->", end = '')
            head = head.next
        print()

    def cari(self, yang_dicari):
        posisi = 1
        x = self.head
        while(True):
            if x.data != yang_dicari:
                x = x.next
                posisi += 1
            elif x == None:
                print(yang_dicari, "Apakah ada dalam data ?")
                return "Data tidak ada"
                break
            else:
                print(yang_dicari,"Apakah ada dalam data?")
                return "Data ada pada simpul ke-"+str(posisi)
                break

    def tambahDepan(self, head):
        tambah = Node(head)
        if self.head != None:
            tambah.next = self.head
        self.head = tambah

    def tambahAkhir(self, head):
        x = self.head
        tambah = Node(head)
        while(True):
            if self.head == None:
                self.head = tambah
            if x.next == None:
                x.next = tambah
                break
            else:
                x = x.next

    def tambah(self, head, posisi):
        sekarang = 0
        tambah = Node(head)
        x = self.head
        while x != None:
            if sekarang == posisi-2:
                tambah.next = x.next
                x.next = tambah
            elif posisi == 1:
                tambah.next = self.head
                self.head = tambah
                break
            elif x == None:
                break
            else:
                x = x.next
            sekarang +=1

    def hapus(self, posisi):
        sekarang =1
        x = self.head
        while x != None:
            if posisi ==1:
                x = x.next
                self.head = x
                break
            elif x.next == None and sekarang < posisi:
                break
            elif sekarang == posisi-1:
                x.next = x.next.next
            else:
                x = x.next
            sekarang +=1

    def display(self):
        current = self.head
        while current is not None:
            print(current.data, end = ' ')
            current = current.next

A = LinkedList()
A.printLinkedList()
A.tambahDepan(24)
A.tambahDepan(15)
A.tambahAkhir(22)
A.tambah(8, 3)
A.printLinkedList()
A.cari(24)
A.hapus(2)
A.printLinkedList()
A.display()
```

Ln: 57 Col: 1

IDLE Shell 3.10.2

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```
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>>>
= RESTART: C:/Users/MSI GF63/Documents/TUGAS SEMESTER 4/Praktikum Algoritma/MODUL 3/nomo
r 3.py

15->24->8->22->
24 Apakah ada dalam data?
15->8->22->
15 8 22
>>>
```
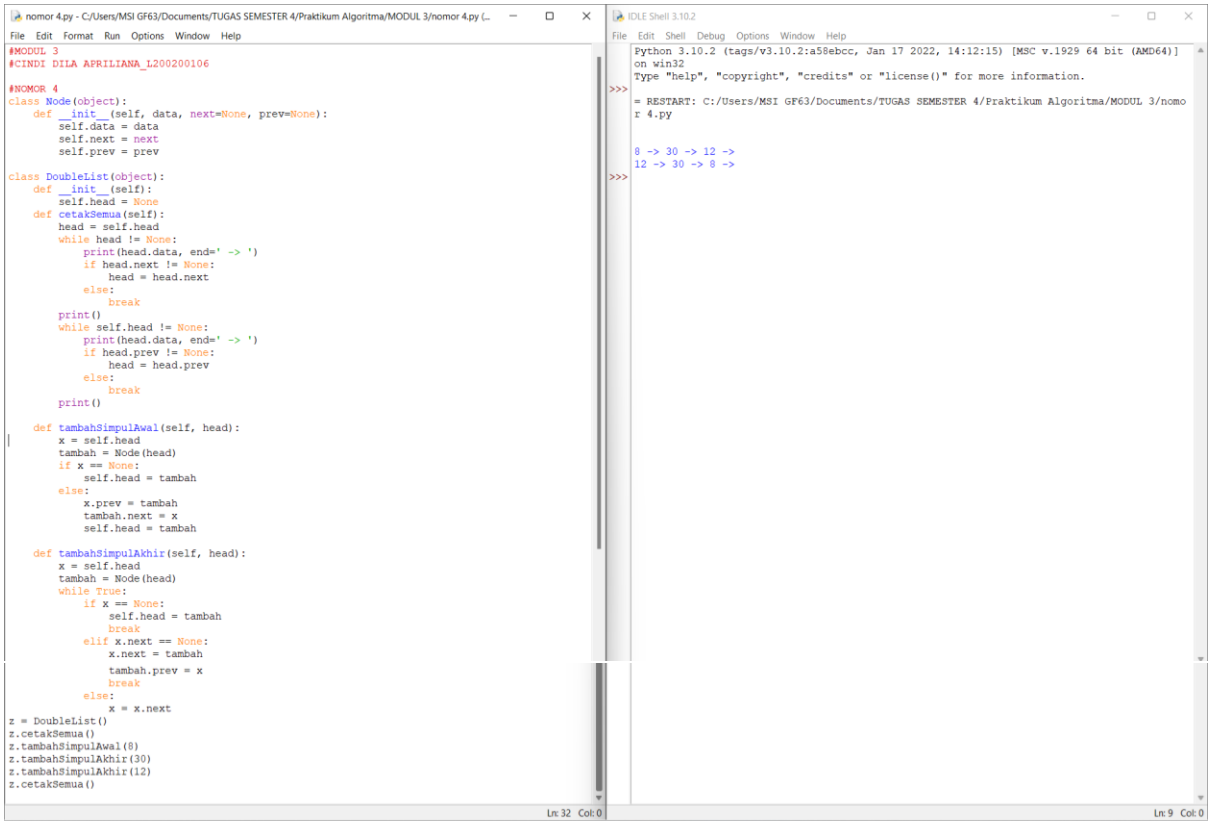

Ln: 10 Col: 0

4. Terkait doubly linked list, buatlah fungsi untuk



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```
#MODUL 3
#CINDI DILA APRILIANA_L200200106

#NOMOR 4
class Node(object):
    def __init__(self, data, next=None, prev=None):
        self.data = data
        self.next = next
        self.prev = prev

class DoubleList(object):
    def __init__(self):
        self.head = None
    def cetakSemua(self):
        head = self.head
        while head != None:
            print(head.data, end=' -> ')
            if head.next != None:
                head = head.next
            else:
                break
        print()
        while self.head != None:
            print(head.data, end=' -> ')
            if head.prev != None:
                head = head.prev
            else:
                break
        print()

    def tambahSimpulAwal(self, head):
        x = self.head
        tambah = Node(head)
        if x == None:
            self.head = tambah
        else:
            x.prev = tambah
            tambah.next = x
            self.head = tambah

    def tambahSimpulAkhir(self, head):
        x = self.head
        tambah = Node(head)
        while True:
            if x == None:
                self.head = tambah
                break
            elif x.next == None:
                x.next = tambah
                tambah.prev = x
                break
            else:
                x = x.next
z = DoubleList()
z.cetakSemua()
z.tambahSimpulAwal(8)
z.tambahSimpulAkhir(30)
z.tambahSimpulAkhir(12)
z.cetakSemua()
```

Ln: 32 Col: 0

IDLE Shell 3.10.2

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```
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>>>
= RESTART: C:/Users/MSI GF63/Documents/TUGAS SEMESTER 4/Praktikum Algoritma/MODUL 3/nomo
r 4.py


8 -> 30 -> 12 ->
12 -> 30 -> 8 ->
>>>
```

Ln: 9 Col: 0